**Unit 1 The Hydrogen Economy**

***Task 2: Skim through Text I and 1) match the subheadings on the left column with the types of information on the right, 2)identify the sentence in the opening section which indicates the types of information and the organization of the text, 3) explain why the author quotes Present Bush’s State of the Union Address.***

**Note:** Before reading a lengthy text carefully, you can read its title, headings, subheadings, annotations, visuals, the introduction and conclusion to get an overall idea of the text structure and the organization of information.

**Subheadings**

**The types of information**

1) Opening Section

A) The prospect of the hydrogen economy

2) The Gas Battery

B) The application of fuel cells in consumer electronics

3) Electric Car Resurgence

C) The development of various types of fuel cells

4) Into the Mainstream

D) The significance of fuel cell technology

5) Out of the Laboratory, Someday

E) The origin of fuel cell technology

6) Fuel-Cell Phone

F) The status of fuel cell cars 1) D; 2) E; 3) C; 4) F; 5) A; 6) B 2) Identify the sentence in the opening section which signals the target information and the organization of the information in the article. The last sentence of the opening section. (…I …have generally become increasingly interested in the history, status and future of the technology.) 3) Explain why Present Bush‘s State of the Union Address is quoted. Quoting the remarks of an authoritative figure is a writing strategy to introduce the topic of an article. The quotation should be relevant to the topic of the writing, in this case, the fuel cell technology. By quoting the former U.S. President, the author introduces the topic and indicates the importance of the technology.

***Task 3: Identify the time expressions in "The Gas Battery" section and complete the following outline to trace the historical development of battery technology and its applications.***

**Note:** Time expressions signal the flow of events or sequence of experiences. They serve as "signposts" in the text to help the reader locate the relevant information. The simplest time expression is the specific year, month, or date. But very often you need to infer the time from a phrase, a clause, or a word that indicates the sequence of events. For example,

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The simple voltaic pile preceded the fuel cell by 39 years.

Within a couple of decades of the invention of the dry-cell battery…

After receiving a degree in geological engineering from Queens University…

1) In 1800 (inferred from the sentence "The simple voltaic pile preceded the fuel cell by 39 years."), Alessandro Volta invented voltaic pile, which was later developed into today‘s dry cell battery.

2) In the 1820s (inferred from ―Within a couple of decades of the invention of the dry-cell battery‖), Michael Faraday demonstrated the principle of the electric motor and that of electromagnetic induction, which led to the electric generator.

3) By the early 1830s working electric motors were being made.

4) In 1839 Sir William Robert Groves devised a ―gas battery‖, which is an early version of fuel cell, but better than the earlier voltaic pile.

(This statement is inferred from the sentence in Para. 4: ―Unlike Alessandro Volta‘s now-familiar dry cell—which contained all its energy-producing ingredients and which produced electricity only as long as it could sustain the chemical reaction—Groves‘s gas battery produced electricity as long as it was fueled by an external source.‖)

5) Well before the end of the decade, electric driven road vehicles and paddle boats were the subjects of experiments.

6) By 1859, an early version of the lead-acid battery used in today‘s automobiles had been developed.

7) In 1873, storage batteries were powering electric motors.

8) By 1882, the speed and range of these electric ―cars‖ increased to 10 miles per hour and 25 miles respectively.

9) At the end of the 19th century, an electric vehicle held the world speed record of 61 miles per hour.

10) In 1900, 1,575 electric vehicles were being manufactured in the United States.

11) In 1906-1909, electric vehicles began to decline.

12) By 1912 electric vehicles had declined.

13) In 1921, the last electric car was produced, then electric cars went into hibernation.

***Task 4: Identify the time expressions in the "Electric Car Resurgence" section and note down Geoffrey Ballard’s experiences and efforts to develop new power systems. Organize the notes into a paragraph in chronological order.***

1) After receiving a degree in geological engineering from Queens University, Geoffrey Ballard began his career in oil exploration, where he became increasingly frustrated when his opinions were ignored in favor of those from scientists with higher degrees.

2) After going back to school and earning a doctorate in geophysics, Ballard

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began working for the U.S. Army as a civilian.

3) During the 1973 energy crisis, Ballard was made director of research for a new government office of energy conservation. But Ballard became convinced that conservation was not the answer to the energy problems. The answer was to develop energy-conversion devices and techniques that were more efficient and cleaner than the traditional burning of fossil fuels. Ballard left his job in energy conservation and struck out on his own to develop smaller, lighter and more efficient batteries to power everything. But his company always had to look for funding.

4) When Ballard was convinced that conservation was no answer to the energy problems, he believed that the real need was to develop energy-conservation devices and techniques that were more efficient and cleaner than the traditional burning of fossil fuels and also saw a need for lightweight and compact portable power sources.

5) When the company relocated to Vancouver, British Columbia, it tried to get Canadian government funding opportunities.

6) With the help of venture capital, Ballard went on to produce stationary fuel cells and intended to work on a fuel cell-powered vehicle demonstration program.

7) After Geoffrey Ballard secured federal and provincial support for the bus plan, the company decided to make a prototype bus powered by fuel cells.

8) In 1993, the prototype vehicle proved to be a resounding success when it had its public roll-out.

***Task 5: Determine which of the following is the communicative purpose of the ―Into the Mainstream‖ and ―Out of the Laboratory, Someday‖sections. Explain the problems to be solved before fuel cell powered vehicles can be widely used.* The communicative purpose of the two sections:** To inform the reader of the present status of fuel cell technology. **Problems**

1) Hydrogen is the essential gas for fuel cell technology. But at present, it is not an efficient process to produce hydrogen from its compounds. Greenhouse gas carbon dioxide is produced in the process of releasing the hydrogen. Producing hydrogen from water by electrolysis is also inefficient. Thus, the challenge is how to extract large quantities of hydrogen cleanly, efficiently, and sustainably.

2) Hydrogen is not readily available in filling stations. Building such a station costs too much. But the author thinks this is not too expensive compared with the cost of laying oil pipelines and building nuclear plants.

3) The hydrogen economy faces the familiar Catch-22 situation, that is, the infrastructure needed to facilitate a paradigm shift is not likely to be put into

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place until the paradigm shifts, but that is not likely to happen until the proper infrastructure exists. It takes technological pioneers to solve the dilemma.

4) Where should the hydrogen be stored?

***Task 6: Answer the following questions based on the last section of Text I.***

1) In what industries or areas are fuel cells more likely to be used in the near future?

Fuel cells are more likely to be used in the consumer electronics industry in the near future. Fuel cells are a more advantageous power source than lithium-ion battery for electronic devices. They can provide relatively longer hours of continuous power for multifaceted electronic gadgets.

2) What examples are given to illustrate the application of fuel cells?

In Japan, fuel cells can be used to provide private residences with power and heat. In Middletown, Connecticut, fuel cells are used to provide power for a juvenile training school, but also used to heat and cool the buildings.

3) What is the prospect of fuel cell technology according to the author?

According to the author, fuel cell is a promising technology. It is a good bet that before long today‘s exotic technology will be familiar, not only in North America but around the world.

***Task 7***：***Complete the following diagram which reflects the communicative purpose and macrostructure of Text I.* Note:** The writer of an article always has a particular communicative purpose in mind. It may be a body of information to convey, an opinion to express, a problem to solve, a theory to propose, or a controversial issue to discuss, etc. The author‘s thoughts are organized to form discernible segments or chunks, which are like "building blocks" for the construction of a lengthy text. Both the types information and the ways of organizing the information are the author‘s choices, efforts or means to achieve the communicative purpose, thus they can be regarded as rhetorical strategies. Very often several rhetorical strategies need to be used for the construction of a lengthy text in order to achieve the author‘s communicative purpose.

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***Task 9: Use the prefixes and words provided to form as many new words as possible. Word formation techniques would help you understand the meaning of unknown technical words*.**

bio-

charge

discharge, recharge, undercharge, overcharge …

de-

carbon

hydrocarbon

di-

number

outnumber

dis-

oxide

dioxide, monoxide, hydroxide

dys-

physics

biophysics, geophysics, electrophysics

electro-

fuel

biofuel

geo-

compose

decompose

hydro-

code

decode

mechano-

formation

deformation, transformation

mono-

generate

degenerate

multi-

magnetism

electromagnetism, geomagnetism

non-

mechanics

hydromechanics, electromechanics

out-

dimensional

multidimensional

over-

function

dysfunction, multifunction

re-

chemistry

biochemistry, mechanochemistry

trans-

degradable

nondegradable

under-

renewable

nonrenewable

***Task 11***：***Work in groups and list the advantages and shortcomings of fuel-cell powered vehicles and IC engine vehicles.***

History •Information segments: Gas battery, its application, electric vehicles, Ballad Power Systems, etc. •Rhetorical strategies: Narration, historcial accounts according to time orderStatus•Information segments: Ballad Power Systems, General Motors, etc. advantages and problems of fuel cell powered vehicles •Rhetorical strategies: Exemplicafication, giving examples one by one; comparison and contrast; explanation of the advantages and problems of fuel cell powered vehicles Future •Information segments: Application of fuel cells in consumer electronics industry, application in Japan, in Middletown, Connecticut•Rhetorical strategies: Exemplicafication, giving examples one by one; explanation of specifics in the applications

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**Vehicle Types**

**Advantages**

**Shortcomings**

**Fuel-cell powered vehicles**

•Good for promoting energy independence;

•Clean, quiet, good for environmental protection;

•Good for sustainable development;

•No mechanical linkage between driver and throttle, steering or brake, giving designers full freedom to use their imagination.

•Lower energy density;

•Higher cost;

•Shorter range;

•Not efficient to produce free hydrogen;

•Costly to construct the necessary infrastructure;

•Problem with storing hydrogen tanks on vehicle.

**IC engine vehicles**

•Higher energy density;

•Lower cost;

•Longer range.

•Producing exhaust fumes;

•Producing noise;

•Consuming a lot of natural resources;

•Depending on oil-producing countries for energy.

***Task 12: Read Text II and explain the author's communicative purpose. Note down why the author thinks that a rapid energy transitions is impossible.* The author's communicative purpose:** To argue that a rapid energy transitions is impossible.

**The author's view of a rapid energy transition:** A rapid energy transition is impossible.

**Reason for this view:** Our existing energy system has such a great inertia and momentum that you cannot change it no matter how hard you try.

**Explanations:**

Inertia

Inertia is the resistance of objects to efforts to change their state of motion.

Momentum Momentum is the force of movement, the impetus or impact of a physical object. It is defined by mass and velocity of an object. Momentum is conserved, that is, once you build it up, it has to go somewhere. So a heavy object, like a football player moving at speed, has a lot of momentum *—*that is, once he‘s moving, it‘s hard to change his state of motion.

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Technological momentum

When a technology is deployed, its impacts reach far beyond itself.

Labor-pool momentum

The labor force has been trained to work in the existing system.

Economic momentum

The major components of our energy systems, such as fuel production and refining and electrical generation and distribution are hard to change. ***Task 13: Read Text III and note down the main points of a new method for hydrogen storage.*** **The problem with wide applications of hydrogen based fuel cells in transportation:** How to store hydrogen on a vehicle. **A new method used by Tom Autrey's team to store hydrogen:** Storing hydrogen in the form of the compound ammonia borane, NH3BH3.

**The method to get hydrogen out of ammonia borane**：By heating the compound sufficiently to extract hydrogen. It takes three steps. A third of the hydrogen is released at about 110 degrees, a second third at about 155 degrees (at which point ammonia borane is a liquid) and the final third at a higher temperature still, more than 500 degrees. Because the last increment requires **awkwardly extreme temperatures**, the new work of Autrey and his colleagues focused on the first two steps, whereby two-thirds of the hydrogen can be extracted.

**Autrey's explanation of the process**：This technology allows engineers to consider using the waste heat from fuel cells to prompt the reaction (the most popular type of fuel cells heat up to about 85 degrees). More important, the change in thermodynamic properties means that driving the reaction in the opposite direction—regenerating the ammonia borane by somehow putting hydrogen back—becomes less difficult, at least in theory.

**The challenge to this method:** Exactly how to regenerate ammonia borane from the residuum left after hydrogen has been extracted.

***Task 14: Complete the following report with the words and collocations you hear.* (http://www.kekenet.com/broadcast/201211/208758.shtml)**

(1) conservation (2) Environmental Protection (3) solar panels (4) overlooked (5) fuel efficiency standards (6) alternative energy (7) air pollution (8) global warming

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(9) national park (10) fossil fuel ***Task 15: Note down some of the inventions in the 20th century which have greatly improved people’s lives.* (http://www.ted.com/talks/robert\_gordon\_the\_death\_of\_innovation\_the\_end\_of\_growth)** 1) ...electric light and electric tools were everywhere. 2) ... the electric washingmachine and the electric refrigerator. 3) ...central heating everywhere. 4) ...the motor vehicle was everywhere. 5) ...90% 6) ... had underground water pipes. 7) ...began to disappear. 8) ...life expectancy improved faster. **9)** ...by computers.

***Task 16***：***Answer the following questions according to a program about the properties of lithium, the third element on the periodic table.* (http://www.bbc.co.uk/programmes/p021syjk)**

1) Why are lithium and batteries are almost synonymous?

Because lithium is used to make batteries.

2) What are the two elements before lithium on the periodic table?

Hydrogen and helium.

3) What is crucial about lithium?

It is the lightest solid.

4) What does the professor say about the weight of lithium?

It weighs extremely little. ***Task 17: Note down the main points of President Obama's State of the Union Address in which he explains his administration's research, technology and energy policies.* (http://www.scientificamerican.com/podcast/episode/state-of-the-union-research-technol-12-01-25/)**

1) **His policy about responsible young people:** to staff our labs, start new businesses, defend this country.

2) **His attitude towards basic research and the reasons:**

**His attitude:** Strong support. **Reasons:** The discoveries taking place in our federally financed labs and universities could lead to new treatments that kill cancer cells but leave healthy ones untouched. New lightweight vests for cops and soldiers that can stop any bullet. Don't gut these investments in our budget. Don't let other countries win the race for the future.

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3) **His plans for oil and gas exploration:** Open more than 75 percent of our potential offshore oil and gas resources.

4) **American oil production now:** The highest in eight years. Not only that, last year we relied less on foreign oil than in any of the past 16 years.

5) **His energy strategy:** To develop cleaner, cheaper energy which can create new jobs without doing harm to the environment.

6) **His policy about renewable energy:** continue to develop high tech batteries, wind, solar energy, spur energy innovation with new incentives, set a clean energy standard that creates a market for innovation.

Obama: Hundreds of thousands of talented, hardworking students in this country face another challenge. The fact that they aren't yet American citizens. Many who are brought here are as small children are American through and through. Yet they live everyday with the threat of the deportation. Others came more recently to study business and science and engineering, but as soon as they get their degree, we send them home, to invent new products, and create new jobs somewhere else. That doesn't make sense…. Let's at least agree to stop expelling responsible young people who want to staff our labs, start new businesses, defend this country…. Innovation also demands basic research. Today, the discoveries taking place in our federally financed labs and universities could lead to new treatments that kill cancer cells but leave healthy ones untouched. New lightweight vests for cops and soldiers that can stop any bullet. Don't gut these investments in our budget. Don't let other countries win the race for the future. Support the same kind of research and innovation that led to the computer chip and the Internet, to new American jobs and new American industries. And nowhere is the promise of innovation greater than in American made energy. Over the last three years we've opened millions of new acres for oil and gas exploration, and tonight I am directing my administration to open more than 75 percent of our potential offshore oil and gas resources. Right now, right now, American oil production is the highest that has been in eight years—that's right, eight years. Not only that, last year we relied less on foreign oil than in any of the past 16 years . But with only 2 percent of the world's oil reserves, oil isn't enough. This country needs an all out, all-of-the-above strategy that develops every available source of American energy ; a strategy that's cleaner, cheaper and full of new jobs. We have a supply of natural gas that can last America nearly 100 years , and my administration will take every possible action to safely develop this energy. The experts believe this will support more than 600,000 jobs by the end of the decade, and I am requiring all companies that drill for gas on public lands to disclose the chemicals they use. because America will develop this resource without putting the health and safety of our citizens at risk. The development of natural gas will create jobs and power trucks and factories that are cleaner and cheaper, proving that we don't have to choose between our environment and our economy. And by the way, it was public research dollars, over the course of 30 years that helped develop the technologies to extract all of this natural gas out of shale rock reminding us that government support is critical in helping businesses get new energy ideas off the ground. Now what is true for natural gas is just as true for clean energy. In three years our partnership with the private sector has already positioned America to be the world's leading manufacturer of high tech batteries. Because of federal investments, renewable energy use has nearly doubled and thousands of Americans have jobs because of it…. I will not cede the wind or solar or battery

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industry to China or Germany because we refused to make the same commitment here. We've subsidized oil companies for a century. That's long enough. It's time to end the taxpayer giveaways to an industry that rarely has been more profitable and double down on a clean energy industry that never has been more promising. Pass clean energy tax credits; create these jobs. We can also spur energy innovation with new incentives. The differences in this chamber may be too deep right now to pass a comprehensive plan to fight climate change. But there is no reason why Congress shouldn't at least set a clean energy standard that creates a market for innovation. So far, you haven't acted. Well, tonight I will. I am directing my administration to allow the development of clean energy on enough public land to power 3 million homes, and I am proud to announce that the Department of Defense working with us, the world's largest consumer of energy will make one of the largest commitments to clean energy in history, with the Navy purchasing enough capacity to power a quarter of a million homes a year.

***Task 18: Note down the main reasons why the market for electric cars is limited in the UK in spite of the government's promotional efforts.* (http://www.bbc.co.uk/programmes/b038xrjr)**

1) Too expensive.

2) Not too green.

3) Underperforming.

***Task 19: Note down the main points of the speaker's view on a hydrogen economy.* (http://www.ted.com/talks/reinventing\_the\_car)**

1) The key question about hydrogen economy:

Where's the hydrogen going to come from?

When are these kinds of cars going to be available?

2) Hydrogen can come from many different sources:

Fossil fuels

Renewables

Biofuels

3) Distance between hydrogen fueling stations:

No more than two miles from a station at any time, every 25 miles on the freeway

4) The real exciting vision:

Home refueling, much like recharging your laptop or recharging your cellphone.

But the real key question I'm sure that's on your mind: where's the hydrogen going to come from? And secondly, when are these kinds of cars going to be available? So let me talk about hydrogen first. The beauty of hydrogen is it can come from so many different sources: it can come from fossil fuels, it can come from any way that you can create electricity, including renewables. And it can come from biofuels. And that's quite exciting. The vision here is to have

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each local community play to its natural strength in creating the hydrogen. A lot of hydrogen's produced today in the world. It's produced to get sulfur out of gasoline—which I find is somewhat ironic. It's produced in the fertilizer industry; it's produced in the chemical manufacturing industry. That hydrogen's being made because there's a good business reason for its use. But it tells us that we know how to create it, we know how to create it cost effectively, we know how to handle it safely. We did an analysis where you would have a station in each city with each of the 100 largest cities in the United States, and located the stations so you'd be no more than two miles from a station at any time. We put one every 25 miles on the freeway, and it turns out that translates into about 12,000 stations. And at a million dollars each, that would be about 12 billion dollars. Now that's a lot of money. But if you built the Alaskan pipeline today, that's half of what the Alaskan pipeline would cost. But the real exciting vision that we see truly is home refueling, much like recharging your laptop or recharging your cellphone. So we're pretty excited about the future of hydrogen. We think it's a question of not whether, but a question of when. What we've targeted for ourselves—and we're making great progress for this goal—is to have a propulsion system based on hydrogen and fuel cells, designed and validated, that can go head-to-head with the internal combustion engine—we're talking about obsoleting the internal combustion engine—and do it in terms of its affordability, add skill volumes, its performance and its durability. So that's what we're driving to for 2010. We haven't seen anything yet in our development work that says that isn't possible. We actually think the future's going to be event-driven. So since we can't predict the future, we want to spend a lot of our time trying to create that future.

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**Unit 2 Space Exploration**

***Task 2: Read the topic sentence and concluding sentence of each paragraph and complete the following diagram that reflects the General-Particular discourse pattern of the article. Then determine the communicative purpose of the article and the rhetorical strategies to achieve the purpose.* Note:** The purpose of this article is to impart information about Mars to general readers. The article follows a "General-Particular" discourse pattern in which the opening section introduces the subject of the article and states the main points. The other sections examines each of the four differences between Mars and the Earth one by one. The main points: To make sense of Mars, investigators cannot be blinded by their experience of Earth. The Red Planet is a unique place. Feature (1) Difference 1: Mars is covered with dust while the Earth is covered with soil. Difference 2: Mars is windy. Feature (2) Difference 3: Mars has a amazing variety of weather and climate cycles. Difference 4: Mars' behavior of liquid water is different. Feature (3) Mars is arid. The uppermost crust consists of layered deposits Feature (4) Unanswered question: Whether was liquid water on ancient Mars. Scientists are uncertain about liquid water. At this point, scientists have three main hypotheses. The text follows a "General-Particular" discourse pattern. The communicative purpose of the article: To provide information about the landscapes of Mars so that misunderstanding of Mars can be removed. The rhetorical strategies to achieve the communicative purpose is: Comparison and contrast, description

***Task 3: Note down the similarities and differences between Mars and the Earth described in paragraphs 3-14. Give an oral summary with the help of your notes. Use words, expressions and structures to indicate or express similarities and differences. Note that some of the comparisons are explicitly stated. Others are implied. For example:***

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Much of Earth‘s surface consists of soil mostly derived by chemical weathering of the underlying bedrock. But much of Mars‘s surface consists of dust. (The difference is explicitly stated.)

As on Earth, storm systems often spiral southward from the northern polar regions. (The similarity is explicitly stated.)

A third way in which Mars differs from Earth is in its amazing variety of weather and climate cycles, many of which are similar to those on Earth, many like nothing on Earth. (The similarities and differences are explicitly stated.)

The Martian year is 687 Earth days. (The difference is implied.)

Mars lacks the precipitation and oceans on Earth. (The difference is implied.)

Similarities:

1) The Martian day is almost the same as an Earth day.

2) The tilt of Mars‘s rotation axis, which produces seasons, is very close to that of Earth‘s.

3) As on Earth, storm systems often spiral southward from the northern polar regions.

4) Fresh gullies that look like water carved features on Earth.

5) On Mars, as on Earth, several types of patterned ground mark the presence of ice-rich soil.

Differences:

1) First, much of Earth‘s surface consists of soil mostly derived by chemical weathering of the underlying bedrock. But much of Mars‘s surface consists of dust.

2) Second, Mars is dominated by aeolian activity, while Earth is dominated by the action of liquid water.

3) The Martian year is 687 Earth days (while an Earth year is 365 days).

4) Mars lacks the precipitation and oceans on Earth. (The implication is that the Earth has precipitation and oceans)

5) The atmospheric pressure is less than 1 percent of that on Earth and varies seasonally by about 25 percent. (The difference is implied: The atmosphere pressure on Earth is much greater.)

6) The thin atmosphere has a very low heat capacity, so the surface temperature swings by more than 100 degrees Celsius from day to night. The upshot is that, despite being so thin, the atmosphere has complex circulation patterns and dynamics. (The difference is implied: The atmosphere on Earth is much denser.)

7) Liquid water is unstable at the surface under present pressure and temper-ature conditions. (The difference is implied.)

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***Task 4***：***Read the "Layer upon Layer" section and determine which of the following statements about Mars are considered to be facts and which are inferences from the known facts. Explain what language features that help you distinguish inferences from facts.***

1) The darker Martian dunes are basaltic, consisting mainly of minerals such as pyroxene and plagioclase, which on Earth would readily weather away. (Fact)

2) It follows that the present cold and dry atmospheric conditions have persisted since a time far back into the planet's history. (Inference )

3) To begin with, the planet has a striking dichotomy in landscape between its northern and southern hemispheres. The southern hemisphere is high in altitude and heavily cratered. The northern one is a vast, low-lying plain with fewer craters. (Facts)

4) The northern lowlands are exceedingly level (Fact), leading to speculation that they were lake beds during a significant chunk of Martian history. (Inference)

5) Along the edge of the southern highlands are features that could only have been carved by liquid water. (Inference)

6) Because these features are carved into the Tharsis Plateau (Fact), they must have an intermediate age. (Inference)

7) During the massive deluge, a lake roughly the size of one of the Great Lakes burst its ice dam and rushed out within just a few days. (Fact)

8) On Mars, such calamities were 10 to 100 times as devastating (Fact).

