TECHNOLOGY

A. Inventions and discoveries

Task 1: Make a list of 10 inventions and 5 discoveries made throughout the history of humanity. Rank them in order of importance. Give reasons for your choice.

Inventions	**Discoveries**
___________________________	_________________________
___________________________	_________________________
___________________________	_________________________
___________________________	_________________________
___________________________	_________________________
___________________________	
___________________________	
___________________________	
___________________________	
___________________________	

Task 2: Think of an invention, discovery or innovation in your field of study. Briefly explain itto the class.

Task 3: The 10 inventions and discoveries which had the greatest positive impact on society in the 20th century, according to astronaut Neil Armstrong. Fill in the gaps with words and phrases from the box below.

" ..... Moving on to the top 10, we have ___________________________ and__________________________ which provided improvements in comfort and health and gave us the ability to transport fresh food and extend its shelf life. Next is the _______________________ . Instantaneous worldwide communications serve both family and business needs. When the founder of IBM, Tom Watson, reportedly predicted before World War II that there was a world market for about 5 ___________________________ , he slightly underestimated the number of machines and applications for these devices which reached number 8 on our list. The world's population grew from 1.6 billion to 6 billion souls during this past century, a milestone that could not have been reached without number 7, _________________________________ . More impressive is the fact that the portion of the population necessary to feed the world has been reduced from slightly more than half in 1900 to just a few percent today.

One step higher, at number 6, are ________________________ . Although Marconi first demonstrated radio in 1895, he broadcast the first transoceanic signal in 1901. In the fifth position is ______________________ , from vacuum tubes to transistors, integrated circuits and microcircuitry. Fourth are the technologies that __ ________ and deliver safe and ___________________ . _____________ _______________________ and distribution techniques led to longer lives and better living standards around the globe. The _________ ________ is ranked third. From its birth in 1903 with no obvious important use, aircraft rapidly changed the character of warfare, found dozens of new uses, and in the latter half of the century decimated passenger

competition in trains and ships.
The second ranked engineering contribution is the ________________________ . It too was a nineteenth century invention, but its development in the twentieth century demanded that it be considered a competitor. Passenger cars and trucks are the major transporters of people and cargo around the world, and the automobile has expanded the ease, practicality, and affordability of short- to medium-range travel enormously.
Now, at this point, if we were in the entertainment world, we would have drum rolls, fanfares, and rockets. But as engineers we are not so inc1ined - well, maybe a few rockets. The winner, the top-rated engineering improvement to the life of earthlings in the 20 century was ________________________ .
The majority of the top achievements would not have been possible without electricity. Electrification changed the country's economic development and gave rural populations the opportunities and amenities as people in cities. It provides the power for small appliances in the home, for computers in control rooms that route power and te1ecommunications, and for the machinery that produces capital goods and consumer products. If anything shines as an example of how engineering has changed the world during the 20th century, it is clearly the power that we use in our homes and businesses."

Water treatment . electrification . agricultural mechanization . telephone
air conditioning . automobile . refrigeration . abundant water . computers
electronics . radio and television . purify . airplane

The inventors of the flying machine

The question has often been asked why the Wright brothers were able to succeed in an effort in which so many others had failed. Many explanations have been offered, but three reasons are most often cited. First, they were a team. Both men worked well together, read the same books, located and shared information, talked incessantly about the possibility of manned flight, and served as a consistent source of inspiration and encouragement to each other. Quite simply, two geniuses are better than one.

They were also both glider pilots. Unlike some other engineers who experimented with the theories of flight, Orville and Wilbur Wright experienced the practical side of their work by building and flying in kites and gliders. Each craft was slightly better than the last, incorporating in it the knowledge that they had gained from previous failures. They had realized from their experiments that the most serious problem in manned flight would be stabilizing and maneuvering the aircraft once it was airborne. While others concentrated their efforts on the problem of achieving lift for take-off, the Wright brothers focused on developing a three-axis control for their aircraft. By the time the brothers started to build an airplane, they were already among the best glider pilots in the world, and they knew the problems of flying first hand.

In addition, the Wright brothers had designed more effective wings for the airplane than had been previously engineered. Using a wind tunnel, they tested more than two hundred different wing designs, recording the effects of slight variations in shape on the pressure of air on the wings. The data from these experiments allowed the Wright brothers to construct a superior wing for their craft.

In spite of all these advantages, however, the Wright brothers might not have succeeded had they not been born at precisely the opportune moment in history. Attempts to achieve manned flight in the early nineteenth century were doomed because the steam engines that powered the aircrafts were too heavy in proportion to the power that they produced. But by the end of the nineteenth century, when the brothers were experimenting with engineering options, a relatively light internal combustion engine had already been invented, and they were able to bring the ratio of weight to power within acceptable limits for flight.

Task 4: After reading the text above, indicate whether the following information from the text is right (✓) or wrong (X). If wrong, correct the information.

		✓	X	correction
A	The text basically deals with the advantage of the internal combustion engine in the Wright brothers' experiments.			
B	Being engineers distinguished the Wright brothers from their competitors.			
C	According to the Wright brothers, manoeuvring after take-off was the most serious problem in constructing a manned aircraft.			
D	The Wright brothers build the wings for their airplanes by copying the wings of gliders they had flown.			
E	The problem with the steam engines used in earlier aircraft was that they did not have enough power to lift their own weight.			

B. Killer technologies

When the steamship was introduced, it was known for blowing up. Eventually, however, the technology improved and it mostly replaced its predecessor, the sailing boat. Then along came the internal combustion engine, and the steamship in turn became redundant.

The petrol engine proved to be by far the most important technology of the early 20th century and car ownership grew by approximately 50% each year between 1910 and 1930. As well as replacing what came before it, this 'killer' technology revolutionized the entire world economy in just over 20 years with its impact on transport, trade, road-building and oil.

In the second half of the 20th century, the transistor experienced a similar extremely fast growth. The number of transistors produced in the world has reached 10^{18} compared to just over a million in 1955. The average price per transistor has fallen steadily from $^{1}/_{10}$ of a cent in 1975 to about one ten-millionth of a cent this year. In addition, chips'* critical dimensions have shrunk from 5,000 nm* to slightly less than 90 nm since 1974 and are continuing to fall.

The combustion engine and transistor were technologies that changed society. They led to thousands of new developments, including mass tourism and television respectively, but as they opened new opportunities, they also destroyed older industries.

At the beginning of the 21st century, the Internet promises to bring about as much change as anything in history, and is developing fast. Internet speeds have increased substantially. We have moved rapidly from 28.8 kbps connections to broadband, and in Europe, there was 206.2% growth in Internet usage between 2000 and 2007, thus reaching fractionally less than 40% of the population, or somewhere in the region of 322,000,000 people.

*chip = silicon chip which contains invisible transistors   *nm = a nanometre = one billionth of a metre

Task 1: After reading the text above, indicate whether the following information from the text is right (✓) or wrong (X). If wrong, correct the information.

		✓	X	correction
A	The steam engine was not a reliable technology initially.			
B	The petrol engine was the dominant technology between 1900 and 1950.			
C	Transistor production peaked in 1955.			
D	The transistor was indirectly responsible for mass tourism.			
E	Internet connection speeds were slow to improve.			

Task 2: Combine the figures with the information they belong to. Write letter figure combinations.

figure	meaning in the text	correct combination
(A) 10^{18}	(1) Year when the Internet usage had grown by 206.2% compared to 2000.	
(B) 28.8	(2) The rate by which the Internet usage had grown between 2000 and 2007 in percent.	
(C) 1910	(3) Year when the car ownership started to grow by approx. 50% until 1930.	
(D) 2007	(4) Approximate number of people in Europe that had internet access in 2007 in million.	
(E) $^{1}/_{10}$	(5) Growth of transistor production in the second half of the 20th century, compared to 1955.	
(F) 206.2	(6) Dimension of the first chips containing transistors in nanome- ters.	
(G) 5,000	(7) Speed of the first very slow dial-up internet connections, given in kbps.	
(H) 322	(8) Average price of a transistor in 1975, given in cents.	