9) They may have been triggered by volcanic heat sources or by the general heat flow from the interior of the planet. (Inference)

10) Heat would have melted ice underneath the thick permafrost layer, building up tremendous pressures until the water finally burst out. (Inference)

11) Located throughout the southern highlands, they have a branching pattern reminiscent of rivers on Earthsuggesting that they were formed by surface runoff from rainfall or snowfall. They are the strongest hint that Mars was once as warm as Earth. (Inferences)

12) But these networks look rather different from rain-fed rivers on Earth. They more closely resemble river networks in desert areas, which are fed by water that slowly seeps from subterranean sources. (Facts)

13) Recent detailed studies of the northern edge of the highlands show that immense amounts of material eroded during—rather than after—the intense meteor bombardment that took place early in Martian history. (Inference)

14) These analyses imply that the distribution of water kept changing as impacts reworked the landscape. (Inference)

15) For instance, the Argyre Basin, 1,000 kilometers in diameter, may once have been filled to its brim with water. (Inference)

16) Almost everywhere that the subsurface is exposed—on walls of canyons,

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craters, mesas and valleys—it is layered. The layers differ from one another in thickness, color and strength. (Facts)

17) They show that the Martian surface has undergone complex sequences of deposition, crater formation and erosion. (Inference)

18) The oldest layers are the most extensive. (Fact)

19) The lack of boulder like blocks argues against their being volcanic flows, although they could be volcanic ash. (Inference)

20) Ultimately, however, most of the layers probably originated in impact debris. (Inference)

**Language features to distinguish inferences from facts:** Facts: Simple verbs, simple present tense, simple past tense are clues of facts. Inferences:

Modal verb + action verb: for example, *may have been triggered... must have (been)... should have (been),*

Modal adverb + action verb: for example, *probably, perhaps, possibly, likely + verb*

Structures such as *it follows that..., it shows that..., it suggests that..*.

Certain verbs in the relevant semantic field: *infer, imply, hint, argue against, etc.*

***Task 5: Identify the hypotheses in the "Blue Mars" section about liquid water on Mars and explain the language features to indicate hypotheses.* Note:** Drawing inferences is the act of reasoning from factual knowledge or evidence, while framing hypotheses means providing a tentative explanation that need to be tested by further investigation. Hypothesis 1：Perhaps the early atmosphere was indeed thick. The planet might have had lakes, even oceans, free of ice. Hypothesis 2：Perhaps Mars had a fairly thin atmosphere. It was a wintry world. Any standing bodies of water were covered in ice. Snow might have fallen, recharging the groundwater and leading to temporary trickles of water across the surface. Hypothesis 3：Finally, perhaps the climate cycles were insufficient to make Mars warm enough to sustain liquid waters. The planet had clement conditions for only brief periods after major impacts. Each such impact deposited water-rich material and pumped enough heat and water into the atmosphere to permit rain.

***Task 6: Determine whether the author is certain or uncertain about the***

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***information in the following statements.* Note:** When information is presented on the basis of reasoning rather than certain knowledge, the author uses *hedge*s as a strategy to imply that information is provided without complete commitment. On the other hand, when the author is certain about the truth value of the information, *boosters* are used to allow writers to express their certainty about the knowledge or information. Both *hedges* and *boosters* emphasize that statements don‘t just communicate ideas, but also the writer‘s attitude to them. They also indicate the degree of caution or assurance that can be attached to a statement. For example:

Malin and Edgett have suggested that wind condition may be less intense now than in the fairly recent past, another hint that the Martian climate changes with time. (hedges, uncertain) Perhaps the absence of larger rocks can be explained by the high concentration of condensed volatiles (such as water ice) in the subsurface that were affected by the Heimdall impact: A violent explosion would have removed and crushed the rocks that may have been at the landing site initially. (hedges, uncertain)

Mars has proved to be a very different and more complicated planet than scientists thought beforehand. (booster, certain)

Evidence for erosion shows up in craters, from which material appears to have been removed by wind, and in bedrock features that clearly have been carved by windblown sand. (In this sentence, *appears to* is a hedge while *clearly* is a booster, meaning that the first chunk of information is not very certain, but the latter chunk of information is certain.)

1) Their size and shape, as shown by topographical measurements, indicate that the caps are predominantly water ice, as opposed to so called dry ice, made of carbon dioxide. (hedge, uncertain)

2) Finally, earlier this year Philip Christensen of Arizona State University discovered gullies that clearly emerge from underneath a bank of snow and ice. (booster, certain)

3) Along the edge of the southern highlands are features that could only have been carved by liquid water. ("could + only" indicates that the author is biased toward the "certain" side.)

4) The timing of the water networks could be the key to making sense of them. (hedge, uncertain)

5) The lack of boulder like blocks argues against their being volcanic flows, although they could be volcanic ash. (hedge, uncertain)

6) Steven M. Clifford of the Lunar and Planetary Science Institute in Houston, among others, has conjectured that melting under a glacier or a thick layer of permafrost could also have recharged subterranean water sources. (hedge, uncertain)

7) Although Mars was bitterly cold, periodic bursts of relatively warmer

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temperatures could have reinvigorated the planet. (hedge, uncertain)

8) A daily weather report might talk of strong winds, high-level ice clouds, low-level fogs, seasonal frost, dust devils and massive dust storms. (hedge, uncertain)

9) The planet might have had lakes, even oceans, free of ice. (hedge, uncertain)

10) Snow might have fallen, recharging the groundwater and leading to temporary trickles of water across the surface. (hedge, uncertain)

11) They appear to be covered with multiple layers of volcanic flows and sedimentary debris that originated in the south. (hedge, uncertain)

12) Aeolian activity seems to have persisted since the time of heavy cratering, back when the solar system was still young. (hedge, uncertain) 13) So the absence of this gas therefore proves the absence of magnesium sulfate in the soil. (booster, certain) 14) Clearly, the erosion cannot go on forever. (boosters. can + not = booster; can = hedge)

15) Ultimately, however, most of the layers probably originated in impact debris. (hedge)

16) Because these features are carved into the Tharsis Plateau, they must have an intermediate age. (booster, rather certain) 17) All these facts taken together point toward the likely presence of calcium carbonate in the soils that Phoenix has analyzed. (hedge, uncertain)

***Task 7: Explain how the nouns are formed and what they refer to. Note that nouns formed from verbs may indicate a natural, geological process, a state/condition, a result from an action or process. Some words may have more than one meaning.*** For example, "erosion" can mean the process, act of eroding or the result of the process, or the state of being eroded. 1) circulation (pattern): the process of circulating 2) condensation (of carbon dioxide frost): the process as well as the result of condensing 3) cratering: the process of forming craters 4) deposition: the process of depositing 5) evaporation: the process as well as the result of evaporating 6) exposure: the state of being exposed 7) (faint circular) expression: the result of expressing 8) (topographical) measurement: the result of measuring 9) (sunlight) penetration: the process of penetrating and the state of being penetrated 10) precipitation: the process and the result of the process 11) resemblance: the state of resembling 12) sublimation: the process of subliming 13) (orbital) variation: the state of being variant

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14) (chemical) weathering: the process of becoming worn down due to exposure to weather

***Task 8: Write an essay which summarizes the striking features of Mars. You can use the General-Particulars discourse pattern and the comparison and contrast strategy in your writing.* Note:** There are two common ways to organize a comparison or contrast. One is known as *block comparison*. For example, when comparing Mars and the Earth, you can examine all the features of Mars first and then all the features of the Earth. The other common way of organizing a comparison is called *point by point comparison*, in which features of Mars and the Earth are compared one by one. The latter method is used in this article. Summary: Present-day Mars differs from Earth in a number of broad respects. First, it is enveloped in dust. Much of Earth‘s surface consists of soil mostly derived by chemica1 weathering of the underlying bedrock. But much of Mars‘s surface consists of dust that has settled out of the atmosphere. Second, Mars is extremely windy. It is dominated by aeolian activity while the Earth is dominated by the action of liquid water. Spacecraft have seen globe-encircling dust storms, huge dust devils and dust avalanches—all wrought by the wind. A third way in which Mars differs from Earth is in its amazing variety of weather and climate cycles, many of which are similar to those on Earth, many like nothing on Earth. The Martian day is almost the same as an Earth day, but the Martian year is 687 Earth days. The tilt of Mars‘s rotation axis, which produces seasons, is very close to that of Earth‘s. Mars lacks the precipitation and oceans that are so crucial to weather on Earth. But the atmospheric pressure (less than 1 percent of that on Earth) varies seasonally by about 25 percent, driven by the condensation and sublimation of carbon dioxide frost at the poles. The thin atmosphere has a very low heat capacity, so the surface temperature swings by more than 100 degrees Celsius from day to night. As on Earth, storm systems often spiral southward from the northern polar regions. But the largest dust storms typically start during the southern spring as the planet rapidly heats up. Periodically they come together and encircle the entire planet. Malin has compared the climatic effect of the dust raised by this storm with the aftermath of Mount Pinatubo‘s eruption on Earth in 1991—namely, a brief but widespread cooling.

A fourth major difference between Earth and Mars is the behavior of liquid

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water. Liquid water is unstable at the surface under present pressure and temperature conditions. It does not rain. Still, water ice can—and does—persist at some depth within the Martian soil during all or much of the year. On Mars, as on Earth, several types of patterned ground mark the presence of ice-rich soil. Mars Odyssey has detected ground ice over most of the planet outside the equatorial regions, and models predict that the ice extends to considerable depths.

***Task 9***：***Work in groups and list what scientists know and what they are uncertain about Mars.***

What scientists know about Mars

What scientists are uncertain about Mars

Mars is enveloped in dust. It is windy.

It has a thin atmosphere. It is covered with craters.

It has otherworldly landscape, with the volcanoes, valleys, deserts, and polar ice caps similar to those on Earth.

The rotational period and seasonal cycles of Mars are likewise similar to those of Earth as is the tilt that produces the seasons. The presence of large quantities of water ice at the poles. ...

Was Mars once warm and wet, possibly hospitable to the evolution of life? If so, what triggered the apparent change in climate? Did it rain on early Mars? Where did the layers of deposits come from? What is the history of liquid water on Mars? Has water ever been stable on its surface (or in its near subsurface) for a geologically significant period of time? And could primitive terrestrial life-forms evolve in the present or past Martian environment? ...

***Task 12: Read Text III and note down the most important events in the history of space exploration around the world. Use your notes to give an oral summary.* Notes:** In 1955: Both the USA and USSR announced plans to launch satellites. In 1957: Sputnik 1(Satellite 1) was launched by the USSR. In 1961: The 27-year-oldcosmonaut Yuri A. Gagarin of the USSR manned the Vostok 1 the first time. In 1965: The Soviet spacecraft, Voskhod 2, was launched. In 1969: The U.S. spacecraft Apollo 11, with astronauts Neil Armstrong, Buzz Aldrin, and Michael Collins on board landed on the moon. In 1975: The USSR-USA Apollo-Soyuz Test Project was launched. In 1990: The Hubble Space Telescope orbited the Earth.

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In 1997: The Mars rover landing by the United States, with the Sojourner rover, Mars Pathfinder was successful. In 2003: US space shuttle, Columbia, was lost. The British Beagle 2 was launched. In 2008: Indian launched its first unmanned lunar space probe. In 2011: U.S. Curiosity was launched. In 2012:Curiositylanded in Mars' Gale Crater. In 2013: India's Mars Orbiter Mission was launched. China's first lunar roverYutu landed on the moon.

***Task 13: Complete the following news report with the words or word chunks you hears.* (http://www.scientificamerican.com/podcast/episode/long-lost-lander-found-on-mars/)** (1) desperately (2) scheduled (3) search for life (4) Martian atmosphere. (5) impact (6) piece together (7) solar panels (8) mission control (9) partial success (10) soft landing

***Task 14: Answer the following questions briefly based on what you watch about Mars.* (http://www.nasa.gov/multimedia/videogallery/index.html)** 1) Why is Mars a cold planet? Because it is 50 million miles farther away from the Sun than the Earth. It gets a lot less light from the Sun than the Earth. 2) Why does Mars have a hard time holding the heat it gets? Because it has an atmosphere a hundred times thinner than the earth. 3) How easily does the heat from the Sun escape? If you stand at an Martian equator at noon, it will feel like summer at your feet and winter near your head. 4) What are the temperatures at night on Mars? They can drop to negative triple digits.

***Task 15: Answer the following questions according to a report about Curiosity rover on Mars.* (http://www.nasa.gov/multimedia/podcasting/index.html)** 1) How much sample was collected this week? 14cc, or 1 table spoon.

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2) How was the sample collected? A drill was used to get inside the rock. 3) What is the color of the sample material? Gray. 4) For what purpose was the sample collected? It will be analyzed by instruments on the rover for mineralogy. 5) What is the location of the sample? At the Yellowknife Bay. ***Task 16: Answer the following questions about NASA's commercial crew program according to Tom Simon.* (http://www.nasa.gov/mission\_pages/msl/videos/index.html)** 1) What is NASA's commercial crew program and how is it different from other human spaceflight programs? It used to be government owned and set up systems to meet the needs of the government. Now we work with industries to help industries to develop systems to meet our needs and the needs of other users of the systems. 2) What is the goal of NASA's commercial crew program? Take astronauts to the international stations. Develop systems to take people to low earth orbit. Take astronauts to the space stations. 3) What is going on aboard the space station? Research is done. One group conduct fundamental science research in microgravity environment. They try to understand fundamental science which will be used to make new medicine, new materials to make products lighter and stronger, etc. The other group explore new technologies that will be used in space and beyond space. 4) What is the purpose of certifying commercial systems for NASA's use? To make systems meet safety requirements. 5) Will the certification approach work effectively according to Tom Simon? Very confident. They will be able to develop systems to meet their needs and meet safety requirements. 6) What does Tom Simon see as the primary benefits of the commercial crew program? The near term benefit is to get the crew to the international space station, the long term benefit is to help NASA achieve its exploration plans, accomplish exploration objective, and make industry shoulder the burden of doing all this.

***Task 17: Watch the video and take notes about the Thanksgiving food for the astronaut in the international space station.* (http://www.nasa.gov/mission\_pages/msl/videos/index.html)**

1) Food available: several options to choose from, smoke turkey, cranberry

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dressing, green beans, mushroom broccoli, mashed potatoes, bread, dessert 2) The roles of the three NASA food scientists: a researcher in advanced food technology program. The speaker, and a new scientist operational systems. 3) Food processing requirement: No food refrigerator. Food should last for a long time. chiller, beverage, food preparation areas. 4) Psychological aspect of food: It is a comfort. They can select their favorite food. The food tastes differently in space. The aroma is important.

***Task 18: Watch the video clip and complete the following statement which summarizes its main idea.* (http://www.nasa.gov/mission\_pages/msl/videos/index.html)** The main idea: LRO scientists usually use lasers to track NASA satellites, but in the future, they will use lasers to communicate with them.

***Task 19: Listen to a program about Curiosity's mission and note down the main points.* (http://www.bbc.co.uk/programmes/p017g5kx)**

1) NASA technicians' feeling when the robot landed on Mars: Excitement and tension.

2) The location of Curiosity's landing: The floor of a huge crater.

3) Curiosity's mission: To find whether Mars was ever a place where life could have flourished.

4) Evidence found by Curiosity: Billions of years ago, fresh water gushed across the landscape that may have even collected in a lake.

5) The reason why water simultaneously boil and freeze: The combination of subzero temperatures and extremely thin atmosphere。

6) People's assumption in the 1960s about Mars: There was vegetation and intelligent life, being which have direct interaction on the planet

7) The finding of Marina 4: No evidence, nothing but craters, a little bit air. It was thought to be a dead planet.

8) The finding of Marina 9: Evidence of volcanoes and water channels.

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**Unit 3 Clean Energy**

***Task 2: Read the title and the subheadings of Text I to answer the following questions. Then read the first paragraph and identify the sentence which announces the content of the text.***

1) What problem is the United States faced with?

High energy prices will affect the U.S. economy.

2) What has been proposed as a solution to the problem?

Developing green power.

3) What do the authors think of the proposed solution?

It would cost millions of jobs.

4) What does "Blowing in the Wind" mean? Why do the authors use this phrase?

Wind power is not a solution. It is not reliable.

5) What solution do the authors propose?

Developing nuclear power. The last sentence of paragraph 1 announces the content of the text: In what follows, we explore these economic ramifications of "green sources" in greater detail, and compare wind power (currently the cheapest source of green energy) with what we believe is the best energy option: nuclear power.

***Task 3: Text I follows a Problem-Solution discourse pattern. Skim through the text and specify the problem, potential solutions, the authors' evaluation of the solutions, and their arguments.*** The main points: Problem: A spike in energy prices fosters higher inflation, falling output, and rising unemployment. Proposed solution: Obama shifts to green energy. Negative evaluation: It would likely result in the net loss of millions of jobs. Potential solution 1: Wind energy (German model) Negative evaluation: Major intermittency problems make it unreliable and capricious. Potential solution 2: Nuclear energy (French model) Positive evaluation: Eliminate CO2 emissions, low cost, reliability Final solution: Nuclear/atomic solution (French model) **The communicative purpose:** To argue that developing nuclear power is the best solution to the U.S. energy problem.

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***Task 4: Read paragraphs 2-3 and work out the chain effect of a rapid rise in energy prices.* The main point:** Reliably affordable energy is important because swift surges in energy prices typically have harmful economic effects. In other words, high energy prices ultimately stoke inflation, reduce economic output, and swell the ranks of the unemployed. **The chain effect:** Energy prices rise → Production costs in industries get higher → These industries pass along the higher costs to other firms → These firms raise the prices of their products and services → households reduce consumption → Sales decrease and higher production costs squeeze corporate profits →businesses lay off workers and reduce output. **Example**: Diesel fuel prices rise → Trucking firms raise their rates they charge retailers to move merchandise to their stores → Retailers face higher costs → They raise retail prices → Consumers buy less → Industries produce less and lay off workers. **Rhetorical strategy:** Explanation (of the harmful effects of a rise in energy prices)

***Task 5: Answer the following questions according to paragraphs 4-6.*** 1) In what way is paragraph 4 related to paragraph 3? Paragraph 3 explains the mechanism or relationship between energy price and economy, i.e. how "a spike in energy prices ultimately fosters higher inflation, falling output, and rising unemployment" (the last sentence of paragraph 3). When this concept is explained, paragraph 4 gives historical cases to show how unreliable prices or rises in prices affect U.S. economy. 2) What is the cause of the recession in 1974? Beginning in late 1973, the Organization of the Petroleum Exporting Countries (OPEC) initiated an embargo that lead to a nearly fivefold increase in crude oil prices in the span of just one year. 3) What is the result of the 1974 recession? The average prices rose by nearly 17 percent, economic output dropped by 2.4 percent, and unemployment soared from 4.6 percent to 9 percent. 4) What is the cause of the 1980 recession? Crude prices doubled due to the Iranian revolution of 1979. 5) What is the result of the 1980 recession? Average prices surged 13 percent, output dropped 1.6 percent, and unemployment jumped from 5.7 percent to 7.8 percent. 6) What is the government's response to the energy problem today? Shifting to green energy to create a 5 million new jobs over ten years. 7) What do the authors think of the government's strategy?

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It is incredible. 8) For what purpose does the author cite the figures from the Bureau of Labor Statistics? To give a careful examination of statistical evidence to disprove the credibility of creating 5 million new ―green‖ jobs.

***Task 6***：***Supply the following types of information on the basis of the "Blowing in the Wind" section.*** 1) **The communicative purpose of the section**: To reject the ideas that wind power is a solution to the US energy problem. Wind power is unreliable and unfeasible. 2) **The rhetorical strategies to achieve the purpose:** Through detailed comparison of wind and nuclear power. 3) **The author's choice of details:** Features unfavorable to wind power

**Shortcoming of wind power:** It neither produces energy nor does any work when the wind stops blowing (also known as the intermittency problem).

**Technical and commercial challenges:** Six different technologies to help boost wind‘s potential, but none of these is yet commercially viable.

**Capacity factor:** The average annual capacity factor for wind is 31.8 percent, while nuclear power achieved a capacity factor of 91.5 percent in 2007.

**Consequences of depending on wind power:** (1)Wind power affects the daily operations of an electric transmission system; (2) it heavily relies on backup generation systems to lessen fluctuations in customer demand and intermittent supply; (3) these backup generation costs are high; (4) intermittency can give rise to complete or rolling blackouts; (5) apart from the obvious public safety problems posed by power outages, their economic impact can be severe; (6) scale is small, the latest nuclear reactor designs can produce up to 1,500 megawatts, as compared to the largest wind turbine, which generates a mere 5 megawatts, or approximately 863 wind turbines are required to equal the output of one nuclear power plant.

***Task 7***：***Supply the following types of information on the basis of paragraphs 15-21.*** 1) **The communicative purpose of the section:** To promote the ideas that nuclear power is a reliable and affordable energy for the U.S. 2) **The rhetorical strategies to achieve the purpose**: Through evaluation (of the features of nuclear power). 3) **Choice of details:** Features favorable to nuclear power 4) **Features of nuclear power:** Lower cost and higher reliability

5) **Features of** t**he French model:** (1) Nuclear power is highly scalable, meaning that nuclear power plants can be built in large numbers to meet the desired

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electric generation needs of an entire nation. (2) Radioactive waste can be reduced. While the science behind reprocessing is quite complex, the basic idea is surprisingly simple. Roughly 96 percent of spent nuclear fuel rods are recyclable. 6) **The three hurdles:** High cost of constructing new installations; the ever-present risk that future regulatory changes may forcibly shut down U.S. reactors; reprocessing of spent nuclear fuel. 7) **The purpose of discussing the three hurdles:** To provide suggestions to overcome the hurdles, so each of the hurdles can be overcome.

***Task 8: Determine whether the following statements are the authors' claims or evidence for their claims****.* **Note:** A claim is a statement expressing an opinion, position, or generalization. Evidence is proof for or against a claim. For example:

In this way, a spike in energy prices ultimately fosters higher inflation, falling output, and rising unemployment. (Para.3: **claim**)

Beginning in late 1973, the Organization of the Petroleum Exporting Countries (OPEC) initiated an embargo that lead to a nearly fivefold increase in crude oil prices in the span of just one year. The following year, the U.S. economy was in recession. (Para. 4: **evidence**)

1) From July 1979 to July 1980, average prices surged 13 percent, output dropped 1.6 percent, and unemployment jumped from 5.7 percent to 7.8 percent. (Para. 4: evidence)

2) Putting all of this together, the entire electric power industry—from the manufacturing of the equipment, to the mining and drilling of fuel, to the generation of power, and the ultimate delivery of that power to customers—employs just over 996,000 workers, or about 20 percent of the Obama green job estimate. (Para. 5: evidence)

3) Creating 5 million new ―green‖ jobs is not even remotely credible. (Para. 5: claim)

4) What‘s more, most green job estimates ignore all of the jobs lost because of higher energy prices. (Para. 6: claim)

5) As of May 2009, the U.S. labor force stood at 160 million workers. Therefore, every 1 percentage point increase in the unemployment rate results in nearly 1.6 million lost jobs. (Para. 6: evidence)

6) In light of the U.S. economy‘s historic sensitivity to high energy prices, an aggressive push toward green power would likely result in the net loss of millions of jobs. (Para. 6: claim)

7) During peak times, water can be quickly released from the lake, driving the turbines and generators, and thus producing hydroelectricity. During periods of low energy demand, such as at night, the process runs in reverse, with the turbines acting as pumps and moving water back into the lake. (Para. 9: evidence)

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8) Unfortunately, this is an inefficient and costly way to store electricity, and thus is not a viable solution for wind energy. (Para. 9: claim)

9) Vattenfall relies heavily on backup generation systems to lessen fluctuations in customer demand and intermittent supply, which necessitates the frequent starting and stopping of backup electric generators, which is very costly and inefficient from both an economic and engineering perspective. (Para. 11: evidence)

10) In its most acute form, intermittency can give rise to complete or rolling blackouts. (Para. 12: claim)

11) Apart from the obvious public safety problems posed by power outages, their economic impact can be severe. (Para. 13: claim)

12) Consequently, the nation experiences blackouts on a regular basis. (Para. 13: evidence)

13) Scale is another area where nuclear energy **trumps** wind power. (Para. 14: claim)

14) If the public wants to eliminate pollution/CO2 emissions, but green technologies fail to deliver both low cost and reliability, how can this policy objective be met? The answer lies with nuclear power. (Para. 15: claim)

15) A second notable feature of the French model is the significant strides made to reduce **radioactive waste**. (Para. 17: evidence)

16) Adopting the German Model will reduce employment and economic growth in the United States by forcing Americans to depend upon expensive and inherently unreliable sources of energy. Embracing the French Model will do the opposite. (Para. 18: claim)

***Task 9: Read Text II and identify the authors' rhetorical purpose, their claim, and arguments.* Note:** An argument is a statement, reasoning, or fact to prove or disprove a claim. **The authors' communicative purpose:** To argue that it is time to put an end to the renewable fuel standard (RFS), or the ethanol mandate. **The authors' claim:** Our conclusions are that the ethanol mandate continues to do more harm than good — inflicting environmental damage, raising food prices, and distorting energy markets. **The authors' arguments against the ethanol mandate:**

1) Any diversions to ethanol production would require either changing the use of other land to growing grain or sharp increases in the cost of grain and meat.