Task 3: Match the words / phrases in the text to these words / phrases with a similar meaning.

1 marginally: ______________________

2 a little more than: ______________________

3 a great deal: ______________________

4 just under: ______________________

5 roughly: ______________________

6 about: ______________________

Task 4: What are recent developments that may also be seen as 'killer technologies'? Brainstorm and discuss in groups.

Task 5: CDs were also among the technologies that revolutionized the world. (🖫 016) Listen to the conversation and answer the questions below.

How Long Do CDs Last? It Depends, But Definitely Not Forever

http://www.npr.org/blogs/alltechconsidered/2014/08/18/340716269/how-long-do-cds-last-it-depends-but-definitely-not-forever

1. What are researchers investigating in the basement lab at the Library of Congress?
2. What effects do the relative humidity and temperature have on CDs and why is it being carried out?
3. What is the goal of the Preservation, Research and Testing Division at the Library of Congress?
4. What problems do small institutions currently face?
5. Explain the problem behind bronzing.
6. What problems are mentioned concerning different standards of manufacturing?
7. Everyone always wants to know - how long do CDs last? What's the average age?
8. All over the country, real estate records and titles were moved from microfilm to CD, says Jim Harper, president of the Property Records Industry Association. What was the reason given?
9. Why has his organization been taking Ms. Youket out to speak to county officials?
10. What does the researcher France say about the durability of CDs?
11. What is the fastest way to destroy your CD collection?
12. What is the Library of Congress starting to do and what could be an issue?

Task 6: Explain the words in the box (used in the conversation) in English.

1. investigate	
2. humidity	
3. preservation	
4. coating	
5. erode	
6. determine	
7. real estate	
8. superior	
9. durability	
10. acknowledge	

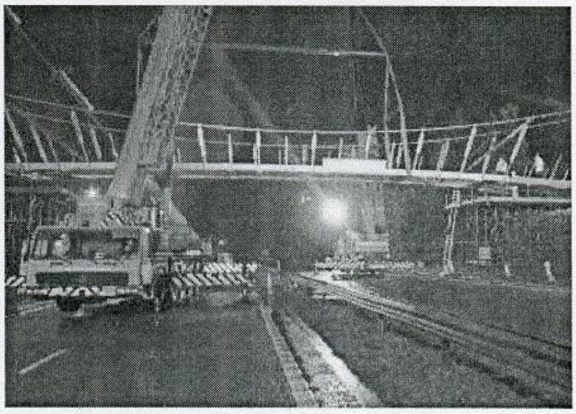
C. Engineering projects

Task 1: Pair / Group work

Make a list of 10 engineering projects (think of buildings, ship canals, bridges, walls, tunnels, dams, etc.). Decide which of them is

(a) the most useful (b) the most useless

for the community. Give reasons.



Overnight construction of the HA's first plastic footbridge over the A30. The HA will soon be constructing its first plastic road bridge.

Highways & materials

Highway Agency's new plastic bridge

Drivers on the M6 in Lancashire will soon be passing under the Highways Agency's first plastic road bridge. The new bridge at Mount Pleasant will be much lighter than the old one but is of a similar strength and will need less maintenance. The innovative new plastic material is so light that the deck can be fabricated at the roadside and lifted into place overnight, meaning disruption to road users is kept to a minimum.

The deck of the bridge will use Fibre Reinforced Polymer (FRP) sections joined together, bonded to and supported by steel girders. FRP materials used in construction generally contain carbon, aramid or glass fibres embedded in a resin matrix. The exact properties of FRPs can be manipulated by the choice and content of fibre, providing a range of structural properties with different values for stiffness and strength. In comparative terms, the type of FRP used for the Mount Pleasant Bridge has around 60% the strength of steel, but is much less dense so that sections used for construction are much lighter.

FRPs are claimed to offer a number of advantages over traditional construction materials. They can be up to four times less dense than steel, so they can be more easily transported and installed in large sections using a mobile crane, saving up to a possible four weeks on traditional construction methods. FRPs are not susceptible to corrosion from water or salt, and are therefore expected to have superior durability. The components are also virtually maintenance free.