2) Ethanol will not keep gas prices down; the price of ethanol will be the same as gasoline, on an energy-equivalent basis.

3) Ethanol poses numerous environmental threats.

One of the most serious is the overuse and destruction of land and water.

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Ethanol production pollutes the water we do have:

Land is also threatened by ethanol production.

Finally, there‘s the issue of climate change. ethanol actually increases the formation of potent greenhouse gases more than gasoline does by itself.

4) The theoretical appeal of cellulosic feedstocks lies in their abundance, availability, and cheap cost relative to corn, in reality, however, cellulosic-based ethanol fails to make good on this promise. 5) It is a political game.

***Task 10: Read Text III and note down the main points.* The author's communicative purpose:** To argue that geothermal energy gets too little attention, although it is greener than wind and solar. **The advantages of geothermal energy**: The United States is rich in geothermal energy, which provides about the same amount of power as the combined output of wind and solar energy, says MIT geophysicist M. Nafi Toksöz. Geothermal is a greener source of power than either solar or wind. It doesn‘t compete with food crops like biomass does, and it can provide base-load electricity without the need for coal, nuclear, or natural gas as backups, unlike wind and solar. Also, a geothermal operation has a far smaller footprint than windmills and solar panels. Geothermal is as green as it gets. **The technical process to tap geothermal energy:** The Earth‘s core emits enor-mous amounts of heat, which, when combined with water—either naturally in hydrothermal reservoirs, or artificially—creates the steam needed to turn a turbine and produce electricity. Water is pumped down at high pressure, creating a reservoir amid the cracks and fissures in the rock. The water is returned to the surface, where hydrothermal energy is extracted to create electricity. The water is then recirculated. Nothing is released to the environment except heat, and no long-term wastes accumulate. Unlike with fossil fuels, no CO2 or other greenhouse gases are produced. **The author's suggestions:** The governments should not get involved in subsidizing any form of energy. Federal involvement, even in energy research and development, has been fitful and haphazard—and probably counterproductive. Geothermal should have to prove itself in the marketplace.

***Task 12: Complete the following science report with words or word chunks you hear.***

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**(http://www.scientificamerican.com/podcast/episode/35-years-of-renewable-energy-12-07-08/)** (1) dedicated to (2) energy efficiency (3) thermal energy (4) hot rocks (5) renewable technologies (6) wind and solar (7) natural gas (8) solar manufacturing ***Task 13: Note down the main point of Prize–winning New York Times columnist Tom Friedman's talk about his new book: Hot, Flat, and Crowded: Why We Need a Green Revolution—And How It Can Renew America.* (http://www.scientificamerican.com/podcast/episode/451d2588-fbf7-96b5-5767e30ece43ba17/)** 1) *Hot, Flat, and Crowded refers to the* three big seismic events:

Global warming

Global flattening, which is really just my shorthand for the rise of middle classes all across the world that increasingly have the kind of energy and consumption patterns, demands, and aspirations of Americans

Global crowding—global population growth

2) The five problems in the 21st century as a result of the three seismic events:

Climate change

Petro-dictatorship

Demand constraints

Biodiversity loss

Energy poverty

3) The basic argument of the new book: How we manage these five problems is what is really going to determine the stability and instability of the 21st century. Note: Although the transcription is available at http://www.scientificamerican.com/podcast/episode/451d2588-fbf7-96b5-5767e30ece43ba17/, students should be discouraged from reading the transcription for understanding the interview or improving their listening comprehension. Interviews and talks are not intended for reading. The students should be encouraged to gradually adapt themselves to authentic language and understand the main points of interviews and other types of spoken discourse.

***Task 14: Note down the main points of an interview about ―A Solar Grand Plan" published in the Scientific American magazine.***

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**(http://www.scientificamerican.com/podcast/episode/f304542b-e7f2-70f7-e6caef1c8b401080/)**

Notes:

1) Past articles say: It is theoretically impossible to replace fossil fuels with solar power in the U.S.

Reason: There is not enough consistent solar radiation across the country", It's only for a few hours a day.

2) This ―Solar Grand Plan‖ article says: It is possible to replace fossil fuels with solar power in the U.S.

Reason: Put really vast arrays of photovoltaic cells and solar thermal plants in the Southwest covering thousands of square miles can clearly generate enough power for the country.

3) What is required is: A new direct-current transmission system that will branch out from the Southwest to the rest of the country to deliver the power.

4) Land requirement: 46–49,000 square miles.

5) Reaction from the people in Arizona: Angry and concerned. They are planning some large demonstrations.

6) The concern of the people in Arizona: Damage to the ecological system.

7) Estimate of power generation by 2050: You could generate 69 percent of all United States electricity and 35 percent of the total energy requirements in the country

8) Two big assumptions for the plan:

replacing utility power

converting cars and truck into hybrid types

9) The economic implications: Eliminating need for importing oil.

10) Political implications: Change of international relations policy

11) Other advantages of solar power: No mining, no drilling, no processing, it actually saves land.

***Task 15: Complete the following notes according to what you hear.* (http://www.scientificamerican.com/podcast/episode/f304542b-e7f2-70f7-e6caef1c8b401080/)**

1) From, 2010 to 2020 roughly, the federal government would have to supply about (1) 420 billion dollars in subsidies to build the (2) photovoltaic systems, (13) solar power systems, (4) the compressed air systems, (5) the direct current system. By 2050, all the components of this new industry would be (6) on their own.

2) It's a lot of money, But it's actually (7) less money than what was spent to create the whole (8) federal interstate highway system, which completely remade the system of commerce in the country.

3) The federal government invested in the Internet connection first and then (9) the whole technology was privatized. That's the way cancer research works in this country too, where the federal government (10) sponsors the initial

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research and then the pharmaceutical companies (11) take advantage of what's been learned and develop the drugs (12) for profit. So, it's really the standard business model.

4) It's how lots of things get done, (13) the telephone systems, (14) farming systems, that's how essentially the government is putting (15) in the seed money.

5) The cost of not doing it: (16) Fossil fuels cost a lot of money and have a lot of (17) climate impact; this plan will also reduce (18) carbon dioxide emissions to about a third of what they are now by 2050.

***Task 16: Watch a debate over the proposition "What the world needs now is nuclear energy" and summarize the main reasons for supporting or not supporting the statement.* (http://www.ted.com/talks/debate\_does\_the\_world\_need\_nuclear\_energy)**

**The main reasons for supporting the statement:** Nuclear energy is constant, clean, and scalable. Wind and other renewable energy are not constant. The nuclear waste typically goes into a dry cask storage. Nuclear energy creates less greenhouse gases than other renewable energy.

**The main reasons for NOT supporting the statement:** Nuclear energy puts out more carbon dioxide, puts out more air pollutants, enhances mortality more and takes longer to put up than real renewable energy systems, namely wind, solar, geothermal power, hydro-tidal wave power. Nuclear energy is associated with nuclear energy proliferation.

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**Unit 4 Evolution**

***Task 2: Read the opening paragraph of Text I and determine what prompted the author to compare Darwin and Lincoln.*** It's not the coincidence of their birthday, but the fact that they each touched off a revolution that changed the world.

***Task 3: Read the first 5 paragraphs of Text I and compare the background, experiences, and habits of Darwin and Lincoln to show how both of them became self-made men. Give an oral summary of the information in the chart.***

**Darwin**

**Lincoln**

He was born on Feb. 12, 1809.

He was born on Feb. 12, 1809.

He was a great man in the 19th century.

He was a great man in the 19th century.

He was a scientist who touched off a revolution that changed the world.

He was a politician who touched off a revolution that changed the world.

He lost his mother in early childhood.

He lost his mother in early childhood.

He suffered from depression.

He suffered from depression.

He wrestled with religious doubt.

He wrestled with religious doubt.

He had a strained relationship with his father.

He had a strained relationship with his father.

He lost children to early death.

He lost children to early death.

He didn't show prospect of success when he was young.

He didn't show prospect of success when he was young.

He published "The Origin of Species" at 50.

He won the presidency at 51.

He was born to rich parents. He was a rich-kid dilettante. He didn't seriously consider learning.

He was born in a log cabin with a dirt floor.

He didn't receive much formal education in any special subject. He had only a year of schooling as a boy—and that spread out in dribs and drabs—Lincoln taught himself. He started out as an amateur naturalist, a beetle collector, a rockhound. Lincoln was not a quick study. He worked slowly to master a subject. He both had restless, hungry minds.

He didn't seriously consider the idea He mastered trigonometry (for work as a

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of being a physician or a preacher. He shipped out with the Beagle without a serious purpose. surveyor), he read Blackstone on his own to become a lawyer. He cared for nothing but shooting, dogs, and rat catching.

He memorized swaths of the Bible and Shakespeare. He shed his aimlessness and replaced it with a scientific sense of skepticism and curiosity so rigorous and abiding that he would be a workaholic almost to the day he died. At the age of 40, after he had already served a term in the U.S. House of Representatives. Darwin was also in the grip of an idea so subversive that he would keep it under wraps for another two decades. But the crucial thing is that he did all this by himself. He undertook Euclidean geometry as a mental exercise. He became the very model of a modern major scientist without benefit of graduate school, grants or even much peer review. As exact coevals, both Darwin and Lincoln are great men in the 19th century although one is a scientist and the other is a politician. Each of them touched off a revolution that changed the world. If we take a closer look at their lives, they have more in common than their birthday coincidence. Both lost their mothers in early childhood and both suffered from depression. Both wrestled with religious doubt. Each had a strained relationship with his father, and each of them lost children to early death. Both spent the better part of their 20s trying to settle on a career. Neither men showed much prospect for success when they were young. Both became successful late in life. In terms of personality, both men were private and guarded.

***Task 4: Tell the story of Darwin's life and his research in a chronological order with the help of the following time expressions.***

On Feb. 12, 1809, he was born.

When he was 22 years old, he was an amateur naturalist, a beetle collector, a rock hound, and he was allowed to ship out with the Beagle as a someone who might supply good conversations at the captain‘s table.

Shortly before the voyage was over, he mulled over what had had seen on the Galapagos.

By the time he left the Beagle in 1836, he was plainly becoming convinced that, contrary to the prevailing wisdom, life is not static—species change and evolve.

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After reading economist Thomas Malthus, he confirmed his theory that species evolve and the ones best adapted to their environment thrive and leave more

Two years later, he conceived the idea of natural selection, offspring, crowding out the rest.

For 20 years, he didn‘t rush to publish his theory. Instead, he sat on it and refined it, recording the results of his research in disparate fields and animal husbandry and barnacles.

When he was 50, he published his ―The Origin of Species‖

***Task 5: Answer the following questions based on the information in paragraphs 11-18 of Text I.***

1) What have you learned about Lincoln from this part?

In 1838, he delivered his ―Address before the Young Men's Lyceum of Springfield‖.

In 1861, he delivered his farewell speech in Springfield, Ill.

In 1863, he made ―The Gettysburg Address‖.

In 1865, he made his Second Inaugural.

2) What is Lincoln's most impressive characteristics? Give an example to explain.

His spirit of perfecting his words is the most impressive one, because what he says and how he says it are one. For example, the Gettysburg Address was gestated when it was one of the lowest points of the Union. When the North were wondering about the goal of their fighting, he was keenly aware of the need to clarify the issue. Then he made one of the greatest speech in American history in 272 words in which he defined the purpose of war and the national principle so thoroughly that today no one would think of arguing otherwise.

3) What was the purpose of the Civil War according to Lincoln? How did he state it ?

The purpose of the war is to fight to preserve the national principle of equality. He put it as a fact instead of an argument. And the word ―proposition‖ serves as a hint that equality is not self-evident as the founders stated in the Declaration of Independence. It is what we believe in and must fight for. Besides, he took the war as a chance to test whether the republican democracy can endure long or not.

4) What are the two pillars of Lincoln‘s political genius?

One is his uncanny awareness of what could be done at any given moment. The other is his ability to change his mind to adapt to circumstances, to grow.

5) According to the author, in what way did Lincoln change his belief to adapt to the different circumstances?

In his Springfield address in 1828, he said the reverence for the laws should be breathed by every American mother and her child, but in his Second

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Inaugural of 1865, he said all people, including the mother and her baby should bear the battle to cherish a just and lasting peace. He is a believer, but it is hard to say just what he believed. And he adamantly refuses to decipher God‘s purpose. And he never, ever claims that God is on his side. And the author thinks that what he said about God‘s true and righteous judgment in his Second Inaugural is a paradox. 6) What was Lincoln's writing style? How did he develop this style? It was forthright, rhythmic, muscular, beautiful, but never pretty. He chose language and organization of language to best suit the situation, the purpose, and the audience. Language was his sword. For this purpose, he has always tried hard to master the power of language, as shown by his habits of constantly revising his remarks and jotting down phrases, notes and ideas.

***Task 6: Explain the following sentences in your own words.*** 1) At the center of what people then believed was that God created the world and that man was the crown of creation. The central belief at that time was that God was the Creator of the world and man was the climax of his creation and superior to the rest.

2) In the next paragraph, he continues this idea of contingency: "Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure."

In the next paragraph of the Gettysburg Address, he explained that the unexpected occurrence of the war was a chance to test whether the nation built on the principle of equality could last long or not.

3) "Fondly do we hope, fervently do we pray, that this mighty scourge of war may speedily pass away. Yet, if God wills that it continue until all the wealth piled by the bondsman's two hundred and fifty years of unrequited toil shall be sunk, and until every drop of blood drawn with the lash shall be paid by another drawn with the sword, as was said three thousand years ago, so still it must be said 'the judgments of the Lord are true and righteous altogether'."

We sincerely hope and pray that the disaster of war would end up as soon as possible. But if it is God's will to continue the war until the wealth accumulated on the painful labor of the slaves is gone and blood is paid for blood, then it is right to continue the war. This is God‘s justice mentioned in the Bible three thousand years ago, and God‘s judgment on the nation is right and fair.

4) It is here, just when he has brought his audience to the edge of the cliff, that Lincoln spins on his heel and concludes, "With malice toward none; with charity for all …" Even today, reading that conclusion after what's come before is like coming out of a tunnel into bright sunshine—or out of a war that claimed more than 600,000 lives.

Just when he brought his audience on the verge of the war and bloodshed, he made a sudden change of his train of thought and ended his speech by pointing out that the intention of the war is not to hurt anyone but to achieve a

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just and lasting peace among ourselves and with all nations. However, it is still very hard to accept the ―healing‖ words after experiencing such a disastrous war which cost so many lives.

***Task 10: Identify the views or arguments of different researchers mentioned in Text II on the issue whether human beings are still evolving.* Are human beings still evolving?**

**Scholars/researchers**

**Views/Arguments**

Steve Pinker, Harvard based evolutionary biologist

It depends on how you define evolution. From a biological perspective, he thinks significant human biological evolution stopped between 50,000 and 100,000 years ago.

Kate Douglas, author of Text II

Human evolution is still going on.

Bruce Lahn of the University of Chicago

Two genes involved in brain development that emerged in recent human history and swept quickly through the population.

Steve Jones, a geneticist at University College London

Natural selection is no longer important for humans.

Christopher Wills of the University of California, San Diego.

Culture itself could be driving natural selection.

Gregory Cochran, Henry Harpending, University of Utah in Salt Lake City

Natural selection has increased the intelligence of Ashkenazi Jews in the past 1000 years.

Geoffrey Miller of the University of New Mexico,

The rate of human evolution is accelerating.

Ray Kurzweil

Humans are evolving.

Daniel Dennett from Tufts University in Boston.

Humans are evolving at a rather swift pace.

***Task 11: Read Text III and complete the following notes.* Notes:**

1) It is difficult to study emotion

Reasons:

There is little consensus on the meaning of the term.

People are careful not to report their true thoughts and feelings.

The influence of behaviorism and psychoanalysis on the scientific study leaves the study of emotion impossible.

It's difficult to describe emotions accurately.

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2) We can study emotion from a psychoevolutionary perspective.

The adaptive function of fear and anxiety: Provide heightened arousal of an animal who senses a predator or a threat to its offspring.

The adaptive function of love and emotional attachment: Promote pair bonding, reproduction and parental investment, basic to evolutionary fitness in human beings.

3) Definition of Emotion from an evolutionary perspective

A complex chain of loosely connected events that begins with a stimulus and includes feelings, psychological changes, impulses to action and specific, goal-directed behavior. Emotions are activated in an individual when issues of survival are raised in fact or by implication.

4) The modeling of emotions based on the psychoevolutionary theory

Eight basic bipolar emotions model: joy versus sorrow, anger versus fear, acceptance versus disgust, and surprise versus expectancy. The psychoevolutionary theory assumes there are eight basic emotion dimensions arranged in four pairs.

***Task 12: Note down the answers people would give to the following questions back in the 1790 or 1800 at the end of the Enlightenment.* (http://oyc.yale.edu/ecology-and-evolutionary-biology/eeb-122/lecture-1)** 1) How old is the world? They would say: "Oh thousands of years." 2) Where did all these species on the planet come from? They would say: "They were all created just the way they look now and they've never changed." 3) Have there ever been any species that went extinct? They would say, "No, everything that was created is still alive and can be found somewhere on the planet."

***Task 13: Answer the following questions about Darwin's early life based on what you hear.* (http://oyc.yale.edu/ecology-and-evolutionary-biology/eeb-122/lecture-1)** 1) How did Darwin like the med school he went to in Edinburgh? He didn't like it. 2) What did he love as a young man? He loved beetles.

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3) How old was Darwin when he got on the British ship to go around the world? 22. 4) What was his goal in life? To solve the problem "where do species come from?"

***Task 14: Complete the following passage with the information you hear.* (http://oyc.yale.edu/ecology-and-evolutionary-biology/eeb-122/lecture-1)** (1) competitive struggle for resources (2) powerful reproduction (3) food resources (4) next generation (5) natural selection (6) mechanism (7) consequences (8) British naturalist (9) let Wallace have the idea (10) do a joint publication (11) rushes his book into print (12) remained in print ever since

***Task 15: Listen to a talk about evolution and answer the following questions.* (http://www.ted.com/talks/harvey\_fineberg\_are\_we\_ready\_for\_neo\_evolution)**

1) The three possibilities of evolution:

We will not evolve.

There will be evolution of the traditional kind, natural, imposed by the forces of nature.

The new evolution that is not simply natural, but guided and chosen by us as individuals in the choices that we will make.



2) The main points of each possibility:

First, we have, through medicine, managed to preserve a lot of genes that would otherwise be selected out. And secondly, we have managed to make the environment adapt to us as well as we adapt to it. And by the way, so much intermix make it impossible for the evolution to take place.

The wheels are inexorable. And when we as a species do colonize distant planets, there will be the isolation and the environmental changes that could produce evolution in the natural way.

The rapid development of genetic engineering has made it possible for people to make choices on their genes.

Evolution does not necessarily favor the longest-lived. It doesn't necessarily favor the biggest or the strongest or the fastest, and not even the smartest. Evolution favors those creatures best adapted to their environment. That is the sole test of survival and success. At the bottom of the ocean, bacteria that are thermophilic and can survive at the steam vent heat that would otherwise produce, if fish were there, sousvide cooked fish, nevertheless, have managed to make that a hospitable environment for them.

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So what does this mean, as we look back at what has happened in evolution, and as we think about the place again of humans in evolution, and particularly as we look ahead to the next phase, I would say that there are a number of possibilities. The first is that we will not evolve. We have reached a kind of equipoise. And the reasoning behind that would be, first, we have, through medicine, managed to preserve a lot of genes that would otherwise be selected out and be removed from the population. And secondly, we as a species have so configured our environment that we have managed to make it adapt to us as well as we adapt to it. And by the way, we immigrate and circulate and intermix so much that you can't any longer have the isolation that is necessary for evolution to take place. A second possibility is that there will be evolution of the traditional kind, natural, imposed by the forces of nature. And the argument here would be that the wheels of evolution grind slowly, but they are inexorable. And as far as isolation goes, when we as a species do colonize distant planets, there will be the isolation and the environmental changes that could produce evolution in the natural way. But there's a third possibility, an enticing, intriguing and frightening possibility. I call it neo-evolution—the new evolution that is not simply natural, but guided and chosen by us as individuals in the choices that we will make. Now how could this come about? How could it be possible that we would do this? Consider, first, the reality that people today, in some cultures, are making choices about their offspring. They're, in some cultures, choosing to have more males than females. It's not necessarily good for the society, but it's what the individual and the family are choosing. Think also, if it were possible ever for you to choose, not simply to choose the sex of your child, but for you in your body to make the genetic adjustments that would cure or prevent diseases. What if you could make the genetic changes to eliminate diabetes or Alzheimer's or reduce the risk of cancer or eliminate stroke? Wouldn't you want to make those changes in your genes? If we look ahead, these kind of changes are going to be increasingly possible.

***Task 16: Answer the following questions according to an interview about an evolutionary explanation of friendships.* (http://www.bbc.co.uk/programmes/b03yn6xm)**

1) What new approach does Professor Robin Dunbar use in his research?

Studying the evolutionary behavior of monkeys and apes, including human beings.

2) What's is the title of Robin Dunbar's new book?

"How many friends does one person need?"

3) What is the size of "Dunbar's Number"? What does this number mean?

140. It is the limit on the number of true relationships and friendships you can have. It is the number of true friends that a person can cognitively manage.

4) What is the evolutionary theory behind the Dunbar's number?

Complex social networks of deeply bonded relationships are very demanding cognitively and need large brains.

5) What is the average size of an 16th century or 18th century village?

150.

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6) What factors have shaped our networks of friendships in the 20th century?

Social and cultural history, changing patterns of how we live in the west. You can keep in touch with friends thousands of miles away. e of sustaining a meaningful relationship.

***Task 17:Complete the following notes according to what you hear* (http://sharethefiles.com/forum/viewtopic.php?t=97938#p594298)** 1) Coyote vs its prey

Place to live: American Southwest

Skills to learn for survival: chase, kill

Success rate of its hunting: one in six hunts

Way to detect its prey: use its nose

Horned lizard‘s self-protecting method: freezing themselves to be motionless to confuse his enemy

1) Wild dogs vs impala

The key to its successful hunting: speed and teamwork

Success rate of its hunting: 85%

3) Scavengers

Animals that eat dead animals killed by another animal: spotted hyena and vulture

Their food:the remaining bones, skin and scraps of flesh

2) Crocodile vs. wildebeest

Reason for fighting:quest for water

Way of killing its prey:clamping its jaws into its prey and forcing it down until it drowns

Ways of animals to achieve a bloody balance: slaughter, pursuit

***Task 18: Watch the video and answer the following questions.* (http://sharethefiles.com/forum/viewtopic.php?t=97938#p594298)**

1) Why don‘t bison and elks enjoy winter?