The initial cost of using FRP can be up to three times greater than conventional materials, but there are significant cuts in other construction costs, particularly in the reduced duration of traffic management. The Mount Pleasant Bridge is likely to cost 5 to 10% more to construct using FRP. However, these estimates do not take into account the 'cost to the nation' of congestion saved, and the Highways Agency is confident there will also be significant whole-life cost savings. In future, material costs are also expected to lower as manufacturing techniques improve and more-efficient designs are developed.

The M6 bridge was made possible by research carried out at TRL, which enabled the development of a HA design standard for the design of FRP bridges, which forms part of the Design Manual for Roads and Bridges. FRP bridges will evolve as the technology develops, good practice becomes established and engineers become familiar with its properties and benefits. They are expected to be particularly useful in motorway widening schemes and in bridge rehabilitation across the country, where lengthy road or lane closures would otherwise be required. The construction of the Mount Pleasant Bridge is an important step towards the wider use of FRP to the benefit of bridge owners and road users.

Article from: http://www.innovationandresearchfocus.org.uk Issue 64, February 2006

Task 2: Reading Comprehension: *Answer the following text questions <u>in English using your own words</u>.*

1. What do Fibre Reinforced Polymer consist of?
2. How can their properties be modified?
3. Which advantages do these materials offer?
4. What do we learn about the costs?
5. What made the construction of this bridge possible?
6. What do we learn about the future use of these materials?

Task 3: Skyscrapers – Reading Comprehension – **Fill in the gaps with words and phrases from the box**

emergence of elevators	bricks and mortar	giant
concentrate the force	steel	support their own weight
commuting time	the right number	1,609
metal beams	conserve land	puts out
earthquake damage	horizontal force	the downward pull of gravity
building safety	new manufacturing processes	height

Throughout the history of architecture, there has been a continual quest for height. Thousands of workers toiled on the pyramids of ancient Egypt, the cathedrals of Europe, the countless other towers, all striving to create something awe inspiring. People build skyscrapers primarily because they are convenient - you can create a lot or real estate out of a relatively small ground area. But ego and grandeur do sometimes play a significant role in deciding the scale of the construction, just as they did in earlier civilizations.

The main obstacle in building upward is __________________. There has to be more material at the bottom to support the combined weight of all the material above. In normal buildings made of________________________ you have to keep thickening the lower walls as you build new upper floors. After you reach a certain ____________________, this is highly impractical. If there's almost no room on the lower floors, what's the point in making a tall building?

In the late 1800s, __________________________ made it possible to produce long beams of solid iron. This gave architects a whole new set of building blocks to work with. Narrow, relatively lightweight_______________________________ could support much more weight than the solid brick walls in older buildings, while taking up a fraction of the space. ____________________, which is lighter and stronger than iron, made it possible to build even taller buildings.

Giant Girder Grids

The vertical columns in a skyscraper consist of dozens of steel beams riveted end to end. At each floor level, these vertical columns are connected to horizontal girder beams. Many buildings also have diagonal beams running between the girders for extra structural support.

In this _____________________ three-dimensional grid - called the *superstructure* – all the weight of the building is transferred directly to the vertical columns, which_____________________ into small areas at the building's base. The entire weight of the building rests directly on the hard clay material under the earth's surface. In very heavy buildings, the base rests on massive concrete or steel piers that may extend all the way to the earth's bedrock layer.

In this design, the outer walls need only ____________________. Architects can open the building up as much as they want; they can even make the outer walls entirely out of glass.

Functionality

Skyscrapers would never have worked without the coincident ____________________________ . Designing skyscraper elevator systems is a balancing act of sorts. As you add more floors to a building, you increase the building's occupancy. When you have more people, you need more elevators. But elevator shafts take up a lot of room, so you lose floor space for every elevator you add. To make more room for people, you have to add more floors. Deciding on _____________________ of floors and elevators is one of the most important parts of designing a building.

_______________________ is also a major consideration in design. Skyscrapers wouldn't have worked so well without the advent of new fire-resistant building materials in the 1800s. These days, skyscrapers are also outfitted with sophisticated sprinkler equipment that ____________________ most fires before they can spread very far.

Wind Resistance

In addition to the vertical force of gravity, skyscrapers also have to deal with the ______________________of wind. Most skyscrapers can easily move several feet in either direction, like a swaying tree, without damaging their structural integrity. Making buildings more rigid also braces them against ___________________. The entire building moves with the horizontal vibrations of the earth, so the steel skeleton isn't twisted and strained.

How High?

Experts are divided about how high we can build skyscrapers. Some say we could build a mile-high (______________m) building with existing technology, while others say we would need to develop lighter, stronger materials and faster elevators. Future technology advances could conceivably lead to sky-high cities, giant buildings that house a million people and more.

We might be compelled to build further upward in the future simply to _________________.When you build upward, you can concentrate much more development into one area, instead of spreading out into untapped natural areas. Skyscraper cities would also be very convenient: More businesses could be clustered together in a city, reducing____________________.

Task 4: A historic engineering project - The Panama Canal

Read the short text. For each item choose the word which *best* completes each sentence.

The Panama Canal rises up to 26 m above the sea level and has huge locks. It's 82 km long. It takes between 24 to 30 hours for a ship to pass *(through, in, over, on)* the canal, but it *(has, does, had, did*) save 8,000 nautical miles of journeying round Cape Horn.

The project was first started by a French company *(under, after, over, at)* a man called Ferdinand de Lesseps in 1879, but thousands of men died of *(black, yellow, red, green*) fever and malaria, which at the time were *(taught, thought, though, through*) to be caused by the climate, not mosquitoes. This led to work being abandoned in 1889, so they did 10 years of working on it before *(resuming, assuming, finishing, abandoning*) it. Then the USA bought part of the Republic of Panama and began construction in 1906. The chief engineer at the time was a man called John F. Stevens. *(Despite, However, Because, Since)* the main contributor to *(that, the, his, this)* success of the scheme was *(even, only, not, ever)* the chief engineer but the *medical (person, personnel, official, officer),* a man called Colonel William C. Gorgas, who *(eradicated, abolished, eliminated, extricated)* yellow fever and (increased, boosted, raised, reduced) the incidence of malaria. *The (global, general, total, entire*) cost of the Canal was $380 million, with 43,000 laborers, who were *(almost, predominantly, most, rather)* black West Indians.

The Canal was first opened in 1914 and consists of a series of lakes *(related, connected, joined, interwoven)* by canals and locks with specially built locomotives to *(pull, drag, push, throw)* ships through the locks. Lake Gatun at the top supplies the water for the canals. They had to cut *(off, down, up, away)* a lot of jungles and that has *(improved, effected, affected, exchanged)* the climate of the area; *(moreover, nevertheless, whereas, however)* there is a lack of water at some times of the year. Now, this unfortunately *is (probable, appearing, likely, similar)* to get worse as the lake fills up with silt and earth.

D. Spray-on Clothing

TEXT 1: Spray-On Clothing Could Deliver a Suit in a Can

http://www.scientificamerican.com/article/spray-on-clothing-could-d/

Reading comprehension → Tasks below

Start-up develops fiber-laden sartorial aerosol that can be styled and worn

Oct 25, 2013 | by Pippa Wysong

Someday, packing for a trip might be as simple as stowing a spray can of colloidal polymer mix for making your own spray-on clothes. Whether it’s a T-shirt or evening attire, spray-on fabric is a novel way to make a variety of light-use fabrics.