No, in particularly cold winter, more than half of the bison and elk may starve.

2) Why are coyotes known as super survivor?

They can eat both the games they kill themselves and winter-killed animals like carions.

3) How do coyotes resolve disputes among themselves?

They resolve disputes with posturing and threats, rarely with bloodshed.

4) Why are the black billed magpies called highly adaptable hunters?

Because in winter they rely on carions, in warmer weather they prey on insects and rodents. But when prey is scarce, they fare better as camp followers of coyotes

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**Unit 5 Mind and Brain**

***Task 2: Read the opening section of Text I and identify the sentence which***

***announces the author's communicative purpose. Then skim through***

***the text and complete the following diagram which demonstrates the***

***discourse pattern of the text.***

My research traces the possible pathways for the life-enhancing effects of

positive emotions and attempts to understand why human beings evolved to

experience them.

***Task 3: Read the opening section of Text I and answer the following questions.***

1)What can we learn from the Catholic nun study?

It found positive emotions correlate positively with life expectancy.

2) What was Martin E.P. Seligman's contribution to the study of postivie

psychology?

Seligman is the founder of positive psychology. He devoted much of his

research career to studying mental illness and found the imbalanced

development of the study of negative emotions. So he set up the branch of

positive psychology to investigate the value of positive emotions.

3) What was the research focus of many psychologists in the past? What change

has taken place later?

What is the value of positive

emotion?

The broaden-and-build theory:

Positive emotions broaden an

individual‘s momentary mindset,

and by doing so help to build

enduring personal resources.

The undoing hypothesis: Positive

emotions undo the lingering

effects of negative emotions.

Positive emotions promote

longevity: Positive emotions

increase the likelihood of feeling

good in the future.

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In the past, many psychologists were engaged in the study of mental illness, while now many have been drawn to positive psychology, the uncharted terrain of human strengths and the sources of happiness. 4) What discoveries have been made from the research on positive psychology? Research found that people who think positively and feel good actually live longer. The research also provided some possible explanations of such a phenomenon. 5) What is the importance of studying positive psychology? To improve individual and collective functioning, psychological well-being and physical health of people. 6) What questions need to be investigated? Why and how do positive emotions contribute to a better life? To be specific, exactly how do positive thinking and pleasant feelings help people live longer? Do pleasant thoughts and feelings help people live better as well? And why are positive emotions a universal part of human nature?

***Task 4: Answer the following questions based on the information in the "Why So Negative" section in Text I.***

1) Why did positive emotions receive little attention in the past?

Reason 1: Positive emotions do not afflict the well-being of human and thus attract less attention. Reason 2: Positive emotions lack clear differentiations and therefore may be a little harder to study.

It lacks clear taxonomy.

It lacks clear words.

It lacks clear physical components of emotional expressions.

Reason 3: Positive emotions cannot be explained from the perspective of conventional psychology.

2) What is the importance of negative emotions?

Negative emotions help human being to survive in life-threatening situations.

3) How do negative emotions contribute to the evolution of mankind?

Negative emotions → Specific urges to act → Physiological changes→ physical actions

4) What problem arises when we try to explain the value of positive emotions from an evolutionary perspective?

Positive emotions such as joy, serenity, and gratitude do not have much adaptive value, because they don't help our ancestors' survival in life-threatening situation.

5) What is the communicative purpose of this section?

Thus section justifies the study of positive emotions. By examining the reasons why positive emotions received little attention and the progress in the study of negative emotions, the author intends to emphasize the significance of positive psychology and indicate the direction in which the

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research should go in the future.

***Task 5: Note down the main points of the hypotheses and tests described in the "The Broaden-and-Build Theory" section of Text I and then give an oral summary of each test.*** 1) The broadening effect hypothesis **Test 2: Researchers**：Alice Isen and her colleagues **Purpose**：Test whether participants think creatively **Subjects/Participants:** Some people (unidentified) **Method:** Participants were required to take the Mednick's Remote Associates Test. **Finding:** Isen and colleagues showed that people experiencing positive affect perform better on this test than people in neutral states. **Conclusion:** Isen and colleagues showed that people experiencing positive affect perform better on this test than people in neutral states. **Test 3: Researchers**：Alice Isen and her colleagues **Purpose**：Test the clinical reasoning of physicians **Subjects/Participants:** Some of the physicians **Method:** They made some of the physicians feel good by giving them a small bag of candy, then asked all of them to think aloud while they solved a case of a patient with liver disease. **Finding:** Content analyses revealed that physicians who felt good were faster to integrate case information and less likely to become anchored on initial thoughts or come to premature closure in their diagnosis. **Conclusion:** It confirms conclusion 2. **Test 4: Researchers**：Alice Isen and her colleagues **Purpose**：Test whether positive emotions induce better solutions of negotiators **Subjects/Participants:** Some negotiators **Method:** Not mentioned **Finding:** Negotiators with good emotions were more likely to discover integrative solutions in a complex bargaining task. **Conclusion:** The same as conclusion 3 2) The building effect hypothesis **Test 1: Researchers**：My students and I **Purpose**：Examine the participants' resilience and optimism **Subjects/Participants:** Group of people (unidentified)

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**Method:** The people were originally interviewed in the early months of 2001, and then again in the days after the September 11th terrorist attack. We asked them to identify the emotions they were feeling, what they had learned from the attacks and how optimistic they were about the future. **Finding:** We learned that after September 11nearly everyone felt sad, angry and somewhat afraid. And more than 70 percent were depressed. Yet the people who were originally identified as being resilient in the early part of 2001 felt positive emotions strongly as well. They were also half as likely to be depressed. Gratitude was the most common positive emotion people felt after the September 11th attacks. **Conclusion:** The tendency to feel more positive emotions buffered the resilient people against depression. Feeling grateful broadened positive learning, which in turn build optimism. **Test 2: Researchers**：My students and I **Purpose**：Test the building effect of positive emotions **Subjects/Participants:** Group of college students **Method:** After the course of a month-long study of daily experiences, we induced one group of college students to feel more positive emotions by asking them to find the positive meaning and long benefit within their best, worst and seemingly ordinary experiences each day. At the end of the month, they were compared with others who did not make this daily effort to find positive meaning. **Finding:** Those who were trained to find the positive meaning and long benefit within their best, worst and seemingly ordinary experiences each day showed increases in psychological resilience. **Conclusion:** Positive emotions help to build resilience.

***Task 6: Describe the experiment to test "the undoing hypothesis‖.* The Undoing Hypothesis:** The positive emotions may undo the lingering effects of negative emotions. **Test : Researchers**：My colleagues and I **Purpose**：Test the undoing hypothesis **Subjects/Participants:** Group of people (unidentified) **Method:** We began by inducing a negative emotion. We then randomly assigned the participants to view one of four films. We then measured the time elapsed from the beginning of the randomly assigned film until the cardiovascular reactions induced by the speech task returned to each participant‘s baseline levels.

**Finding:** Those individuals who watched the two positive-emotion films

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recovered to their baseline cardiovascular activity sooner than those who watched the neutral film. Those who watched the sad film showed the most delayed recovery. **Conclusion:** Positive emotions had a clear and consistent effect of undoing the cardiovascular repercussions of negative emotions.

***Task 7: Identify the other hypotheses about the value of positive emotions in the last section of the Text I.*** Three other hypotheses about the value of positive emotions

Hypothesis 1

Experiencing positive emotions increases the likelihood that one will feel good in the future.

Hypothesis 2

Positive affect and broadened thinking mutually enhance each other.

Hypothesis 3

Positive emotions may also transform groups of people within communities and organizations.

Some of them are not confirmed yet but indicate that positive psychology will contribute the well-being of humanity in the future.

***Task 8: Identify hedges (words or expressions used to show the author's cautiousness when making a statement or expressing an idea and to leave room for further exploration) in the last two sections of Text I.***

1) We might also ask whether there are other immediate benefits to experiencing positive emotions...

2) ...then perhaps positive emotions undo the lingering effects of negative emotions.

3) Such effects may extend to the physiological realm.

4) A number of studies suggest that the cardiovascular activity associated with stress and negative emotions...

5) Experiments on non-human primates reveal that recurrent emotion-related cardiovascular activity also appears to injure the inner walls of arteries and initiate atherosclerosis.

6) ...they may also loosen the hold that negative emotions gain on both mind and body,

7) It may be that broadening one‘s cognitive perspective by feeling positive emotions mediates the physiological undoing.

***Task 9: Paraphrase John Milton's words ―The mind is its own place, and in itself can make a heaven of hell, a hell of heaven.‖***

Whether it is a heaven of hell or a hell of heaven is determined by your attitude.

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It is your thinking rather than the circumstances that decide how you feel.

If you think positively, you will see a heaven in hell; if you think negatively, you will see a hell in heaven.

If you think positively, you will feel positive emotions; if you think negatively, you will feel negative emotions.

If you are optimistic, your life will be full of happiness, whereas if you are pessimistic, your life will be full of sadness.

If you want to feel more positive emotions, your mind should look for positive meanings in everyday experiences.

The best way to experience more positive emotions is to find positive meanings within current circumstances, including adversity, ordinary events, and problem solving.

***Task 10: The following are words to express different types of emotions. Work in groups to put them in the right place in the chart.***

**Basic emotions**

**Secondary emotions**

**Causes**

**Resulting acts**

Anger

annoyance, antagonism, displeasure, enmity, fury, hatred, impatience, indignation, irritation, outrage, rage, resentment, mad

Offence

Attack

Disgust

aversion, antipathy, dislike, distaste, hatred, loathing, nausea, objection, repugnance, repulsion, sickness

Nasty things

Expel

Fear

apprehension, angst, anxiety, concern, dismay, doubt, dread, horror, scare, suspicion, terror, unease, worry, awe, timidity

Threat or danger

Escape

Happiness

satisfaction, bliss, contentment, delight, elation, enjoyment, euphoria, exhilaration, glee, joy, jubilation, optimism, pleasure, well-being, cheerfulness, ecstasy, felicity, hopefulness, lightheartedness, playfulness, vivacity

Pleasant things

Smile

Sadness

depression, anguish, grief, heartache, heartbreak,

Loss

Cry

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hopelessness, melancholy, misery, mourning, sorrow, distress, gloominess

Surprise

amazement, astonishment, awe, bewilderment, shock, wonder

Unexpectedness

Jaw drop

***Task 12: Skim through the opening section of Text II and answer the following two questions.***

1) What questions are discussed in the text?

The text mainly discuss the two related questions in the study of sleep: What is sleep? Why do you need it?

2) Why is it important to study sleep?

Sleep is important for it consumes one third of our lives. The study of sleep is a newly-developed field of scientific inquiry and the nature and function of sleep are not completely understood. ***Task 13: Read the opening section and "What is Sleep?"section to find out how the following writers describe "sleep".*** What is sleep? Shakespeare: Sleep knits up the raveled sleeve of care and is the balm of hurt minds, great nature‘s second course, chief nourisher in life‘s feast. Cervantes: Sleep is the food that cures all hunger, the water that quenches all thirst, the fire that warms the cold, the cold that cools the heart… the balancing weight that levels the shepherd with the king, and the simple with the wise. Kleitman & Aserinsky: Sleep is a state in which REM sleep(quiet sleep) alternates with non-REM sleep(periods of rapid eye movement) in a regular cycle. The author: The nature of sleep is explained on the level of nerve cells(neurons) in the brain which behave differently during the three states: awaking, REM sleep, non-REM sleep.

State

Brain neurons

Physical features

awaking

Most are at or near their maximum levels of activity. Neurons behave individually.

Not mentioned

non-REM sleep

Most in the brain stem reduce or stop firing. Most in the cerebral cortex reduce their activity only slightly and fire synchronously.

Regular breathing and heart rate

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Sleep-on neurons are maximally active.

REM sleep

Neurons behave individually. Most in the forebrain and brain stem are quite active. REM sleep-on cells become especially active. The brain stops releasing those neurotransmitters that activate motoneurons and instead send other neurotransmitters that shut down the motoneurons. The motoneurons that control the muscles that move the eyes are not affected.

Dreams Irregular breathing and heart rate Body temperature drifts toward environment.

***Task 14: Read "The Function of Sleep" and "Other Possibilities" sections and complete the following chart. Give an oral summary with the help of the information in the chart.*** What is sleep for?

Researchers

Hypotheses

Related studies

Types of sleep

My research group

The cell-repair hypothesis(Non-REM sleep wards off metabolic harm.)

The study of sleep deprivation or reduction; The study of sleep amount (It is determined by the size of the creature.)

Non-REM sleep

Michael Rogwski and I

The cessation of neurotransmitter release is vital for the proper function of these neurons and of their receptors.

Various studies indicate that constant release of monoamines can desensitize the neurotransmitters' receptors.

REM sleep

Frederick Synder and Thomas Wehr

The elevated activity during REM sleep of brain cells that not involved in monoamine production enables mammals to be more prepared than reptiles

The observation that humans are much more alert when awakened during REM sleep than during non-REM periods supports this idea.

REM sleep

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to cope with dangerous surroundings.

Some researchers

REM sleep might have a role in memory consolidation.

Not mentioned.

REM sleep

Michel Jouvet

REM sleep's intense neuronal activity and energy expenditure have a role early in life in establishing the genetically programmed neuronal connections that make so-called instinctive behavior possible.

Howard Roffwarg's experiment with cat. Our study with the platypus.

REM sleep

***Task 15: Read the article entitled "Facing Darkness" in Text III and note down the main points as outlined below. Then discuss effective ways of coping with negative emotions such as depression, anger, sadness, depression, etc. You may use the information in Text III.* Notes:**

1) The reasons why many men try to hide their depression

Bob Antonioni kept his depression from the people around him, because he didn't want to sound like he couldn't take care of myself, that he wasn't manly. When he openly talked about his depression, the response was universally positive.

Men often suffer silently instead of seeking help, because in American traditional culture, men often view asking for help as an admission of weakness, a betrayal of their male identities.

Men often fail recognize symptoms of depression.

The image of successful men in American culture is strong, always up, positive, in charge and in control of his emotions. It is not depressed, down or sad.

2) The consequences of depression.

Destroying marriages, disrupting careers, filling jail cells, clogging emergency rooms and costing society billions of dollars in lost productivity and medical bills. It is also creating a cohort of children who carry the burden of their fathers' pain for the rest of their lives.

3) New understanding of depression

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Depression affects the behavior of men and women differently.

Depressed women often weep and talk about feeling bad; depressed men are more likely to get into bar fights, scream at their wives, have affairs or become enraged by small inconveniences like lousy service at a restaurant.

David Feherty's symptoms are alcoholism, physical pain. When David Feherty was diagnosed with depression, he felt shocked and relieved.

Researchers have developed depression-screening tests which help doctors assess the patients' emotional state and detect symptoms at an early stage.

New research found that the cause of depression is the nerve cells themselves and how the brain's circuitry can be permanently damaged by hyperactive stress responses, brought on by genetic predisposition, prolonged exposure to stress or even a single traumatic event.

4) Treatment of depression

Medications that block the production of excess stress chemicals, hoping to reduce damage to otherwise healthy nerve cells.

Hormonal therapy

Deep brain stimulation

Fast-acting antidepressants

The most effective remedy remains a combination of medication and therapy.

5) Attitude towards depression and the right definition of a man

Taking care of yourself physically, mentally and emotionally—maybe that's the real definition of what it means to be a man.

***Task 16: Fill in the blanks in the following science news report with the information you hear.* (http://www.scientificamerican.com/podcast/episode/lots-or-little-sleep-linked-to-sick-days/)** (1) *chief nourisher in life’s feast* (2) Insufficient sleep (3) diabetes and obesity (4) a significant increase in (5) participated in (6) increased dramatically (7) was associated with (8) seven hours 46 minutes (9) sleep patterns *(10) knits up the raveled sleeves of care* ***Task 17: Listen to a report on children's intellectual development and answer the following questions.***

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**(http://www.economist.com/news/science-and-technology/21581698-regular-sleeping-hours-really-are-good-childrenif-they-are-girls-bedtime)** 1) What is Dr Kelly's research interest? She's interested in studying the connection between sleep habits and cognitive ability. 2) Why did she carry out the research on children? Many studies on the connection between sleep habit and cognitive ability had been conducted in adults and adolescents, but little such research had been done on children. 3) How did she conduct the research? Family interviews were conducted with 11,178 children respectively at the age of nine months, three years, five years and seven years. 4) What did she find from her research? A regular bedtime helped the development of cognitive ability among girls. Boys were not affected by the bedtime habits by the age of seven.

***Task 18***：***Answer the following questions according to what you hear.*** （**http://www.bbc.co.uk/programmes/b017w65r**）

1) What was the prevailing view about autism and dyslexia in the 1960s?

Autism was due to parents being cold and distant towards their children. Dyslexics were just lazy.

2) What was Uta's research purpose?

To understand what was felt like to be autistic and to understand what was going on in the brain.

3) What is the significance of her studies?

Her studies have fundamentally changed our views about these conditions.

4) What technology was used to support Uta's theory about autism?

Brain scan technology.

5) What is the practical use of Uta's research findings?

To improve learning in the classroom.

6) What is Uta hope's now?

She hopes her research would inform education in the same way anatomy informs medicine.

***Task 19: Watch the video of Tali Sharot's "The optimism bias" and answer the following questions.* (http://www.ted.com/talks/tali\_sharot\_the\_optimism\_bias)**

1) What is optimistic bias?

It refers to our tendency to overestimate our likelihood of experiencing good events in our lives and underestimate our likelihood of experiencing bad events.

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2) What is the logic of the people who say the secret to happiness is low expectations?

If we don't expect greatness, if we don't expect to find love and be healthy and successful, well we're not going to be disappointed when these things don't happen. And if we're not disappointed when good things don't happen, and we're pleasantly surprised when they do, we will be happy.

3) Why is that theory wrong?

Reason one: People with high expectations always feel better because of the favorable interpretation of the event that occurs to them. Reason two: Regardless of the outcome, the pure act of anticipation makes us happy. Reason three: Optimism leads to success in academia and sports and politics.

4) What is the most surprising benefit of optimism?

The most surprising benefit of optimism is health because if we expect the future to be bright, stress and anxiety are reduced.

***Task 20: Listen to a report on psychosomatic medicine and note down the information you hear.* (http://www.economist.com/news/science-and-technology/21567876-you-can-it-helps-think-well-yourself-first-place-think-yourself)**

1) The uncharted terrain: the link between mind and body.

2) The finding of recent respectable research: people with positive emotions live longer and healthier lives.

3) The concentration of Dr Fredrickson and Dr Kok: the vagus nerve.

4) The job of vagus nerve: to tell organs to slow down when calm and safe.

5) The difference between people with high vagal-tone and those with low: People with high tone are better at coping with bad feelings than those with low.

6) The purpose of the experiment on 65university staff: to determine whether positive emotion drives vagal tone or vice versa.

7) The finding of the experiment: People who meditated had increased vagal tone and the others didn't. Meditators with highest tone reported biggest increases in positive emotions and those with low tone didn't.

8) The finding of another experiment by Dr Kok: Reflecting at night on the day's social connections help to improve one's vagal tone.

Psychosomatic medicine Think yourself well. You can. But it helps to think well of yourself in the first place THE link between mind and body is terrain into which many medical researchers, fearing ridicule, dare not tread. But perhaps more should do so.

For centuries, doctors have recognised the placebo effect, in which the illusion of treatment, such as pills without an active ingredient, produces real medical benefits. More recently,

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respectable research has demonstrated that those who frequently experience positive emotions live longer and healthier lives. They have fewer heart attacks, for example, and fewer colds too. Why this happens, though, is only slowly becoming understood. What is needed is an experiment that points out specific and measurable ways in which such emotions alter an individual's biology. And a study published in Psychological Science, by Barbara Fredrickson and Bethany Kok at the University of North Carolina at Chapel Hill, does precisely that. Dr Fredrickson and Dr Kok concentrated their attentions on the vagus nerve. This nerve starts in the brain and runs, via numerous branches, to several thoracic and abdominal organs including the heart. Among its jobs is to send signals telling that organ to slow down during moments of calm and safety. How effectively the vagus nerve is working can be tracked by monitoring someone's heart rate as he breathes in and out. Healthy vagal function is reflected in a subtle increase in heart rate while breathing in and a subtle decrease while breathing out. The difference yields an index of vagal tone, and the value of this index is known to be connected with health. Low values are, for example, linked to inflammation and heart attacks. What particularly interested Dr Fredrickson and Dr Kok was recent work that showed something else about the vagal-tone index: people with high tone are better than those with low at stopping bad feelings getting overblown. They also show more positive emotions in general. This may provide the missing link between emotional well-being and physical health. In particular, the two researchers found, during a preliminary study they carried out in 2010, that the vagal-tone values of those who experience positive emotions over a period of time go up. This left them wondering whether positive emotions and vagal tone drive one another in a virtuous spiral. They therefore conducted an experiment on 65 of the university's staff, to try to find out. They measured all of their volunteers' vagal tones at the beginning of the experiment and at its conclusion nine weeks later. In between, the volunteers were asked to go each evening to a website especially designed for the purpose, and rate their most powerful emotional experiences that day. Dr Fredrickson and Dr Kok asked their volunteers to consider nine positive emotions, such as hope, joy and love, and 11 negative ones, including anger, boredom and disgust. They were asked to rate, on a five-point scale, whether—and how strongly—they had felt each emotion. One point meant not at all; five meant extremely. In addition, half the participants, chosen at random, were invited to a series of workshops run by a licensed therapist, to learn a meditation technique intended to engender in the meditator a feeling of goodwill towards both himself and others. This group was encouraged to meditate daily, and to report the time they spent doing so. Dr Fredrickson and Dr Kok discovered that vagal tone increased significantly in people who meditated, and hardly at all in those who did not. Among meditators, those who started the experiment with the highest vagal-tone scores reported the biggest increases in positive emotions. Meditators who started with particularly low scores showed virtually no such boost. Taken as a whole, these findings suggest high vagal tone makes it easier to generate positive emotions and that this, in turn, drives vagal tone still higher. That is both literally and metaphorically a positive feedback loop. Which is good news for the emotionally positive, but bad for the emotionally negative, for it implies that those who most need a psychosomatic boost are incapable of generating one. A further experiment by Dr Kok suggests, however, that the grumpy need not give up all hope.

A simpler procedure than meditation, namely reflecting at night on the day's social

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connections, did seem to cause some improvement to their vagal tone. This might allow even those with a negative outlook on life to bootstrap their way to a mental state from which they could then advance to the more powerful technique of meditation. Whether, besides improving general health, the mechanism Dr Fredrickson and Dr Kok have discovered helps explain the placebo effect remains to be investigated. But it might, because part of that effect seems to be the good feeling engendered by the fact of being treated. More generally, doctors in the ancient world had a saying: a healthy mind in a healthy body. This sort of work suggests that though this proverb is true, a better one might be, a healthy mind for a healthy body.

*Task 21: Watch the video of Martin Seligman's "The new era of positive psychology" and complete the following outline.* (http://www.ted.com/talks/martin\_seligman\_on\_the\_state\_of\_psychology)

1) What is the state of psychology today?

Good. Reasons:

Psychology worked within the disease model.

Now 14 of the disorders are treatable, two of them actually curable.

The science of mental illness has developed. We are able to identify, measure, understand, and even to invent drug treatments and psychological treatments for the mental illnesses.

Conclusion: We can make miserable people less miserable.

2) What is the state of psychology today? (two words)

Not good. Reasons:

Psychologists and psychiatrists became victimologists, pathologizers. We forgot that people made choices and decisions and we forgot responsibility.

We forgot about you people. We forgot about improving normal lives. We forgot about a mission to make relatively untroubled people happier, more fulfilled, more productive.