British fashion designer Manel Torres dreamed up the idea after attending a wedding and watching people spray each other with Silly String, filaments of plastic propelled in liquid form from an aerosol can. “I thought, wouldn’t it be neat if there was a way to create a material that could be sprayed to cover a larger surface area and used for clothing?” he says. To do this, he went back to school at Imperial College London, earned a PhD in chemical engineering, and launched Fabrican, Ltd., with Paul Luckham, a chemical engineering professor, also at Imperial. Once sprayed onto a surface the instant fabric forms a nonwoven material, Torres says. This formula consists of short fibers bound together with polymers and a solvent that delivers the fabric in liquid form. The material is sprayed directly onto a person’s bare skin where it dries almost instantly. It can be easily peeled off because the polymers do not bind to skin. Other variants would adhere to surfaces. “The difference is largely in the formulations, but also in the method of spraying,” he says, adding they have experimented with spray guns, aerosol nozzles, portable canisters and jet sprays for both industrial and customized applications. To create a shape—such as a flaring skirt—the solution would be sprayed onto a surface with that desired shape. The material’s characteristics—such as strength and texture—depend on the type of fibers mixed into the solution. Possibilities include natural fibers such as wool, cotton, silk or cellulose as well as synthetic fibers such as nylon. The fabric itself is like a thin, slightly stretchy suede and can be applied in layers to make it thicker, Torres says. But the texture and feel differs depending on the types of fabrics are mixed into the solution. The wearable fabric feels quite cool when it is first sprayed on, but warms up to body temperature within seconds. Some models describe the spray-on clothing as feeling like a “second skin,” "like being dressed but feeling naked," Torres says.

Luckham notes that a T-shirt can be sprayed, taken off over the head and put back on again. But one can get more creative in undressing. “A T-shirt can be cut up the front with scissors and removed like a waistcoat, put back on again, and then the front can be resprayed,” he says.

After a person is finished wearing a spray-on garment, it can be recycled. This is done by shredding or cutting the garment into small pieces and dissolving it in a solution. Smaller pieces of fabric dissolve more easily than big ones do, and resemble tissue dissolving in water, Torres says. The propellant used to spray the fabric is the same substance as the solvent, which simplifies the recycling process because you don’t have to have another solution or solvent on hand, Luckham says.

The team is also developing spray-on, lightweight waterproof plaster casts and testing prototypes in partnership with U.K. military personnel who have lost limbs in combat. Commercialization of a final product is expected once testing has been completed. Spray-on bandages and other medical applications are also under development. An advantage of the spray-on fabric is that it's sterile when applied, which makes it attractive for emergency applications such as field dressings, Torres says.

One automotive company is working with Fabrican to develop spray-on fabric for car interiors. The challenge is to create a fabric strong and durable enough to withstand the daily wear and tear of the family car or a commercial vehicle.

Near-term, Luckham envisions giving people the ability to spray small amounts of fabric onto surfaces to create an instant face cloth or towel—or even using spray-on materials as decorations similar to papier mâché.

Short video (without text) available: *http://www.scientificamerican.com/article.cfm?id=spray-on-clothing-could-d)*

Task 1: Comprehension questions on Text 1: Spray-On Clothing Could Deliver a Suit in a Can:

1. What made Mr. Torres come up with the idea of spray-on clothing and what did he do to turn his idea into reality?
2. What is the formula made of?
3. What are the qualities that make the spray suitable for being used on people?
4. What are the different ways of applying the spray?
5. What do the material’s characteristics depend on?
6. Can the sprayed clothes be reused? Explain in detail.
7. What other purposes for the spray-on technology does the author mention?

TEXT 2: Spray-on Clothing

Bruce Doran - Staff Scientist - 2013-08-30 (*http://www.sciencenorth.ca/coolscience/science-post.aspx?id=3311)*

This week at Science North, we're celebrating Unbelievable Products week. Each day, we're going to look at the science behind some of the products we use every day, and some innovations and technologies that may be part of our lives in the future.

How we make clothes hasn't really changed in hundreds of years. Natural or artificial fibers are processed in factories where they are woven into the various fabrics used today. Factories then take these fabrics and stitch them together to make all forms of clothing. There is very little creative input on the part of the consumer. What if we could change this? What if consumers could create their own unique clothing in their homes in relatively little time? We might soon be able to do this by spraying on our own clothing!