In our rush to do something about people in trouble, in our rush to do something about repairing damage, it never occurred to us to develop interventions to make people happier, positive interventions.

The three happy lives:

The first happy life is the pleasant life. This is a life in which you have as much positive emotion as you possibly can, and the skills to amplify it.

The second is a life of engagement—a life in your work, your parenting, your love, your leisure, time stops for you.

Third, the meaningful life.

Conclusion: To what extent do the three lives contribute to life satisfaction?

It turns out the pursuit of pleasure has almost no contribution to life satisfaction. The pursuit of meaning is the strongest. The pursuit of engagement is also very strong. If you've got all three, the full life, the sum is greater than the parts, while

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if you have none of the three, the empty life, the sum is less than the parts.

3) What is the state of psychology today?(three words)

Not good enough. Reasons: With technology, entertainment and design, we can actually increase the amount of tonnage of human happiness on the planet.

If technology can, in the next decade or two, increase the pleasant life, the good life and the meaningful life, it will be good enough.

If entertainment can be diverted to also increase positive emotion, meaning, eudaimonia, it will be good enough.

If design can increase positive emotion, eudaimonia, and flow and meaning, what we're all doing together will become good enough.

***Task 22: Watch the video of Russell Foster's "Why do we sleep" and answer the following questions.* (http://www.ted.com/talks/russell\_foster\_why\_do\_we\_sleep)**

1) How do the following people describe sleep?

Shakespeare: "Enjoy the honey-heavy dew of slumber.""O sleep, O gentle sleep, nature's soft nurse, how have I frighted thee?"

Thomas Dekker: "Sleep is the golden chain that ties health and our bodies together."

Thomas Edison: "Sleep is a criminal waste of time and a heritage from our cave days."

Margaret Thatcher: "Sleep is for wimps."

Gordon Gekko: "Money never sleeps."

2) Why do we abandon sleep in our thoughts?

Because it seems that we don't do anything much while we're asleep.

3) Why do we sleep?

Hypothesis 1: the whole restoration hypothesis. That is, all the stuff we've burned up during the day, we restore, we replace, we rebuild during the night.

Hypothesis 2: the energy conservation hypothesis. That is, we essentially sleep to save calories.

Hypothesis 3: the brain processing and memory consolidation hypothesis. That is, we sleep to consolidate our memory and enhance our creativity.

4) What is the difference in the amounts of sleep in the past and now?

In the past: Most of us got about eight hours of sleep a night, and teenagers nine hours for full brain performance.

Now: We sleep one and a half to two hours less every night, so we're in the six-and-a-half-hours-every-night league. Teenagers are only getting five hours of sleep.

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**Unit 6 Climate Change**

***Task 2: Read the underlined parts in Text I and determine which of the following is the author's communicative purpose. Then skim through Text I and work out the discourse pattern and the author's writing strategy with the help of the following chart****.*

To argue the carbon dioxide theory can explain the facts about variations in climate**.**

***Task 3: Read Text I carefully and answer the following questions.***

1) What were the most widely held theories, at the time when the article was written, to explain the variations in the climate?

a) Variations in the solar energy received by the earth, b) changes in the amount of **volcanic dust in the atmosphere**, and c) **variations in the average elevation** of the continents. **2)** Why did the author think it appropriate to reconsider the carbon dioxide theory about climate change? Because in recent years many people were rejecting the carbon dioxide theory, but new research work suggests that the usual reasons for rejecting this theory are not valid.

3) What strategy is used in paragraphs 9-11?

Two counter-arguments against the carbon dioxide theory are explained and then refuted with evidence from new research. The refutation is introduced by "however". For example, the first counter-argument is that water vapor absorption is so large that there would be virtually no change in the outgoing radiation if the carbon dioxide concentration should change. However, this conclusion was based on early, very approximate treatments of the very complex problem of the **calculation of the infrared flux in the atmosphere**. Recent accurate calculations take into account the detailed structure of the spectra of these two gases and show that they are relatively independent of one another in their influence on the infrared absorption. The second argument against the carbon dioxide theory is that the atmosphere is completely opaque at the center of the carbon dioxide band and therefore there is no change in the absorption as the carbon dioxide amount varies.

4) Why does the author discuss the two factors that can change as a result of increased carbon dioxide in the atmosphere in paras.19 and 20?

To show that the two factors will not make much difference to the rising temperature during the time interval of several centuries.

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5) What is the author's prediction of the temperature in about 1000 years?

At least temperature rise 7.0 degrees even if the calcium carbonate will dissolve and come to equilibrium in the oceans.

***Task 4: Skim through Text II and complete the following chart which demonstrates the Summary-Comment discourse pattern of the technical review.*** Intentionally engineering Earth‘s atmosphere to offset rising temperatures could be far more doable than you imagine, says David Keith. But is it a good idea? (Sentence 1 is a summary of the Keith's proposal, sentence 2 is an indication of the upcoming comments.)

***Task 5: Explain the communicative purpose of the technical review in Text II and the rhetorical strategy to achieve this purpose.* The communicative purpose:** to give an objective evaluation of geoengineering before answering the question whether it is a good idea. **The rhetorical strategy:** The most important strategy used in this review is quoting.

***Task 6: Read the first two sections of Text II carefully and summarize the main points of Keith's idea of geoengineering. Identify the different ways of quoting Keith's idea. For example:***

1) "The author of this so-called geoenginering scheme, David Keith..." in paragraph 3 indicates that the summary of the geoengineering idea in the preceding paragraph is quoted from Keith. This part of the quote takes the form of summary. In other words, summarizing is one way of quoting.

**Summary Comment** Intentionally engineering Earth‘s atmosphere to offset rising temperatures could be far more doable than you imagine, says David Keith. **But is it a good idea?** Why It MattersSummary of Keith's SRM ideaThe ExperimentSummary of Keith's proposed experimentSwitching It OnSummary of Keith's argument Barking MadDangerous consequences to the earth A MoratoriumSocial political consequences Comment on Keith's argument SRM is not a good idea.

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2) Quoting Keith' scheme of solar geoengineering (in the form of summary): Use jet planes to spray the sulfuric acid to the lower stratosphere, which can increase the planet‘s albedo and offset the warming effect caused by the greenhouse gases.

3) Quoting Keith's calculations (in the form of summery): Solar geoengineering scheme is a cheap and effective way to offset the warming, only a little amount of sulfur would be required and the sulfate particles would remain in the stratosphere for a few years.

4) Quoting Keith's explanation of the solar geoengineering (in the form of direct speech): "There is a realistic chance that solar geoengineering technologies could actually reduce climate risk significantly, and we would be negligent if we didn‘t look at that,‖ ―I‘m not saying it will work, and I‘m not saying we should do it.‖ But ―it would be reckless not to begin serious research on it,‖ he adds. ―The sooner we find out whether it works or not, the better.‖ ..."The only thing that we think might actually help reverse the warming in our lifetime is in fact geoengineering."

5) Quoting Keith and Anderson's description of the experiment they are considering: (in the form of indirect speech, or paraphrase)

**Goals:** 1) to test how sulfuric acid should be distributed to optimize the size and longevity of the resulting particles, and 2) to measure how sulfur affects ozone at the altitude and under the conditions associated with SRM. **Method:** Send a helium-filled balloon to the lower stratosphere, use a Kevlar thread to lower canisters filled with water vapor and sulfur, and release small amounts of the test samples. Then the researchers would drop down miniature laser-based analytic instruments to monitor the chemistry in the small ―seeded‖ area and monitor the effect of different amounts of sulfur and water vapor.

***Task 7 : Read the "Barking Mad" and "A Moratorium" sections and identify the comments on the SRM field experiment. Explain the different ways of quoting the critics.***

1) Raymond Pierrehumbert' comments:

It's a crazy idea. We don‘t really know what it is going to do.

Field experiments are really a dangerous step on the way to deployment.

It will lead to serious consequences.

Our climate models are not advanced enough for us to engineer the planet.

2) Alan Robock's comments:

SRM is not cheap and easy.

SRM has many differences from volcano eruption in terms of cooling effect.

SRM would cause negative effects which outweigh the benefits.

3) Phil Rasch's comments: "Many issues that remain unexplored".

4) The author's comments:

The scientific uncertainties and the prospect of winners and losers among different parts of the world make it almost unfathomably difficult to envision

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how SRM might be appropriately implemented and controlled. How could we fashion the international system of governance that would eventually be needed? Who would decide how and when to implement the technology? Who would monitor and control it? Who would set Earth‘s thermostat and at what temperature? If anything, the questions about who would make the decisions on solar geoengineering are more daunting than the questions about the science itself.

5) Edward Parson's comments:

Without such knowledge of what solar geoengineering can do and what the risks are. ―you don‘t know what you need to govern.‖

There are lots of worries and fears about the social and political consequences.

Early experiments must be strictly limited.

***Task 8: Read the "Switching It On" section and answer the question asked at the beginning of the text, whether geoengineering is a good idea. Determine whether the following sentences are quotations or the author's own comments.*** The geoengineering is NOT a good idea. The answer is in the last paragraph, which summarizes the author's comment and judgment.

1) Keith sometimes lapses into animated annoyance with SRM critics. (The author's comment)

2) A moment later, however, he is calmly and logically countering the criticism with responses he has developed after years of thinking and writing about geoengineering. (The author's comment)

3) Sulfur injection could be rationally ended a century or less after it‘s begun.(Quotation from Keith)

4) While the underlying climate changes it was masking would return, the rate of change affecting ecosystems and humans would have been slowed and managed. (Quotation from Keith)

5) The idea that initiating SRM would commit us to continuing it indefinitely is definitely false.(Quotation from Keith)

6) SRM could meaningfully reduce climate risks without too many risks of its own.(Quotation from Keith)

7) Technology for SRM could be ready to be deployed as early as 2020 (or, more realistically, 2030) and would involve levels of stratospheric sulfur ―practically‖ within normal ranges for the first decade. (Quotation from Keith)

8) The process could be monitored and evaluated, and because the amounts of sulfur injected into the stratosphere would be relatively small.(Quotation from Keith)

9) SRM would not be turned on with a big switch. (Quotation from Keith)

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10) Intentionally adjusting the climate would be an extreme and desperate action. (The author's comment)

11) It is impossible for society and governments to decide whether to carry out the implement the SRM project. (The author's comment)

***Task 10: Identify the sentence in the opening section which signals the information structure of Text III and supply information indicated in the following structure.*** The last sentence of the opening section signals the information structure of the maim part. (Our studies focus on three segments of the community. Ducklow works with marine plankton, the small organisms that swim or drift near the sea surface. McClintock's realm is the benthos, the community of bottom-dwelling plants and invertebrate animals. And Fraser studies the penguins and other seabirds that dwell at the triple interface of land, air and sea.)

***Task 12: Note down the main points of each section in Text III.* Climatic Regime Change**

1) The creation of Drake Passage contributes to the formation of the ACC.

2) The temperature increase in this region.

3) Sea ice will not form in most of the year and the glaciers and ice shelves are in retreat.

4) All these may in turn cause the regional ecosystem change.

**Cause:**Climatic regime change in the ecosystem**Effect on**the base of food chain (plankton)**Effect on**the forests of the Antarctic (benthos)**Effect on**the penguins and other sea birds

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**The Base of the Food Chain**

1) The dominate phytoplankton, Diatoms, which are the preferred food for Antarctic krill, are being replaced by crytophytes.

2) The replacement of diatoms by cryptophytes will surely have observable effects on higher trophic levels, esp. krill, a key link in the food chain, which pass energy and nutrients captured by phytoplankton up to penguins, seals and whales.

3) Second, the replacement of krill by salps has potentially grave consequences for an Antarctic food web that is highly dependent on krill as food for larger predators, including penguins.

**Forests of the Antarctic**

1) As warming continues to erode the extent of ice, the undersea forests, algae, will not be shaded by ice and thus are likely to expand into territory previously unavailable for colonization.

2) In addition, because of more energy available for photosynthesis, it may prevent herbivores from consuming their tissues with chemical defenses.

3) The dynamics of the organisms supported by the algae could be fundamentally changed.

4) As for the benthic invertebrates, warming could shorten the embryonic and larval stages of life, thus, when the larvae emerge into a sea, it would be too early to find sufficient resources to support them. This would be disastrous for the benthic invertebrates.

5) The warming trend makes the crabs survive and grow in the waters of the Antarctic. Therefore, the invasion of crabs would present a significant threat to benthic invertebrates that lack defenses against crushing predators.

6) Moreover, as absorbed CO2 continues to lower the *p*H of seawater, benthic invertebrates whose larvae or adults rely on calcified skeletal elements may either be killed outright or, with weakened shells, become increasingly vulnerable to durophagous predators.

**Displaced Penguins**

1) The first reason to study penguins is that seabirds are long-lived and wide-ranging. Their life histories integrate the effects of marine

1) The creation of Drake passage The Antarctic Circumpolar Current (ACC)，Global warming Temperature increase in the western coast of the Antarctic Peninsula Declined sea ice coverage and the glaciers and ice shelves in retreat Ecosystem change

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environmental variability and allow the investigators to distinguish the genuine trends from mere ecosystem noise.

Second, their species are abundant and readily accessible. Third, since they breed on land, it is comparatively easy to gather data.

2) Adélie penguins are decreasing while Gentoo and Chinstrap penguins are growing more abundant.

3) Two reasons for the decline of Adélie penguins: First, as sea ice retreats continuously in the waters of the western Antarctic Peninsula, Adélie penguins will lose access to the most productive winter foraging regions. Second, increasing precipitation in Antarctic Peninsular renders more spring blizzards during the Adélie penguins' breeding season. Thus, the spring storms kill large numbers of eggs and chicks when the snow eventually melts and floods the nests.

4) Chinstrap and gentoo penguins prosper because they breed approximately three weeks later than Adélie penguins, thus, it reduces the risk of nest flooding in the aftermath of spring blizzards. In winter, both species forage successfully in ice-free areas.

**Ice, Kril and Penguins**

1) The krill surplus hypothesis: First, if the *krill surplus hypothesis* is true, krill surplus would lead to significant population growth in krill-dependent predators, but in fact, one type of brush-tailed penguins, Adelie, is declining, even though the other two types are increasing. It‘s the same as the seals. Therefore the *krill surplus hypothesis* cannot explain it.

2) Second, along the northern half of the western Antarctic Peninsula, and in much of the Atlantic sector of the Southern Ocean, there is no krill surplus; on the contrary, this area has experienced an 80 percent decrease in krill abundance over the past 30 years.

3) The ice-reduction hypothesis: With ice reduction, krill cannot reproduce successfully because the larvae need to graze on phytoplankton on the underside of the ice to survive winter. With ice reduction, ice-dependent Adelie penguins cannot access the prey population-krill, but the ice-avoiding penguins be able to reach and thus have continued to increase. Therefore, *ice-reduction hypothesis* is confirmed.

Sea ice is the dominant factor governing the animals' response to climate change.

***Task 14: Complete the following science report according to what you hear.* (http://www.scientificamerican.com/podcast/episode/clock-ticking-on-climate-change-prevention/)**

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(1) burning fossil fuels (2) in the atmosphere each year (3) reduces (4) to their essence (5) concentrations of greenhouse gases (6) twice as fast as (7) poses risks ranging (8) stronger heat waves and drought (9)Unfortunately (10) to be agreed upon ***Task 15: Answer the following questions according to the interview you hear about the link between climate change and ozone loss.* (http://www.bbc.co.uk/programmes/p00vqn4l)**

1) What are the consequences of ozone loss?

Skin cancer, crop damage and disruption of marine life.

2) What did Jim Professor Anderson's newly published research show? Why does his research result raise concern?

Ozone is under attack again. It raises concern, because we could lose ozone protection around the world.

3) How does the stormy summer weather account for the ozone destruction?

The stormy weather is changing conditions in the upper stratosphere and leading to ozone destruction.

4) How is rising carbon dioxide level linked to the depletion of ozone layer?

CO2→Climate change through CO2→severe storms → injection of water →the fundamental shift in the chemical reactions in the lower stratosphere that controls ozone → depletion of ozone layer.

***Task 16: Paul Olsen, the researcher of Columbia University's Lamont-Doherty Earth Observatory, takes us to a basalt quarry in New Jersey and explains what makes the rock ideal for soaking up carbon dioxide emissions. Watch the video clip and answer the following questions.* (http://www.sciencefriday.com/segment/01/08/2010/carbon-sequestration.html)**

1) What do the scientists hypothesize about the basalt flows?

The basalt flows might be a good place to store carbon dioxide emissions. 2) What is the process of CO2 emissions and sequestration?

CO2 comes out of the basalt when it is erupting.

It goes into the atmosphere.

Plants absorb that CO2.

Those plants become fossil fuels 200 million years later.

We take the fossil fuels, burn them and put CO2 back into the atmosphere.

Now we are thinking to take CO2 back into the basalt.

3) What have the experts found in the up-flow underneath? The up-flow underneath is full of holes. The holes are ancient gas bubbles.

The holes may provide the place to store the mixture of CO2 and water,

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because the basalt reacts with the CO2 to produce limestone and become stable. 4) Where is the best place to store CO2 ? The contact area between the younger up-flow and the older up-flow. 5) How much CO2 could one spot ofbasalt flows in New Jersey hold? Roughly a billion tons of CO2.

***Task 17: Answer the following questions according to what you hear.* (http://www.scientificamerican.com/podcast/episode/how-to-save-the-woods/)**

1) Where is most of the world's forest located?

Australia, Canada, New Zealand, Russia and the U.S.

2) What is the size of untouched forests in the world?

13 million plus square kilometers

3) Why are the world's forests under serious threat?

Because of logging, mining or farming.

4) What are the two suggestions to protect the world's forests?

One is to make forests a part of international environmental negotiation. The other is give forests local ownership.

***Task 18: A public-private partnership is teaching farmers better soil-management and how to adapt to climate change in order to safeguard their livelihoods. Watch the video clip ―Climate-smart coffee farming in Uganda‖ and supply the missing information.* (http://www.theguardian.com/global-development-professionals-network/video/2013/jul/09/climate-smart-coffee-farming-uganda-video)** 1) The conditions for the growth of the high quality African coffee beans in Mount Elgon in south-east Uganda: the rich volcanic soil, high altitude, and good rainfall. 2) Due to climate change and poor farming practices, their present potential yield of coffee here:only a third. 3) The reasons for the increasing risk of landslides : heavy rain, deforestation, poor farming practices. 4) To protect against the effects of climate change, farmers are trained to: improve their yields by providing shade trees for their coffee plants; making organic composts, better soil management, proper spacing between coffee trees; control of pests and recycling plastic.

***Task 19: Answer the following questions based on David Keith's speech on global warming and climate change.* (http://www.ted.com/talks/david\_keith\_s\_surprising\_ideas\_on\_climate\_change)**

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1) How fast is the growth rate of CO2 in the atmosphere? It's accelerating even faster than what we thought was the worst case just a few years back. 2) What could we do to cut the CO2 emission? What is the problem with it? We could do that by perfectly sensible things like conservation, and wind power, nuclear power and coal to CO2 capture. All we lack is the action to actually spend the money to put those into place. Instead, we spend our time talking. 3) What might we do if we did not cut CO2 emission? We can solve the problem by geo-engineering. That is, we could put signed particles, say sulfuric acid particles—sulfates—into the upper atmosphere, the stratosphere, where they'd reflect away sunlight and cool the planet. 4) Why is David Keith certain that the geo-engineering idea will work? The reason is that it has been done by nature. For example, Mount Pinatubo in the early '90s put a whole bunch of sulfur in the stratosphere with a sort of atomic bomb-like cloud. The result of that was pretty dramatic. After that, and some previous volcanoes we have, you see a quite dramatic cooling of the atmosphere. 5) What are the problems with sulfates? One of the problems with sulfates is they fall out quickly. The other problem is they're right in the ozone layer. 6) What is David Keith's new idea? We can have sunlight hitting some particle and it's unevenly heated. So the side facing the sun is warmer; the side away, cooler. Gas molecules that bounce off the warm side bounce away with some extra velocity because it's warm. So you see a net force away from the sun. That's called the photophoretic force. 7) What does David Keith want to convey with the metaphor of the alien box? We have no global governance and different people will have different opinions.

***Task 20: Note down the impacts of El Niño according to what you hear.* (http://www.bbc.co.uk/programmes/p02rhxgp)**

Largest driver world wide of year to year change in the climate. Drought, floods, extreme temperatures.

Starvation of millions. It is hard to predict.

Dramatic impacts on whether.

largest climate year to year fluctuations in the world.

It can be associated with severe drought in Australia, heavy rains and flooding in western South America, Pacific North West in the US, winters are warm and dry affect water supply throughout the year southern tier of the United States, it can also bring heavy rains and flooding.

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**Unit 7 Automation**

***Task 2: Skim through Text I and match the subheadings on the left column with the types of information on the right.*** 1-D 2-F 3-G 4-C 5-A 6-E 7-B

***Task 3: Read the opening section of Text I and identify the issues to be discussed in the main part of the article.***

**The hypothetical (In the 1950s and 1960s)**

**The real (At present)**

Computers were supposed to be labor-saving devices.

We're still working so hard.

**Optimists:** People would be working less once computers and other kinds of automatic machinery became widespread. Humanity would be freed from constant toil and would be devoted to more refined pursuits. **Pessimists:** Many people would be replaced by machines.

As predicted, computers guide machine tools and run assembly lines, but that‘s a minor part of their role in society. The computer is far more pervasive in everyday life. As predicted, unemployment do occurs nowadays, but a result of other causes other than automation.

***Task 4: Summarize the hypotheses of different authors and the contrasting realities based on the information in "The Problem of Leisure" and "Where's My 15-Hour Workweek" sections regarding the issue of automation on the job.***

**The hypothetical**

**The real**

J. M. Keynes

People‘s average income and affluence would increase by 4-8 times with the gains in productivity. Workers produce more with less effort.

The upper bound of his prediction is an annual growth rate of 2.1 percent, while the observed average rate is 2.9 percent.

Worldwide income will have

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People would work significantly less. A 15-hour workweek would become the norm.

increased by a factor of 17 in a century. People are more affluent. The workweek has changed little and stayed round roughly 40 hours, which contrasts the 15-hour workweek as predicted in 1930s.

Y. Brozen

A mass aristocracy would be produced. The common man will become a university-educated world traveler with a summer place in the country, enjoying such leisure-time activities as sailing and concert going.

Yes. It has already been more than fulfilled at least in wealthier nations.

N. Wiener

Automation will produce serious unemployment situation.

People are unemployed, but not due to automation.

A. J. Hayes

Automation threatens to make workers superfluous—and thus without value.

Thus labor-force participation has risen from 59 percent to 66 percent.

D. N. Michael

People will work short hours, with much time for the pursuit of leisure activities. Worries: what will they do all their long lives?

Many who are working long hours do not see their behavior as a product of conscious choice.

These trends contradict almost all the expectations of early writers on automation, both optimists and pessimists. So far, automation has neither liberated us from the need to work nor deprived us of the opportunity to work. Instead, we‘re working more than ever.

***Task 5: Compare automation in the past and automation at present based on the information in the ―On the Factory Floor‖ section. Explain the rhetorical strategies used in this section.***

**Automation** (In the 1950s and 1960s)

**Automation** (At present)

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**In manufacturing**

**In all areas of life**

Reducing labor costs in factories.

Helping with clerical tasks, warehousing and retailing.

Control in continuous-process industries such as oil refining.

Using various tools to perform several hundred boring and milling operations.

Introducing printed circuit boards, with all the connections laid out in advance. Eventually, machines were developed for automatically placing the parts on the boards and for soldering the connections all at once.

Using integrated circuit.

Computer control in manufacturing

Manufacturing as a whole has become a smaller part of the U.S. economy

Not much factory automation is visible.

But automation and computer technology have infiltrated other areas of the economy and daily life.

Rhetorical strategies: Comparison and contrast, exemplification, explanation.

***Task 6: Answer the following questions based on the ―The Do-It-Yourself Economy‖ section which discusses new economic trends with automation development****.*

1) What did Donald Michael hypothesize about the spread of computers? What is the reality now?