Manel Torres, a European chemist and fashion expert, is creating a novel method of making clothing. He has invented a product called Fabrican which can be sprayed on a surface to produce a clothing-like covering. This nonwoven fabric is dissolved in a liquid but when it comes into contact with air, it produces a solid fiber. By spraying an area, these fibers stick to one another and form a layer on a surface. The product can be dispensed using a professional paint sprayer or as simple as using a spray can. One can change the texture of the fibers by modifying the formula and by changing the frequency and methodology of spraying. And of course, you can also add colour to the product.

What's interesting about this product is that the clothing created will be unique to the wearer. The product hugs to the contour of the body and therefore there is no need for alterations. Wearers can also create neat features such as waves, flowers and folds which would be more difficult to do with conventional clothing. The product can be washed but if the wearer is bored of it or if it becomes damaged, it can be recycled. To recycle the clothing, the fibers are dissolved into a solution which can then be reused to make a new article of clothing!

Mr. Torres also believes that his product could be used for medical purposes. By modifying the formula, the product could be used to make casts and braces. The product can be sprayed on the injured area and can harden to a consistency similar to a plaster or fibreglass cast. This would be an easy method for ambulance technicians to add braces in the field and for injuries where adding a brace may be difficult (i.e. neck injuries). The material can harden quickly and add support as the patient is being transported to the hospital. Since the product is sterile, it could potentially be used to cover wounds. Mr. Torres also thinks that antibiotics could be incorporated into the spray thereby helping to prevent infections. Another medical application is to create hygienic covers. The product could be sprayed on hospital beds or other surfaces creating hygienic and water proof coatings.

The possibilities are almost endless. Waterproof coverings could be made to cover any surface such as sofas, walls, flooring or car seats. Anyone who has had a child vomit in their vehicle would definitely appreciate this product! The main advantage with this product is that once a consumer is bored of it or is finished with it, it can be easily removed and recycled.

The future of fabrics may be changing. Consumers could end up actively creating their own clothing or making new fabrics for a multitude of applications. Who knows… the future of fabric may all start from a spray can.

Task 2: Comprehension questions on TEXT 2: Spray-on Clothing:

1. What is the purpose of 'Unbelievable Products week'?
2. How are clothes normally produced?
3. What are differences between the new and the old method of producing clothes?
4. What makes spray-on clothes unique?
5. In which other areas can the spray-on clothing be used? Explain in detail.
6. Where could waterproof coverings be made with the spray?

(🖫 017)VIDEO: Spray-on Clothing

http://www.snotr.com/video/11206/Spray_on_Clothing

Task 3: Study the vocab below. Then watch this video and answer the following questions:

1. What does liquid fabric contain?
2. What is the name of the product?
3. What was Mr. Torres 'eureka moment'?
4. What happens when liquid fabric comes in contact with air?
5. What characteristics make it useful for bandages?
6. True or False?
   a. Fabrican is a mixture of natural polymers and liquid fibres.
   b. A sprayed-on clothing feels like a bodice.
   c. Spray-on clothing can be recycled.
7. What else can you add into the formula and for what purpose?
8. What else can you make with liquid fabric?
9. Why is it a useful option for cleaning up an oil spillage?
10. With what inventions is the liquid fabric compared?
11. In which areas of society does Mr. Torres hope to see his product in the future?

Vocabulary: Spray-On Clothing

attire	Garderobe, Kleidung
fibers	Fasern
to solve	etw. lösen
solvent	Lösungsmittel
to dissolve	etw. auflösen
liquid	Flüssigkeit
to adhere	anhaften, kleben
aerosol nozzles	Sprühdüsen
silk	Seide
garment	Bekleidung, Gewand, Kleidungsstück
tissue	Stoff, Gewebe
propellant	Treibstsoff, Treibmittel
plaster casts	Gipsabdruck
limbs	Gliedmaße
durable	beständig, haltbar
wear and tear	Abnutzung, Verschleiß
artificial	künstlich
woven, to weave	gewebt, weben
novel *(adj.)*	neuartig, ungewöhnlich
solid	fest
to dispense	verteilen
alterations	Änderungen
neat	ordentlich, adrett
coating	Beschichtung