Computers would be confined to small groups of elites and would not be universally and commonly applied. These elites would be in rapport with the advanced computers. But in reality, we are all expected to have rapport with computers.

2) What is the social and economic impact of the spread of automation outside of factory?

In many cases, automation doesn‘t just mean that machines replace labor force, but it means that we all run the machines.

3) What examples are provided to explain the social and economic impact of automation?

The dial telephone; making travel arrangement. In the past, we needed human assistance to make phone calls and travel arrangement, while nowadays we can do them by ourselves.

***Task 7: Read the ―The Full-Employment Paradox‖ section and answer the following questions****.*

1) What does the full-employment paradox refer to?

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50 years ago, people predicted that automation would have replaced workforce and generated great unemployment. 50 years later, there has been no great workforce decline.

2) How is this paradox often explained?

Automation brings a net increase in employment by creating jobs for people who design, build and maintain machines.

3) How did Herbert A. Simon explain this paradox?

Economies seek equilibrium, and so ―both men and machines can be fully employed regardless of their relative productivity.‖ It‘s just a matter of adjusting the worker‘s wage until it balances the cost of machinery.

4) What is the third explanation of the full-employment paradox?

Whatever you earn, you eventually spend. If technological progress makes some commodity cheaper, then the money that used to go to that product will have to be spent on something else.

5) What example does the author use to explain that people are able to adapt to change?

American farmers.

***Task 9: Read Text II and answer the following questions****.*

1) What does the Digital Dark Age refer to?

Digital data are not preserved and managed well and could not be accessed or understood by modern electric tools.

2) What are the two challenges in digital data preservation?

The first is the preservation of the data itself; the second is the comprehensibility of the data.

3) What sources can we refer to in our efforts to preserve digital data?

We can briefly look at the historical trends and advances in data representation in human history. We can also turn to nature for a few important lessons.

4) What historical trends and advances in data representation are mentioned? What are the strengths and weaknesses of each type of information-storage medium?

The earliest known human records are millennia-old physical scrapings on whatever hard materials available. The medium was often stone, dried clay, bone, bamboo strips or even tortoise shells. These substances were very durable. However, stone tablets were heavy and bulky, and thus not very practical. Possibly the first big advance in data representation was the invention of papyrus in Egypt about 5,500 years ago. Paper was lighter and easier to make, and it took up considerably less space. It worked so well that paper and its variants, such as parchment and vellum, served as the primary repositories for most of the world‘s information until the advent of the technological revolution of the 20th century.

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Technology brought us photographic film, analog phonographic records, magnetic tapes and disks, optical recording, and a myriad of exotic, experimental and often short-lived data media. These technologies were able to represent data for which paper cannot easily be used (video, for example). The successful ones were also usually smaller, faster, cheaper and easier to use for their intended applications. In the last half of the 20th century, a large part of this advancement included a transition from analog to digital representations of data.

5) What dispute is uncovered through the whirlwind tour of historical advances in data preservation?

New media types tend to have shorter lifespans than older ones, and digital types have shorter lifespans than analog ones.

6) In what aspects does analog data coding differ from digital data encoding?

Information recording density and encoding techniques.

7) What example is cited to demonstrate the problem of comprehensibility in digital data preservation? What approaches could be taken to solve such a problem?

The example cited: Lack of proper tape drives to access the magnetic tapes containing photos of the Earth taken by Lunar Orbiter 1 in the 1960s. At least two effective approaches can be taken: Choosing data representation technologies wisely and creating mechanisms to reach backward in time from the future.

8) According to the text, how can we make good data-representation choices?

We can copy our digital data into as many different media, formats and encodings as possible. We can just follow the pack.

9) What approach can we take if data could not be accessible with modern hardware and software? What examples does the author cite to illustrate his point?

To fake it. The example: The compatibility of IBM computers.

10) According to the text, what can we do to save our personal digital data?

First and foremost, make regular backup copies onto easily copied media and place these copies in different locations. Second, try reading documents, photos and other media whenever upgrading software or hardware, and convert them to new formats as needed. Lastly, if possible, print out highly important items and store them safely. We could revert our digital data back to an analog form and use traditional media-preservation techniques.

***Task 10: Identify the purpose of the article in Text III and find out the prospective applications of farmerbots and agribots. Work in groups and discuss the social, economic and environmental impacts of widespread application of farmerbots and agribots.***

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1) **Purpose:** To explain that robots can do better than farmers by feeding the planet‘s rising population while helping to protect the environment.

**2) Prospective applications of farmerbots or agribots:**

Agribots would be able to identify individual seedlings and coax them along with tailored drops of fertiliser and measured sips of water. Other machines would distinguish weeds and dispatch them with a microdot of pesticide, a burst from a flame gun or a shot from a high-power laser. These machines will also be able to identify and harvest all kinds of ripe vegetables. Robots will bring major changes in the soil and its quality and could reduce chemical use, pollution and water use. Robots are likely to solve the problem of farm labor shortage and would bring significant financial benefit to farmers. Agribots offer a chance to keep price of groceries down and might shift the traditional farming into agribot-friendly farms.

***Task 11: Listen to a short talk about the development of new technology and write down every word you hear.* (http://www.bbc.co.uk/programmes/b0540h85)** New technology has always put people out of work. In a way, that's its point. And it has always caused pain when it does. It hurts to imagine that even part of what we do for work could be done better by a machine. But in the past, technology has always held some prospect at least of some new role in the world of work, a new skill to learn, a new job to do, a new way of earning living. That doesn't feel so true anymore, because technology now has got very good indeed. and the speed is improving, has become almost supersonic. It's hard to peer into this hyper-technological future with much certainty. 10 years ago, we couldn't have imagined we'd all have this little supercomputers in our pockets. 20 years ago, we couldn't have imagined Facebook. But one thing is for sure, technology won't stop its advance. The only question is where it's going to strike next?

***Task 12: Note down the main points of the interview you hear.* (http://www.bbc.co.uk/programmes/b0540h85)**

1) The title of Andrew McAfee's new book: The Second Machine Age

2) The readers' response to the new book: Attention and controversy.

3) The difference between the technological change now and the technological upheavals in the past:

In the past, technology upheaval put people out of work, but eventually people went back to work. But now technology is demonstrating that

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machines can have human like ability, the comparative advantages of human beings in lots of different fields is vanishing is very quickly.

4) The classical bargain: I offer my labor, I get a good middle class living in exchange.

5) Cognitive labor refers to professionals' work.

6) The nature of a doctor's work: It is basically an exercise of pattern recognition. Doctors diagnose patients by pattern recognitions.

7) Part of a doctor's work can be replaced by software because cutting edge software can recognize patterns better than human beings.

8) Part of a lawyer's work can be automated becausethe initial step is to go through the documents. This process is called discovery.

9) E-discovery refers to a software which can read the documents. But now a lot of work can be done at a push of a button.

***Task 13: Listen to an interview about the challenges in the new technological age and note down what the experts think of job security. Then work in groups and discuss how to address the challenges.* (http://www.bbc.co.uk/programmes/b0540h85)**

1) What challenges do young people have to face?

Automation put people out of work.

2) Is there such a thing as job security in today's world?

No. Today's big companies do not provide job security.

3) What attitude should we take toward education and careers according to experts?

We should bring back fun to education, learn about the world and understand the world. Say yes to the change. We should have multiple career, multiple endeavor, multiple skills, lifelong education.

4) What should parents and schools do to prepare students for challenges?

Open.

***Task 14: Answer the following questions based on the video clip about robots.* (http://watchdocumentary.org/watch/next-world-episode-04-extreme-tomorrow-video\_a6e835645.html)**

1) What task is the robot performing at the beginning of the video clip?

It is conducting a symphony orchestra.

2) What toughest jobs were robots supposed to do until now?

They were supposed to work the assembly line and defuse or even detonate explosive devices.

3) How does Professor James Kuffner describe the traditional tasks for a robot?

3Ds-dull, dirty, dangerous.

4) What attitude does Professor James Kuffner take towards humanoid technologies?

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Our homes and offices are going to be occupied by robots and humanoid technologies will improve our life in the 21st century.

5) What does Asimo look like?

It is a small-stature humanoid, less than 4 feet tall with the size of an 8-year-old boy, can walk gracefully.

6) What will Asimo be able to do for us?

The will be able to assist us much in the same ways our computers have. They can search information for us, clean the house, make dinner even and pick up the kids at school. They will monitor our family‘s health and home security and will be our live-in nurses and eventually even replace the doctor.

7) What learning ability will the robots be able to acquire in the future?

The robots will be able to learn new skills by observing other humans do them or by observing other robots.

8) What is projected to happen in the next 20 years?

More than 4 million homes will soon have their personal robots. Household robots will be cheap and affordable and will transform our society. Robots with human-level intelligence could arrive as early as the year 2029 and a society of smart and undetectable androids in our midst may seem alarming.

***Task 15: Watch the video clip about artificial intelligence and answer the following questions.* (https://www.youtube.com/watch?v=WGZHMX\_Srk4)** 1) According to Ray Kurzweil, what probably will happen within 30 years? We will have the hardware and software to create superhuman intelligence. The machines will be vastly superior to unaided human intelligence and we would not be able to keep up with them. We will use these machines to expand our intelligence and we are going to become machines. 2) What features does the exoskeleton have? It is an analogue to the human body. It has structures which replace bones, actuators which act as muscles, computers that act like brains. It can move in harmony with human body, giving people super strength and great agility. 3) What does Professor Larry Yaeger think of artificial intelligence? What does he want to prove in his experiment ―Polyworld?‖ The computers will teach themselves if we let intelligence evolve as it did in human brains. In his experiment, he has created a computer program filled with digital creatures to see if he can get them to evolve intelligence. 4) According to Professor Larry Yaeger, what can be expected by the year 2035? Human-level intelligence could be expected to run around in such a system.

***Task 16: Answer the following questions based on the video you watch about***

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***robotics and data protection.* (http://www.dailymotion.com/video/xcuin0\_next-world-future-danger-5th-april\_shortfilms)**

1) What features is Robert Wood's tiny robot expected to have?

It will have the maneuverability and agility of a fly.

2) What does Robert Wood have to learn first?

He has to understand how flies accomplish their acrobatic moves and how flies generate their astonishing maneuverability.

3) What are the practical reasons for making the robotic flies small?

They are faster, potentially cheap and mass-producible and swarms of these devices could operate together.

4) What tasks might these devices undertake presumably?

They might replace large million-dollar machines of the past. Mounted with various sensors they could do everything from exploring hazardous environments to searching for survivors in the rubble of a falling building. Thousands of them might be sent out to other planets to feedback useful information to orbiting satellites or back to Earth.

5) According to Eran Feigenbaum, what is the future of data protection and what concept is it?

He sees the future of data protection in cloud computing. Cloud computing is a simple concept of taking the same data, services and applications in personal computers or IT servers and moving them into the cloud.

6) What does ―cloud‖ refer to?

It is a network of servers around the globe, each holding fragments of personal information. Only when do you log on to the PCs, all come together.

7) Why is moving data to the cloud very similar to banking?

Although you can‘t see your money in the bank, you know they are safe. Likewise, putting your data on your hard drive or local device to the cloud is secure.

8) What results will be brought to us with this revolutionized way of data protection?

Hackers and identity theft will be prevented.

There is no need for PC users to understand antivirus and firewalls.

The load will be lifted in other ways too, no more lugging laptops and cumbersome hard drives.

***Task 17: Watch the video clip about future transportation and answer the following questions.* (http://www.dailymotion.com/video/xklyk4\_nextworld-future-life-on-earth-720p-hdtv-x264\_tech)**

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1) What is the future of flight to Dan Hanchette?

The future of flight is being able to fly on his schedule, utilizing state-of-the-art technologies in first-class comfort and doing it at 500 miles an hour.

2) What can the next generation of personal jets do?

They will be able to fly you from point A to point B in comfort and style.

3) In what ways does a corporate jet differ from a Viper Fanjet?

Operating cost.

Fuel consumption: The former chugs over 400 gallons of fuel per hour in the air, while the latter sips only 55 gallons per hour.

Price: A corporate jet will be around 20 million dollars, and a Viper Fanjet assembly kit just for a mere 400 grand.

For a Viper Fanjet, no pilot will be needed because we will be flying ourselves.

4) What system is Boeing developing?

Boeing is developing a system that will create flexible and trackable preprogrammed routes that will be allow aircraft to take off, fly and land themselves.

5) What does the Boeing system depend on? What automation technology will be embedded in future aircraft?

It depends on building intelligence into the future air vehicles. The vehicles will be fully autonomous. The vehicles know where they are, where the weather is, what is available for takeoff and landing. They will talk among themselves, automatically keeping out of each other‘s way and doing it far more safely than any human could.

6) According to Graham Hawkes, what will the future transportation be like?

He thinks the future lies beneath the waves and people will move underwater as easily as they take to the highways.

7) What are the features of Frank Rinderknecht‘s latest concept car sQuba?

It is fast, stylish, eco-friendly and self-steering. Most prominently, it can ride on the water and under water.

8) In the diving mode, how does the sQuba car further distinguish itself?

It provides passengers with oxygen masks attached to an integrated tank of compressed air. Two propellers in the back and two water jet engines in the front get it moving. It can stay underwater for up to 3 hours at around 2 miles per hour. ***Task 18: Answer the following questions based on the video about future transported presence and telepresence.* (http://www.dailymotion.com/video/xklyk4\_nextworld-future-life-on-earth-720p-hdtv-x264\_tech)**

1) What does transported presence mean?

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In the future, people will have the ability to experience a place right from where you are sitting.

2) What map is Google Earth trying to build? How does Google Earth build such a map?

They are building the ultimate interactive map of the future, a 360-degreee panoramic view of every spot on the planet, complete with information about that spot, all accessible on your computer screen. By mounting omni-directional cameras on top of lots of cars.

3) What is Margaret Hoosgmand‘s typical workday like?

She doesn‘t commute to her office and she just pushes a button and her presence will be transported there with the visual and audio system.

4) What is telepresence and what benefits could it generate?

Telepresence means people can communicate naturally without having to go there. It is time-saving, energy-saving and will allow us to connect to anybody across the globe.

5) What can we learn about healthcare in the future?

With the help of health presence devices, people will have access to the quality medical care service across the globe.

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**Unit 8 Genetic Engineering**

***Task 2: Skim through Text I and match the subheadings with the types of information. Identify the key issue of the current debate on GM crops.***

1) 1-C; 2-E; 3-D; 4-A; 5-F; 6-B

2) The key issue of the current debate: Are genetically modified crops an environmental dream come true or a disaster in the making?

***Task 3: Read the opening section (paragraphs 1-5) and identify the arguments of GM crop advocates/proponents and the counterarguments of the critics/ opponents. Explain why the authors start with a description of the violent events.* GM crop advocates/proponents' arguments:** GM crop proponents claim that the plants will benefit the environment by requiring fewer toxic pesticides than conventional crops. **GM crop critics/opponents' counterarguments:** GM crop opponents fear the potential risks and wonder how big the benefits really are. You can‘t see, taste or touch a gene inserted into a plant or sense its effects on the environment. You can‘t tell, just by looking, whether pollen containing a foreign gene can poison butterflies or fertilize plants miles away. The purpose of the description: Describing a dramatic scene is a writing strategy to introduce the topic of an article, in this case, the GM crops. The description should be startling, humorous, or otherwise interesting, and followed by further background information that leads to the thesis statement. By describing several violent events in different places, the authors introduce the topic and the conflict between GM crop proponents and opponents.

***Task 4: Read the "Fewer Poisons in the Soil?" section and identify the argument of GM crop advocates/proponents and the counterargument of the critics/opponents. Identify the questions to be addressed in the main part of the text.*** 1) The argument of GM crop advocates **Claim:** GM crops limit the use of more hazardous pesticides or herbicides, simplify operations, and even increase yields. The drop of pesticide use in cotton planting is the best example to illustrate the point. **Evidence:** GM crops reduce the yearly 971 million pounds of pesticides. 7-14 times of insecticide use for cotton can be reduced. 2) The counterargument of GM crop critics

**Claim:** GM crops do not really slice the use of poisonous pesticides or

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herbicides and instead constitute a threat to our environment. **Evidence:** According to the U.S. Department of Agriculture, farmers who plant herbicide-tolerant crops do not necessarily use fewer sprays. There are several negative studies. 3) The questions to be addressed in the main part of the text

Questions

Subheadings

How do Bt crops affect ―non-target‖ organisms—the innocent bugs, birds, worms and other creatures that happen to pass by the modified plants?

At What Cost to Wildlife?

Will GM crops pollinate nearby plants, casting their genes into the wild and create superweeds that grow unchecked?

Seeding Superweeds?

What are the odds that the genetically engineered traits will lose their ability to protect against insects and invasive weeds, leaving GM plants suddenly vulnerable?

Evolving Immunity?

Will the foreign genes inserted into food plants lead to health problems?

The Risks on the Table?

***Task 5: Read the main part of the text and identify the arguments of the GM crop critics and advocates.* At What Cost to Wildlife?** 1) The argument of GM crop critics **Claim:** They worry that Bt plants can inadvertently harm unlucky creatures. **Evidence:**

The Swish study found that green lacewing caterpillars proved more likely to die after eating European corn-borer caterpillars that had fed on Bt corn instead of regular corn.

John Losey's study found that monarch butterfly larvae fed with milkweed leaves dusted with Bt corn pollen in the lab died.

2) The counterargument/refutation by GM crop advocates **Claim:** Bt corn pollen in the field does not pose a hazard to wildlife. The lab bench is not a farm field, and they question the usefulness of these early experiments. **Evidence:**

The EPA estimates that the insects face no observable harm when consuming milkweed leaves laden with up to 150 corn pollen grains per square centimeter of leaf surface.

Recent studies of milkweed plants in and around the cornfields of Maryland, Nebraska and Ontario report found no harm to wildlife.

**Seeding Superweeds?**

(Superweeds refer to weedy plants that are produced by fertilization from GM crop pollen through gene flow. Superweeds can develop resistance to

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herbicides.) 1) The argument of GM crop critics **Claim:** They worry that GM crop pollen will fertilize weedy plant relatives and the newly pollinated plants could break ecological rank, becoming ―super weeds‖. **Evidence:**

Allison Power's study investigates gene flow in cultivated grain crops—wheat, barley and oats—engineered to contain genes that make the plants resistant to the barley yellow dwarf virus.

Canadian farmers describe GM corn escaping from farm fields and invading wheat crops like a weed.

The cases in Hawaii, southern Florida, Mexico and South America show it is hard to avoid creating superweed.

2) The counterargument/refutation by GM crop advocates **Claim:** No scientific studies have found evidence of GM crops causing superweeds. **Evidence:**

∙ The 10-year study reported in Nature in February found no weed-like behavior by GM potatoes, beets, or corn planted in England.

∙ It is rather unlikely that herbicide-tolerant or Bt crops will spread their biotech gene to weeds. That‘s because the GM crops in the US have no close relatives in the regions where they grow.

**Evolving Immunity?** (Evolving immunity means that if a farmer sprays a plant repeatedly with the same kind of pesticide or herbicide, the pests eating this plant or weed surrounding it may gradually develop immunity or resistance to that kind of pesticide or herbicide. ) 1) The argument of GM crop critics **Claim:** They worry that GM crops will become useless since the target pest/weed or virus may pick up the resistant traits. They question the ecological safety of emerging crops designed to resist drought, tolerate salt or deliver an extra nutritional punch. **Evidence:**

∙ Johnathan Wendel commented that agriculture is an evolutionary arms race between plant protections and pests.

∙ Margret Mellon's noted that salt-tolerant rice could potentially behave like a disruptive weed if it found its way into vulnerable wetlands.

2) The counterargument/refutation by GM crop advocates **Claim:** GM technology can revolutionize agriculture for the better.

**Evidence:** The report of some farmers like Rylan Utlaut. He has been sowing and reaping 3,50 acres along the Missouri River. Last year, for the first time, he planted only herbicide-tolerant corn and soybeans across his entire, soil-friendly farm. As a result, he claims, he sprayed the crops half as often as he did before and got bigger yields.‖ ―Even the strongest environmentalist could see my

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farming practices now, I think they‘d understand the benefits,‖ **The Risks on the Table?** 1) The argument of GM crop critics **Claim: They worry that**

∙ The proteins made from foreign genes may be directly toxic.

∙ The food may consist of less nutrition or more poison.

∙ The proteins may elicit allergy.

∙ The test reliability is questionable due to the limitations in the experiments.

∙ The food may hasten the spread of antibiotic resistance of bacteria.

∙ The safety test is performed by the GM food producers.

**Evidence:** No clear evidence is provided. 2) The counterargument/refutation by GM crop advocates **Claim:**

∙ GM foods are safer than crossbred ones.

∙ GM foods benefit human health indirectly by reducing pesticides.

∙ GM foods are designed to be more nutritious.

∙ GM foods can solve the problem of malnutrition or starvation.

∙ GM foods have been thoroughly and extensively tested for possible health effects.

**Evidence:**

∙ Every genetically engineered food crop has been thoroughly tested for possible health effects. The chemical makeup and nutritious value of GM crops are compared with those of conventional plants. If the proteins are the only change, testers will feed large quantities of them to animals to check their toxicity; if there are more changes, testers will feed the complete GM food to animals to check the toxicity. The risk of allergy elicited by GM foods is all examined. The novel protein is compared with the 500 known allergens and tested with acid in an environment similar to human stomach. The origin of the protein is also taken into consideration.

∙ The manufacturers‘ studies typically begin by comparing the GM version under consideration with conventionally bred plants of the same variety, to see whether the addition of a foreign gene significantly alters the GM plant‘s chemical makeup and nutritional value.

***Task 6: Explain why the authors quote almost the same number of arguments and counterarguments in the report on the benefits and risks of GM crops.*** This is due to the objectivity feature of the reporting genre. Reporting is different from argumentations where the authors take a position and aim to use evidence to support this position. Most of the evidence in argumentation is in favor of the authors' own position. This text is a typical example of reporting genre whereas Text I of Unit 6 is a typical example of argumentation.

***Task 7: Use the following examples to explain the strategies employed by the***

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***reporters to strive for objectivity in reporting the debate on GM crops.***

∙ Choice of content: The reporters make a point to quote voices from both sides of the debate.

∙ Arrangement of the content: Advocates and critics' arguments are closely interwoven.

∙ The choice of language: Use of reporting clauses; words, expressions, and structures that express conflicts

1) Advocates of GM, or transgenic, crops say the plants will benefit the environment by requiring fewer toxic pesticides than conventional crops. But critics fear the potential risks and wonder how big the benefits really are. ―We have so many questions about these plants,‖ remarks Guenther Stotzky, a soil microbiologist at New York University. ―There‘s a lot we don‘t know and need to find out.‖

2) Some of their recent findings are reassuring; others suggest a need for vigilance.

3) Insect-resistant crops also bring mixed benefits.

4) According to the Environmental Protection Agency, in 1999 growers in the United States using high amounts of Bt cotton sprayed 21 percent less insecticide than usual on the crop. That‘s a ―dramatic and impressive‖ reduction, says Stephen Johnson, an administrator in the EPA‘s Office of Pesticide Programs.

5) But confirming environmental benefit is tricky....Defining the environmental risks of GM crops seems even harder than calculating their benefits.

6) But the lab bench is not a farm field, and many scientists question the usefulness of these early experiments.

7) The EPA estimates that the insects face no observable harm when consuming milkweed leaves laden with up to 150 corn pollen grains per square centimeter of leaf surface. Recent studies of milkweed plants in and around the cornfields of Maryland, Nebraska and Ontario report far lower levels of Bt pollen, ranging from just 6 to 78 grains of Bt corn pollen per square centimeter of milkweed leaf surface. ―The weight of the evidence suggests Bt corn pollen in the field does not pose a hazard to monarch larvae,‖ concludes EPA scientist Zigfridas Vaituzis, who heads the agency‘s team studying the ecological effects of Bt crops.

8) But the jury is still out. ―There‘s not much evidence to weigh,‖ notes Jane Rissler of the Union of Concerned Scientists. ―This issue of nontarget effects is just a black hole, and EPA has very little good data at this point to conclude whether the monarch butterfly problem is real, particularly in the long term.‖

9) So far no scientific studies have found evidence of GM crops causing superweeds, and a 10-year study reported in Nature in February found no weed-like behavior by GM potatoes, beets, or corn planted in England. But worrisome anecdotes have appeared.

10) If that happened in the field, she says, wild oats might run amok in the

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western U.S. Every GM crop, Power cautions, brings its own environmental personality and its own risks....In the U.S., at least, it is rather unlikely that herbicide-tolerant or Bt crops will spread their biotech gene to weeds.

11) Finally, opponents of genetically modified foods worry that splicing foreign genes (often from bacteria) into food plants through recombinant-DNA technology could lead to even nastier health surprises.

12) Proponents offer a number of defenses for genetically engineered foods.

13) Arguably, the testing system has worked well so far.

14) The safety tests are not necessarily foolproof, though.

15) Meanwhile many consumers remain disturbed that most safety tests are performed by the very corporations that produce GM foods.

***Task 10: Read Text II and trace the development of the debate centered around Emma Rosi-Marshall's research paper.***

1) The main idea or conclusion of Emma Rosi-Marshall's research paper published in PNAS (Para. 2) :

Caddis-fly larvae fed only on Bt maize debris grew half as fast as those that ate debris from conventional maize. And caddis flies fed high concentrations of Bt maize pollen died at more than twice the rate of caddis flies fed non-Bt pollen. Therefore, widespread planting of Bt crops has unexpected ecosystem-scale consequences.

2) The response to Emma Rosi-Marshall's paper (Para. 3):

Other researchers' vehement objections to the experimental design and conclusions

3) The names of the scientists who either wrote or signed rebuttal letters:

Alan McHughen Brian Federici Klaus Ammann Wayne Parrott Henry Miller

4) Their reason to attack Rosi-Marshall's "problem paper" and their fear (Para. 5):

They are determined to prevent papers they deem to have scientific flaws from influencing policy-makers. The fear that activists would use the research to forward an anti-GMO agenda

5) The sharp language used to criticize Rosi-Marshall's paper:

The publication of the paper had "seriously jeopardized the credibility of PNAS"

The work is so bad that an undergrad would have done a better job.

Rosi-Marshall's conclusions are "dubious", and said their use of evidence "arguably amounts to investigator misconduct". Rosi-Marshall's "offending" paper "carried a wrong message to farmers and environmentalists", and that anti-biotech crop activists would use

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the paper to "hamper the progress of science".

It is "bad science", with the "sloppy experimental design" and dubious conclusions. It omitted contrary findings. It is "flawed science that verges on misconduct"."It was just an idiotic experiment."

6) The viewpoint or standpoint of the researchers who are not involved in the debate:

Arthur Benke: The strong language in some of the criticisms is inappropriate. Anonymous editor: The knee-jerk, partisan, emotional way of criticizing other scientists is not helpful in advancing knowledge and is outside the ideals of scientific inquiry. Ignacio Chapela: The attacks may be deterring young scientists from pursuing careers in biotech crop research. Don Huber: When scientists become afraid to even ask the questions … that's a serious impediment to our progress.

7) Emma Rosi-Marshall's response to the criticism:

She will continue to investigate the influence of maize varieties on stream ecosystems. She will produce more data. The attacks won't deter her from her studies.

***Task 12 : Read Text III and provide the information indicated below.* The purpose of the paper:** This paper describes the benefits that GM seeds can provide to farmers, as well as the concerns that farmers should address before utilizing these seeds. **Benefits:**

GM seeds will increase the yields of farmers that adopt the technology.

The adoption of GM seeds reduces the use of chemical pesticides and herbicides.

Farmers' profits increase as they adopt GM seeds.

**Concerns:**

The contracts that seed companies require that buyers of their GM seeds sign when obtaining those seeds may disadvantage farmers.

Farmers may worry that their use of GM seeds will create "superweeds" or "superbugs" that, over time, become resistant to GM seeds and crops and to other herbicides and pesticides.

Another concern for farmers who are not currently planting GM crops is preserving the identity of their non-GM crops as those crops move from farm to market.

The uncertain effects of the products may "spook" domestic consumers.

**Suggestions to farmers:**

Neither full-scale adoption nor full-scale rejection is a viable option.

The technology is appropriate for farmers who have difficulty spraying pesticides and herbicides.

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GM seeds may work well for farm areas that are inaccessible to tractors or close to water bodies, or in places where winds are high.

Farmers should educate himself about this technology and to carefully read all legal documents before deciding to plant GM seeds.

***Task 13: Fill in the blanks with the information you hear about how to use genetic technology to protect chestnut trees in North America. (http://m.kekenet.com/menu/201311/266596.shtml)*** (1) 4 billion trees (2) little more than a memory (3) genetic engineering (4) rescue species of tree (5) sponsored research (6) transgenic chestnuts (7) genetic protection (8) transferred the gene (9) evolved resistance (10) collaborators (11) various combinations of these genes (12) fit into (13) commercial aims (14) genetic modification (15) escape and damage wild forests ***Task 14: Watch the video of "GMO Pioneers Win World Food Prize" and answer the following questions.* (http://www.51voa.com/VOA\_Standard\_English/gmo-pioneers-win-world-food-prize-53178.html)** 1) What did Chilton believe when she started her scientific career in the 1970s?She believed that a microscopic bacterium and a stalk of corn were much too different to be able to exchange genetic code. 2) What changed her deep-seated belief? A common plant infection called crown gall changed her mind. These ugly lumps form when a germ called Agrobacterium inserts a piece of its own DNA into the plant cell‘s genes. The plant then makes food for the bacteria. 3) What did she and her colleagues realize? They realized that scientists could put these tiny genetic engineers to work making plant breeding more flexible and precise than ever. 4) How does conventional breeding differ from genetic engineering? Conventional breeding produces offspring with a random assortment of good and bad traits while genetic engineering can insert the right genes into organisms for desirable traits. 5) What do people think about Chilton's winning of the World Food Prize? Not everyone believes she deserve the World Food Prize. 6) Why did Herren win the prize in 1995?

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He won the prize in 1995 for using natural methods to control a devastating insect pest outbreak in Africa. 7) What is Herren's view of GM crops? He says genetically modified organisms are not the best way to fight hunger. He sees GMOs as just the latest version of the water-, fertilizer- and pesticide-intensive form of agriculture. It is a dead end.He says more research is needed on the health, environmental and social impacts of GMO crops that are rapidly spreading around the world. 8) What is Chilton's view of GM crops in the future? She is confident that GMO technology will help feed the world.

GMO Pioneers Win World Food Prize It's perhaps the most controversial pick in the history of a respected award. Three pioneers in the science of genetically modified crops are receiving this year's prestigious World Food Prize, Thursday, Oct. 17 in Iowa. According to the prize citation, 17 million farmers worldwide grew these 'GMO' crops in 2012, more than 90 percent of them small-scale farmers in developing countries. It says the technology increased yields, reduced harmful pesticide use, and will be a key tool to feed the 9 billion people expected on Earth by 2050. But critics of the technology question the role of genetically modified organisms in fighting world hunger. When Mary Dell Chilton started her scientific career in the 1970s, she believed that a microscopic bacterium and a stalk of corn were much too different to be able to exchange genetic code. ―And I was soon to find out that this very deep-seated belief was just wrong," said Chilton. She found that out studying a common plant infection called crown gall. Building on work by Belgian scientist Marc Van Montagu, she discovered that these ugly lumps form when a germ called Agrobacterium inserts a piece of its own DNA into the plant cell‘s genes. The plant then makes food for the bacteria. ―I was very surprised. I was blown away....Agrobacterium was really being a genetic engineer," she said. Chilton and Van Montagu, and Rob Fraley with the agribusiness company Monsanto, quickly realized that scientists could put these tiny genetic engineers to work making plant breeding more flexible and precise than ever. Every plant‘s DNA is like hundreds of books‘ worth of information: genes for productivity... flavor... heat tolerance... even harmful or toxic traits. Conventional breeding produces offspring with a random assortment of those books - good and bad. But genetic engineering can insert just a page's worth of information - say, instructions for a protein that kills insect pests but is safe for people. ―That means that you don‘t have to put insecticides on those corn plants to protect them and enhance the yield that you get. That‘s a good thing," said Chilton Nearly all the corn and cotton grown in the U.S. contain this type of gene, reducing insecticide use by at least 50 million kilograms per year. Critics, however, note that another modification - adding genes for herbicide resistance - has increased the use of weed killers.

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Chilton is now with seed and chemical company Syngenta. Not everyone believes she, Van Montagu and Fraley deserve the World Food Prize. ―I was rather shocked, actually," said Hans Herren, 1995 World Food Prize winner. Hans Herren won the prize in 1995 for using natural methods to control a devastating insect pest outbreak in Africa. He says genetically modified organisms are not the best way to fight hunger. ―Because I think the cause of the food shortages in some places have nothing to do or can‘t be fixed with GMOs," he said. Herren sees GMOs as just the latest version of the water-, fertilizer- and pesticide-intensive form of agriculture that he says is a dead end. ―We need to change the paradigm because we are running out of fertilizer. Fertilizer production produces a lot of CO2. Water is limited, and will be even more limited in the future. So, again, we have to find better solutions," he said. And Herren says more research is needed on the health, environmental and social impacts of GMO crops that are rapidly spreading around the world. Opposition to them is also spreading rapidly. In the Philippines, protesters have uprooted test fields of rice modified to produce vitamin A. But, Mary Dell Chilton is confident GMO technology will help feed the world. "We need it. There are too many people in this world and we need to feed them in order to keep them from fighting with each other," she said. Meanwhile, the fight over the technology is sure to continue.

***Task 15: Note down the main points of the new studies on GMO foods and the responses to the findings.* (http://tv.globalresearch.ca/2012/10/gmo-foods-science-pr-and-public-backlash)** 1) The finding of a new study published in the *Journal of Food and Chemical Toxicology*: Rats fed Monsanto‘s patented NK603 GM corn were more likely to develop tumours and suffer severe liver and kidney damage. 2) The finding of the 2011 study coordinated by the International Commission on the Future of Food and Agriculture: GMO crops were promoting the creation of ―superweeds,‖ contributing to food insecurity, and required vastly higher concentrations of pesticides to be sprayed. 3) The response of biotech giants to those studies: They smear, undermine and cover up those studies. As for the latest rat study, they pointed to the perceived flaws in the collection, reporting and analysis of the study's findings. 4) The responses of the following countries: Germany: announced a ban on the cultivation of Monsanto‘s MON 810 genetically modified corn.

Peru: passed a law banning genetically modified ingredients for ten years to

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prevent ―the danger that can arise from the use of biotechnology.‖ Hungary: The authorities destroyed 1000 acres of corn which were found to have been grown with genetically modified seeds, which are banned under Hungarian law. Russia: immediately suspended the importation and use of Monsanto‘s GMO corn. India: The Supreme Court has just called for the Indian government to follow suit with a 10 year ban on all GMO crop field trials for the next 10 years. US: The fight for a proper, standardized labelling system for foods containing GMO ingredients is heating up.

Genetically modified food crops have long been sold to the public as the answer to humanity‘s 21st century food supply problems. For decades now, the public has been told that they are safe for human consumption, that they will improve crop yields, that they will require less pesticides and that they will be the safest, most effective way to feed the world‘s population as we head into times of severe instability in the global food supply. Although scientific research have long exposed these claims as biotech propaganda, a new batch of studies in recent months have garnered attention for upending every one of these claims about GMO technology. Last month, a new study published in the Journal of Food and Chemical Toxicology found that rats fed Monsanto‘s patented NK603 gmo corn were more likely to develop tumours and suffer severe liver and kidney damage. The study followed 200 rats over two years, divided into 10 groups of 10 males and 10 females. Three groups were fed the NK603 corn alone, three groups were fed the corn treated with Roundup herbicide, three groups were not fed the corn but their water was treated with Roundup, and a control group was fed non-GM corn and plain drinking water. The researchers found that the rats that consumed the GM corn or the Roundup, separately or combined, were prone to serious health problems that typically did not manifest until the fourth month of the trial. Industry-sponsored rat feeding tests only span three months. This is in addition to numerous studies in recent years showing that, contrary to the claims of the GM food supporters, GM crops neither produce larger yields nor reduce the amount of pesticides necessary for the cultivation of crops. A 2009 study by the Union of Concerned Scientists found that genetically engineered crops produced no significant yield increases, and what increases in yield were detected were almost exclusively due to traditional breeding and improvement in agricultural practices. This was affirmed in a report to the UN Human Rights Council last year showing that the scientific literature demonstrates that the greatest potential for increased yield in the future comes not from gmo foods, but from organic agro-ecological practices that are capable of doubling yields within entire regions in under 10 years. A 2011 study coordinated by the International Commission on the Future of Food and Agriculture showed that GMO crops were promoting the creation of ―superweeds,‖ contributing to food insecurity, and required vastly higher concentrations of pesticides to be sprayed. As convincing as the results of this latest research is, it only adds to an already voluminous body of research in the scientific literature that has already undermined claims of GMO‘s safety and efficacy. Earlier this week I had the chance to talk to independent journalist and researcher Anthony Gucciardi of NaturalSociety.com about these studies, and the detrimental health effects that have been tied to the consumption of genetically modified crops.

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The reason that this scientific refutation of the safety and efficacy of GMO technology has not reached the general public is hardly mysterious. The biotech giants whose very reason for existence is the promotion of the GMO myth have fought a long and protracted campaign to smear, undermine and cover up studies pointing out the disastrous consequences of the use of this technology. This process has been underway for years and, unsurprisingly, the GMO PR machine is once again revving into action to attempt to counteract the damage to the reputation of genetic engineering technology that this recent research has caused. Immediately upon the release of the latest rat feeding study, a coordinated effort to undermine the study and its researchers began. Critics pointed to perceived flaws in the collection, reporting and analysis of the study‘s findings. One of the key voices driving the campaign against the study was the Science Media Centre, a supposedly neutral party that connects journalists to scientists when important scientific discoveries are in the headlines. The Science Media Centre itself, however, is funded by bodies like CropLife International, a biotech trade association working to promote the interests of biotech companies around the world, and Syngenta, one of the key biotech seed giants. It has also received funding directly from Monsanto UK. In the wake of the publication of the new study, the popular GMO information website GMWatch.org was targeted with an aggressive cyber attack that succeeded in almost crippling the website. The site operators had to direct traffic from their main page to their Twitter account at the height of the attack, which they noted was not the first time that outside forces had attempted to take them offline. GMWatch is not funded by the biotech industry and regularly publishes news, information and studies demonstrating the health risks of GM foods. The latest round of attacks and misinformation brings to mind for many the case of Arpad Puzstai, a renowned British researcher who was immediately fired from his position at a prestigious Scottish research institute after announcing in 1998 the disturbing findings of severe health effects on rats subjected to feeding tests of a new genetically modified potato variety. Still, despite the best efforts of the biotech giants and their financially connected apologists, public skepticism over the benefits of genetically modified foods is reaching new highs, even as public awareness that GMO crops already account for a large percentage of the North American food supply is also hitting record levels. This awareness and understanding is slowly being transformed into action, as grassroots movements are prompting country after country to set up new barricades against the introduction and spread of these GMO foods. In 2010, Germany announced a ban on the cultivation of Monsanto‘s MON 810 genetically modified corn. In January of this year, BASF, the last firm still developing genetically modified crops in Germany, was forced to stop working on GM crops because of widespread public backlash. In 2011, Peru passed a law banning genetically modified ingredients for ten years to prevent, in the words of the Peruvian Agrarian Commission President, the ―danger that can arise from the use of biotechnology.‖ Also in 2011, Hungarian authorities destroyed 1000 acres of corn which were found to have been grown with genetically modified seeds, which are banned under Hungarian law. In the wake of the French rat feeding study, Russia immediately suspended the importation and use of Monsanto‘s GMO corn. In India, the Supreme Court has just called for the Indian government to follow suit with a 10 year ban on all GMO crop field trials for the next 10 years.

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In the United States, meanwhile, the fight for a proper, standardized labelling system for foods containing GMO ingredients is heating up. In California, citizens are preparing to vote on a ballot measure, known as Prop 37, which will require clear labelling for genetically modified products. As promising and hopeful as it is that people are moving to ban GMO foods from their country, and as helpful as movements like the Prop 37 GMO labelling movement are in raising awareness of the issues, such activism runs the risk that the public will be placated into thinking that the legislative process can be relied on to keep this genome-altering technology in check. This thinking is ultimately utopian, seemingly ignoring the existence of the long-acknowledged revolving door between the biotech corporations and the institutions like the FDA which are supposedly there to monitor and regulate them. In the case of Prop 37, draft proposals of the text show lengthy lists of exemptions that would allow animals that have been reared on GMO feed, or foods that contain as many as 10 GMO ingredients, being labelled as ―non-GMO‖ foods. It is scarcely believable that any attempt to check the spread and use of these GMO foods by purely legislative means will survive the legislative process in a state that would render it ultimately effective. Much more important, as always, is what individuals can do for themselves to insure that they do not purchase, support or consume GMO products. Although the process of sorting through the ingredients and production processes of various foods can be a bewildering experience, grassroots movements are now taking advantage of the crowd sourcing and networking powers of the internet to do an end-run around the government regulatory process altogether to create usable, practical lists of truly non-GMO foods that can be cross-referenced by anyone with access to the internet. Websites like that of the Non-GMO Project at NonGMOProject.org are helping concerned citizens to take matters into their own hands to empower them to avoid GMO products altogether and to stop supporting the corporations that are producing these foods with our own funds. In the end, perhaps this is where the fight against GMO technology will ultimately be won: not in the halls of congress or parliament, but on the dinner plates of an informed citizenry who have taken matters into their own hands and refuse to eat these GMO products.

***Task 16:Answer the following questions according to a report on genetically modified crops.* (http://www.kekenet.com/Article/201401/272963.shtml)** 1) What did the environmentalists do in Philippines in August? Why? They vandalised a field of Golden Rice because they claimed that GM crops posed health risks. 2)For what purpose was the Golden Rice experimented? The aim is to improve the health of children in poor countries by reducing vitamin A deficiency. 3)What was the finding of the paper mentioned in the report? It found unusual rates of tumors and deaths in rats that had been fed with GM maize. 4) What was the impact of the paper?

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Russia suspended imports of the grain in question; Kenya banned all GM crops; France planned to issue a ban on GM maize. 5) Why did the report say that the main ground of the environmentalists had crumbled? The methodology of the paper was widely criticised and no other serious scientific evidence suggest that GM crops do any harm to the health of human being. 6) Why did the report say that GM crops would benefit human beings? GM crops would increase the yields and thereby solve the problem of starvation and malnourishment by resisting climate change, diseases and pests. GM crops would benefit human being by reducing the use of agrochemicals. GM crops would also protect wild habitat from plough.

**Genetically modified crops** Fields of beaten gold Greens say climate-change deniers are unscientific and dangerous. So are greens who oppose GM crops. IN AUGUST environmentalists in the Philippines vandalised a field of Golden Rice, an experimental grain whose genes had been modified to carry beta-carotene, a chemical precursor of vitamin A. Golden Rice is not produced by a corporate behemoth but by the public sector. Its seeds will be handed out free to farmers. The aim is to improve the health of children in poor countries by reducing vitamin A deficiency, which contributes to hundreds of thousands of premature deaths and cases of blindness each year. Environmentalists claim that these sorts of actions are justified because genetically modified crops pose health risks. Now the main ground for those claims has crumbled. Last year a paper was published in a respected journal, Food and Chemical Toxicology. It found unusual rates of tumours and deaths in rats that had been fed upon a variety of maize resistant to a herbicide called Roundup, as a result of genetic modification by Monsanto, an American plant-science firm. Other studies found no such effects, but this one enabled campaigners to make a health-and-safety argument against GM crops—one persuasive enough to influence governments. After the study appeared, Russia suspended imports of the grain in question. Kenya banned all GM crops. And the French prime minister said that if the results were confirmed he would press for a Europe-wide ban on the GM maize. But the methodology of the study, by Gilles-Eric Seralini of the University of Caen and colleagues, was widely criticised and, on November 28th, the journal retracted the paper. There is now no serious scientific evidence that GM crops do any harm to the health of human beings.。There is plenty of evidence, though, that they benefit the health of the planet.

One of the biggest challenges facing mankind is to feed the 9 billion-10 billion people who will be alive and richer in 2050. This will require doubling food production on roughly the same area of land, using less water and fewer chemicals. It will also mean making food crops more

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resistant to the droughts and floods that seem likely if climate change is a bad as scientists fear. Organic farming—the kind beloved of greens—cannot meet this challenge. It uses far too much land. If the Green revolution had never happened, and yields had stayed at 1960 levels, the world could not produce its current food output even if it ploughed up every last acre of cultivable land. In contrast, GM crops boost yields, protecting wild habitat from the plough. They are more resistant to the vagaries of climate change, and to diseases and pests, reducing the need for agrochemicals. Genetic research holds out the possibility of breakthroughs that could vastly increase the productivity of farming, such as grains that fix their own nitrogen. Vandalising GM field trials is a bit like the campaign of some religious leaders to prevent smallpox inoculations: it causes misery, even death, in the name of obscurantism and unscientific belief. Follow your principles America takes little notice of this nonsense. But green groups in Europe, with the support of influential figures such as Prince Charles, have succeeded in shaping policy. Governments have hedged genetic research around with so many restrictions that much of the business has fled a continent that could be doing more than most to feed the world. Some developing countries—Kenya, India and others—have turned their backs on technologies that could literally save their peoples‘ lives. And European governments spend taxpayers‘ money financing groups encouraging them to do so. The group in the Philippines that trashed the rice trials, MASIPAG, gets money from the Swedish government. On moral, economic and environmental grounds, this must stop.

***Task 17: Watch the video of "Five GMO Myths Busted" and answer the following questions.* (http://tv.globalresearch.ca/2013/9/five-gmo-myths-busted)** 1) What did the biotech giants try to convince the public? They have made GMOs into a multi-billion dollar industry and unsurprisingly have launched one of the largest PR campaigns in the history of the food industry to convince the public that their products are safe, healthy and beneficial. 2) What did the 2008 study demonstrate? It demonstrated that organic farming methods with little or no chemical fertilizer and pesticide use was able to increase yield by 116%. 3) What did the 2012 paper conclude? It concluded that the rise of glyphosate-resistant ―superweeds‖ in the wake of the GMO revolution has actually increased pesticide use in the last 15 years by 183 million kilograms, or 7%. 4) What difficulties do the independent scientists have before publishing their research findings?

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They have to ask the biotech companies‘ permission before publishing research on their products. 5) What will a GMO proponent tell you about genetic engineering and traditional breeding techniques? They will eventually try to tell you that there is no difference between conventional breeding techniques and genetic engineering except for the time frame involved. What used to take hundreds of generations can now be accomplished in a laboratory in a short time, they say.

Every year, a greater and greater percentage of our food supply sources back to genetically modified ingredients. Monsanto, Dow, Bayer, DuPont and the other biotech giants have made GMOs into a multi-billion dollar industry and unsurprisingly have launched one of the largest pr campaigns in the history of the food industry to convince the public that their products are safe, healthy and beneficial. Let‘s examine five of the main claims of this PR campaign and see how they stack up to reality. GMOs feed more people. Contrary to what the biotech giants say on their industry-sponsored websites, GMO crops do not produce greater yields. A comprehensive 2009 report by the Union of Concerned Scientists demonstrated that GMO soybean and corn produced no increase in intrinsic yield over conventional soybean and corn. But even if future improvements were able to increase yields, a 2008 study demonstrated that organic farming methods with little or no chemical fertilizer and pesticide use was able to increase yield by 116%. But there‘s no money to be made for the international agri-chemical companies by citing that research, so the public continues to be told that GMOs, which do not increase yield, are necessary to end world hunger. GMOs reduce pesticide use. Again, despite what the chemical companies who are spearheading the GMO revolution are telling you, these GMOs are requiring farmers to buy more of their chemical pesticides, not less. A 2012 paper concluded that the rise of glyphosate-resistant ―superweeds‖ in the wake of the GMO revolution has actually increased pesticide use in the last 15 years by 183 million kilograms, or 7%. The study estimated that if new strains of GM corn and soybeans are approved for commercial use, herbicide use could increase by a whopping 50%. Still, you have to admit it‘s a good business move for the chemical companies that produce the fertilizer to also create the GMO crops that require more fertilizer. There is no scientific proof of adverse health effects from GMO. This is one of the most disingenuous pieces of the GMO PR campaign. In reality, the FDA doesn‘t even test the safety of GMO crops. Instead, all GMO foods are assumed to be safe unless there is already evidence to the contrary. In other words, the FDA relies on self-reported data from the companies that manufacture the crops as to their safety.

Even worse, due to legal and copyright restrictions surrounding GMO patents, independent scientists have to ask the biotech companies‘ permission before publishing research on their products. As a result, almost all of the long-term animal feeding studies that have ever been conducted on GMOs have been carried out by the biotech companies themselves, on their own rules and with their own standards of reporting. What few independent studies have been

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conducted have shown a range of adverse health effects from reduced fertility to immune system dysfunction, liver failure, obesity and cancer. Yet still, for some reason Obama‘s ―Food Czar‖ Michael Taylor refuses to make FDA testing of GMO safety mandatory…I wonder if it‘s because he used to be the Vice President of Monsanto? There is no difference between genetic engineering and traditional breeding techniques. Argue with a GMO proponent long enough and they will eventually try to tell you that there is no difference between conventional breeding techniques and genetic engineering except for the time frame involved. What used to take hundreds of generations can now be accomplished in a laboratory in a short time, they say. But this is not true. Conventional breeding takes one strain of a certain crop, such as corn, and breeds it with another strain of that crop. Genetic engineering takes genetic material from one species, such as soil bacteria, and inserts it into a crop, such as corn. This can be done by a variety of techniques, such as the use of gene guns to fire the genetic material into the cell of the target organism, an inherently imprecise process that leads to random and unintended genetic combinations. To say that this is the same process as conventional plant breeding is simply a flat out lie. And if anyone wants to challenge that assessment, I will give them a soil bacteria, a corn plant and a thousand years. They will never get that bacteria‘s genetic information into the corn plant through ―conventional breeding.‖ Labeling GMOs is a bad idea…for some reason. The argument for why companies should not have to label GMOs is not an argument at all. The biotech giants and their PR fronts merely say that the public is so stupid that they don‘t deserve to know what they‘re eating because it would ―scare them.‖ That is the sum total of the argument. On the other hand are people who believe it is their right to know what they are eating, every bit as much as ingredients and dietary information labeling have long been standardized. The logic is simple enough for a 14-year-old girl to understand evidently, but not a fully-grown man.

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**Unit 9 Design: the Artist vs. the Engineer**

***Task 3: Explain the figures of speech used to describe automobile design style in the 1950s post-war America. Summarize the main features of such style.*** 1) The 1950s was the heyday of American automobile styling. (Metaphor: prosperous time) 2) Functionless tail fins soared to the heavens. (Exaggeration) 3) Chrome decoration spread like a cancer. (Simile) 4) The first postwar recession in America took the wind out of the sails of consumer exuberance...(Metaphor: Stop the trend) 5) These events made Detroit‘s chromed-up, befinned dinosaurs look rather wasteful. (Metaphor) **The main features:** Cars are consistently made bigger, more powerful, and more glitzy, which reached dizzying heights of frivolity and absurdity. Functionless tail fins and chrome decoration showing automotive extravagance and consumer exuberance are wasteful.

***Task 4: Summarize the main points of Ralph Nader's criticism of the American automobile style design in the 1950s and the author's comments both on Nader's criticism and on the stylists.*** Criticism in popular literature

Nader's criticism

The author's comments on Nader's criticism

The author's comments on the stylists The stylists just catered to the consumer‘s emotional wants for status, glamor, and freedom instead of their rational needs for safety and efficiency, thus resulting in car accidents. Nader argued the ―repetitive, emotional exploitation‖ of consumers by stylists, ultimately endangered their lives by preventing engineers from designing safe cars.

Nader and the authors were correct in stating that merchandisers of this era were researching the emotional appeal of automobiles. But they were wrong in arguing that that this research determined auto design. Actually, the automobile stylists did not rely on the marketer's survey of consumer emotions. The stylists had almost complete control of auto design themselves. The stylists relied on their own intuitive emotions for their design.

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***Task 5: Read paragraphs 6-10 and identify the essential differences between the two schools of serious design criticism: the European modernism and the British populism. Summarize the authors' comments on their criticisms.***

**Serious/scholarly/intellectual criticism**

**European modernist school**

**British populist school** The aesthetics of mass-produced American automobiles is an abomination. The chrome-laden, tail-finned, mass-produced cars of the 1950s revealed the degraded tastes of the masses and the new rich, whose culture had not yet caught up with their cash.

The British Independent Group represented by Banham was fascinated with American automobile design as an example of a new kind of mass art. Banham defended the feature of American car design thinking that the annual model change or planned obsolescence reflect was constantly improving technology, and aesthetics had to constantly express it. Thus, he asserted, throwing out perfectly functional cars for newer ones facilitated technological progress.

**The author's comments** Those modernists who condemned such design would deny the masses their simple pleasures by imposing on them their own narrow conception of good design. They were nothing but "pinkos" and "snobs" who violated the basic principle of democracy.

Banham did not note that the design created air drag and ruined fuel economy. He also ignored the dirty little secret behind the annual model change: the mechanical technology underneath remained constant for years, sometimes decades. So annual models merely gave these cars the appearance of progress that diverted consumers' attention and prevented them from demanding real technological improvements

***Task 6: Provide the information as indicated below.***

1) The social background in the 1970s:

The 1970s witnessed the energy crisis combined with economic stagnation. America‘s large and powerful cars became seen by many as socially irresponsible. Automakers were forced by both consumer demand and government regulation to focus on efficiency over aesthetics, and consequently auto engineers began to wield more control over design than stylists.

2) The main feature of automobile style in the 1970s:

Efficiency rather than aesthetics.

3) The social background of the 1980s:

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After a painful period of economic restructuring, prosperity began to return, creating a newly enriched class of young urban professionals, or yuppies, who were anxious to display their wealth and good taste.

4) The cultural consequences:

As a result, the return of prosperity created the yuppies and the erosion of the barrier between high and popular culture turned into a landslide named postmodernism.

5) Impact on automobile design:

There was a nostalgic tendency to reappropriate the reassuring forms of the past and use them to give meaning to an uncertain present. Auto design functioned as a fetish for recapturing a generation‘s lost youth.

***Task 7: Read the ―Auto Design as Mass Culture, Influenced by Societal Change‖ section and summarize the main points of postmodern criticisms of automobile design and the author's comments on these criticisms.* Post-modern serious/scholarly/intellectual criticism of automobile design**

**Authors and works**

**Approach and criticisms**

**The author's comments**

Stephen Bayley *Harley Earl and the Dream Machine*.

He took a high-art approach to auto design and focused on the creativity of the individual designer. He argued that European critics failed to take the needs of the masses into consideration. Their approach seemed somehow out of place and proportion. Armi‘s excesses were caused not merely by his personal bias but also by the automobile-as-art perspective as such. The auto-as-art perspective ignores the social nature of not only consumer demand but also the process of design creation itself. The high-art approach focuses on the individual artist as creator, an isolated loner struggling against the world to realize an aesthetic vision. Creation generally comes from individuals strategically placed in important social networks and taking advantage of opportunities offered by particular historical periods. The creator in auto design is always the group.

Edson Armi *The Art of American Car Design*.

He also viewed auto design as high art, as the creative product of strong individual genius.

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Paul Wilson *Chrome Dreams: Auto Styling Since 1893*

Auto design is not high art but as part of a mass culture that changed and evolved with the social conflicts and contradictions of America. So he ignored individual stylists and concentrated on the changing public as the real creator of the look of cars in an era. He placed early auto design in the context of the rising aspirations of middle- and working-class Americans for symbols of success. But his holistic approach yielded more insights on autos than most books dealing exclusively with them. He focused on historical narrative and saw the changing public as the real creator of the look of cars. Although Wilson tended to fall into simple psychologism in his explanation of the cars of the fifties as reflective of the ―subconscious emotions‖ of aggression, his more social approach was a refreshing departure from the usual emphasis on heroic designers.

Jeffrey Meikle *Twentieth Century Limited*

Meikle placed the emergence of aesthetically designed industrial products such as cars in the social context. Meikle showed that social, economic, and psychological factors converged to produce the aesthetics of products. His holistic approach yielded more insights on autos than most books dealing exclusively with them. His work is sophisticated social analysis.

Thomas Hine *Populuxe*

The exuberant and often futuristic style that reigned in this period was produced not by individual needs but by a social mood that gripped the country. And he carefully tied this mood to social trends like equalization of income, suburbanization of the working class, the decline of extended families, and the insecurities of the Cold It is a delightful but learned book. These works by Meikle and Hine are models of how to do serious scholarship that gives popular design its due and does not seek to force it into the inappropriate framework of the high arts.

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War

David Gartman *Auto Opium: A Social History of American Automobile Design*

Auto design was shaped by social conflicts and struggles.

There are still many unexplored problems and questions that demand the attention of serious scholars.

**Note:** *-ism* is a suffix added to the end of a word to indicate that the word represents a specific practice, system, or philosophy. Often these practices, systems, or philosophies are political ideologies or artistic movements. Using -ism at the end of a word also suggests the word is related to a belief (or system of beliefs) accepted as an authority by a group or school of thought. Here are some examples.

criticism

fetishism

Freudianism

modernism

postmodernism

psychologism

realism

surrealism

Fatalism

modernism

Individualism

materialism

Idealism

altruism

Capitalism

impressionism

Truism

existentialism

Racism

deconstructionism

Constructionism

liberalism

Vegetarianism

nihilism

Feminism

cynicism

Empiricism

methodism

Skepticism

atheism

Theism

pacifism

Pantheism

feudalism

Radicalism

colonialism

Commercialism

paternalism

Rationalism

mutualism

Sentimentalism

symbolism

Metabolism

optimism

Pessimism

protectionism

Exclusionism

egoism

Hegemonism

escapism

Heroism

plagiarism

Barbarism

humanism

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Confucianism

patriotism

Cosmopolitanism

...

***Task 8: Determine whether the following comments are positive or negative.***

1) Critical books like Nader‘s certainly seemed to resonate with the mood of American consumers, who were feeling a bit guilty about their frivolous products and feared that somehow they were being manipulated behind their backs, but the factual content of these popular criticisms of auto styling left a lot to be desired. **Negative**

2) Banham's defense of the over decorated and symbolic American cars of the 1950s on technological grounds was questionable at best. **Negative**

3) He failed to note that hundreds of pounds of chrome doodads tacked onto those "streamlined" shapes surely created air drag and ruined fuel economy. **Negative**

4) And he also ignored the dirty little secret behind the annual model change. **Negative**

5) Perhaps sensing the weakness of his technological arguments, Banham felt compelled to add a social and political justification of American cars that was more persuasive. **Negative**

6) His arguments sidestepped, however, a question that later critics of auto design asked. **Negative**

7) Thus, Banham embraced the American idea of consumer sovereignty, contending that the auto market merely delivered what the majority wanted. **Positive**

8) Regardless of the flaws in his arguments, Banham and his British Independent Group were precursors of an artistic trend that would spread to other countries and become a major movement in the 1960s, Pop Art. **Positive**

9) The most carefully researched and scholarly work on automobile design to this date, Armi‘s book, published by a university press, pushed the autos-as-art argument to new heights, and in the process exposed its inherent weaknesses. **Positive**

10) All of Armi‘s vitriol against some auto designers, as well as his lavish praise for others, seemed somehow out of place and proportion, however. **Negative**

11) The auto-as-art perspective ignores the social nature of not only consumer demand but also the process of design creation itself. **Negative**

12) These works by Meikle and Hine are models of how to do serious scholarship that gives popular design its due and does not seek to force it into the inappropriate framework of the high arts. **Positive**

***Task 9: Answer the following questions based on Text II.***

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1) What made Henry Ford suddenly famous in 1914? How was Ford portrayed across Europe and Latin America at that time?

The Ford Motor Company startled the globe with its ―Five Dollar Day.‖ In Europe he was portrayed as symbol and exemplar of American energy, confidence and resourcefulness. In Latin America Ford‘s personality was regarded as summing up the quintessential American traits and gifts. In Russia, he was a figure about whom *moujiks* and mechanics wove wistful dreams.

2) Why did the Americans have their own different images of Henry Ford?

Because he was a myth. It was very difficult to give a true portrait of the man.

3) In what way does the author think Henry Ford held up a mirror to the American character of his time?

He was typically American of his time in his technological talents, his individualistic economics, his social blindness, his frequent brilliant insights, his broad veins of ignorance, prejudice and suspicion, he at first glance seems unique; a man fascinating in his intricacy even to those who most detest some of his traits

4) What examples are given to show that Henry Ford had peculiar engineering talent?

Ford had the power of defining almost any mechanism at a glance. He *read* engines. As a boy he took apart and reassembled every watch he could reach, and spent a Sunday afternoon, his father away, in disassembling and restoring much of a steam engine. In his everyday experience with machines, Ford often came up with novel technological ideas which would solve mechanical problems. He constantly worked on experiments.

5) What accounts for Ford's steady succession of technological ideas?

His peculiar intuitive mind.

6) Why does the author think of Ford as essentially a man of artistic temperament?

He has a puzzling and complex character which only an artist would have. His detachment, his arch, wry humor, his constant self-projection into the spotlight, his ability to lift himself above those business minutiae which absorbed most industrialists, his readiness to do some terrible things with as little seeming consciousness of their quality as Byron or Swift showed in their misdeeds, all suggest an artistic bent. Ford had the artist's desire to reshape the world to fit his vision of what life should be like.

7) What does the author think is the cause of the negative element in Ford's personality?

His inadequate formal education and other limitations in his background.

8) What are the virtues of an American countryman that are always visible in Ford's way of living?

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He condemned smoking, drinking and marital irregularities. He was a countryman also in his devotion to work as a virtue in itself. His cure for all evils was more work.

9) What frontiersman‘s spirit did Ford demonstrate?

He preferred trial and error to precise planning. He relied on courageous innovation for the development of his company. Careful and precise planning and calculation might have hindered the development of Ford's company. He hated monopoly and patent in the industrial world.

10) What does the author think is the pleasant part of his personality?

He was inarticulate. He didn't like making public speeches. He disliked class lines. He had a rugged comradeship with fellow workers which he showed in his early career. He had a warm love of nature, and the feeling for wild life which made him build shelters for rabbits, grow corn for crows, and keep warm water available all winter in the hope of retaining migratory songbirds in the North. One of the most important parts of his countryman‘s heritage was his stubborn originality of thought—when he did think. He didn't take ideas secondhand from books; he hammered them out for himself, usually on walks in field and wood. Often they were immature. But sometimes, between intuition and lonely thinking, he seized a concept which startled men with its novel glint of truth.

11) Why did Henry Ford fail to maintain a good relationship with his son?

Because Ford tried to make his son Edsel in his own image.

12) What kind of world did Henry Ford try to make?

He tried to remake his world a little nearer to the heart‘s desire. He wanted to abolish war (―a habit, and a filthy habit,‖ he said) from his world. He wanted to exclude drink, class divisions, idleness and disorder. He wanted to get rid of money as anything but a part of the mechanism of production.

13) Why do YOU think Henry Ford became more and more isolated with the expansion of his business and the increase of his age?

Open.

14) What do YOU think are Henry Ford's virtues and weaknesses?

Open

***Task 11: Note down the main points of Text III which addresses the question whether software is art or engineering.***

1) ...contain a significant engineering element.

2) ...if a theme is chosen then planned to include particular incidents, then the product is engineered.

3) ...if you do something without defined requirement, budgeting, or deadline, it is art.

4) ... if you do something to solve an individual problem, it is art.

5) ... privately, quasi-secretly, on the developer's own time, therefore in a complete black box, or in an R&D environment with broad independence,

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the ability to choose ideas of interest and express them in the artist's own fashion, and little management of the process in terms of deliverables or deadlines.

6) ... bad products that do not match public problems, if you regard software as engineering.

7) ... Treating software as an engineering process when it is not.

8) ... an art form: less concentration on the budget and more on the best approaches for obtaining a quality result; and the counter-intuitive idea that software can be done better with fewer people involved.

***Task 12: Fill in the blanks with information you hear from the report.* (http://www.scientificamerican.com/podcast/episode/5b63bdf8-e7f2-99df-33f5e0df775baa48/)** (1) appreciate the styles of different artists (2) incorporated other styles into the painting (3) developed a system (4) breaks down the image (5) determine whether Dalí himself painted it (6) variety of influences (7) replace professional expert judgment (8) teaching computers how to see the world around them ***Task 13: Listen to the speech ―Metals that breathe‖and answer the following questions.* (http://www.ted.com/talks/doris\_kim\_sung\_metal\_that\_breathes)** 1) What are the advantages of thick walls and small windows in the past? The thick walls are great for insulation. It keeps the interior very cool during the summertime, and warm during the wintertime, and the small windows were also very good because it limited the amount of temperature transfer between the interior and exterior. 2) How did the advent of plate glass, rolled steel and mass production change our life? With the advent of plate glass, rolled steel and mass production, we were able to make floor-to-ceiling windows and unobstructed views, and with that came the irreversible reliance on mechanical air conditioning to cool our solar-heated spaces. 3) What is the heat island effect? How does this effect come into being?

Over time, the buildings got taller and bigger, our engineering even better, so

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that the mechanical systems were massive. They require a huge amount of energy. They give off a lot of heat into the atmosphere, and for some of you may understand the heat island effect in cities, where the urban areas are much more warm than the adjacent rural areas.

***Task14: Listen to the second part of the speech and supply the missing information.* (http://www.ted.com/talks/doris\_kim\_sung\_metal\_that\_breathes)** 1) The purpose the speaker mentions human skin is to make our building skins more similar to human skin, and more dynamic, responsive and differentiated, depending on where it is. 2) The smart thermo-bimetal is called being smart because it requires no controls and it requires no energy, and that's a very big deal for architecture. 3) The thermo-bimetal canopy of the ―Bloom‖ is done with two intentions, one is to block the sun, the other one is toconstricts the amount of sun passing through. 4) The typical double-glazed window panel is mentioned to illustrate the speaker‘s interest and work in developing some building components for the market. 5) The grasshopper an inspiration to the speaker‘s design because grasshoppers have a different kind of breathing system. They breathe through holes in their sides called spiracles, and they bring the air through and it moves through their system to cool them down, and so in this project, I'm trying to look at how we can consider that in architecture too.

***Task 15: Answer the following questions according to the video you watch.* (http://www.ted.com/talks/john\_maeda\_on\_design)**

1) Why does RISD have the facilities in the Edna Lawrence Nature Lab?

Because at RISD, you have to look at the actual animal, the object, to understand its volume, to perceive it. At RISD, you're not allowed to draw from an image.

2) Why doesn‘t RISD make the facilities all digital?

Because there's something good to how things used to be done. There's something very different about it, something we should figure out what is good about how we did it, even in this new era.

3) What is the new media artist‘s reflection on his experience in the antique shop?

He realized, art isn't about old or new. It's about something in between. It isn't about "old," the dirt, "new," the cloud. It's about what is good. A combination of the cloud and the dirt is where the action is at. What are the differences between a traditional leader and a creative leader?

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4) What are the differences between a traditional leader and a creative leader?

In many senses, a regular leader loves to avoid mistakes. Someone who's creative actually loves to learn from mistakes. A traditional leader is always wanting to be right, whereas a creative leader hopes to be right.

5) What is the speaker‘s understanding of leadership?

Leadership is to connect those impossible things and people whether you're in the hierarchy or the heterarchy, which is a wonderful design challenge.

***Task 16: Watch the video and answer the following questions.* (http://www.engineering.com/Videos/tabid/4624/Default.aspx)** 1) Why does Jeff attend USA science and engineering festival? To interact with many people, the worlds of science, technology and engineering the world of art 2) What is Jeff‘s view on the interplay between art and science? It informed each other of new vision and explored the unknown. 3) How does Jeff do complex science projects but deliver beauty at the same time? Looking at it in the wrong way, using intuitive mind and rational mind sitting there and simmer with science and art for long time sometimes for years before they started to fuse.

Todd: We're here at the USA science and engineering festival and I'm sitting with Jeff Lieberman artist and engineer. Jeff, were here at this giant festival there‘s hundreds of thousands of students here. Why are you involved with the festival, why come? Jeff: I guess mostly because I was invited to come here and I have the opportunity to interact with so many people and maybe because I have a slightly different slant than a lot of people where my work is usually about mixing the worlds of science, technology and engineering with the world of art and human perception is the link between those two for me usually. Todd: That‘s fascinating; I think you hit on something that‘s really important in a theme that we've seen over the week. We tend to think of science and art when in reality there is this enormous of interplay between them and they‘re really you need one for the other. Why do you focus on that, what have you seen on that, what might you teach the teenagers watching the video right now.

Jeff: Oh, there‘s so much to say. You know you go back and you got a picture of Da Vinci on the wall behind you right, you go back 500 years science and art were exactly the same thing. There was no artificial division between the two they were both processes that informed each other and processes of explorations into the unknown. And I think we've kind of gotten so differentiated in all of our knowledge that we sometime we forget that it's about sitting in those unknown circumstances that leads into all the movements forward. You can't just assume that we have all the answers already, that's why things keep changing. So for me I was just really interested in science and really interested in art and kind of lived a double life for 25 years where I didn't know what I was going to do

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with my life and I was trying to decide every day what to spend time on and eventually through robotics and eventually through human perception started realizing like they knew a long time ago that these things were part of one larger organism. Todd: I really like that a lot, I think one of the things you look at especially when you look at schools, you have your arts classes and your math and science and engineering classes, if you can call them that . And often times you end up creating these two separate groups. It feels like for engineers there is a fear of embracing that but you've done some amazing art installations, design installations, that incorporate science, incorporate engineering and incredibly complex but they deliver beauty. Tell us about some of the work that you‘ve done, some of your favorite projects. Jeff: First let me say, it‘s valid to fear that kind of thing because in our community we don't foster it at all. So when I was growing up and doing science and art there was no one saying, no but you can do both of these things. There was a lot of fear for a lot of years on what am I really going to do and that's one of the hardest things I think right now. I you‘re growing up with the scientific mindset but you want to do art there‘s no one reminding us that that‘s okay and that it's actually the beautiful part. And if you back up into all the scientific revolutions that have happened in the last hundred years especially it's not that it's because we‘re getting a new piece of data that points us to new paradigm. Because someone's looking at the same stuff and realizing that we're looking at it in the wrong way and that‘s a creative process. People like five Einstein talked about this all the time, it was not their rational mind that was the dominant things that led to the scientific revolutions, it was their intuitive mind that backed up and saw things in a new way. So when I went to the media Lab for grad school and started working on these art installations it was through a robotics and you can't build a robot without having technical knowledge of how to make it work. So there's always this kind of grounding process but the work that I was doing was primarily emotional and aesthetics. The idea was to try to give people a feeling like they were interacting with some true intelligence and we were doing this through very simple sensors and motors and artificial intelligence routines. And that started to form the link for me and I'm not saying anyone else should go that direction. Anyone else who's interested in some science or some artwork will find their own pathway towards how those things mix. But I think the trickiest thing is you have to sit there and simmer with both of them for really long time sometimes for years before you start realizing how they are interconnected and for me that was like almost 10 years of that before it started to fuse. Todd: I'm sitting with Jeff Lieberman, Jeff is I would say an artistic engineer, can we say that an artist and engineer here at the USA science and engineering festival. You can hear more about what Jeff has to say as well as the other engineering and science celebrities here at the festival on engineering.com.

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