

OVO

Name

# Exploration 2 Interacting Systems September 10

- How do you think systems within your body interact to produce sensations? Your Brain Sends Signals to your Body - Gibran

organ system: when two or more organs work together to perform functions.

- How do structures in the respiratory system interact to protect the lungs?

Name

# Exploration I: Interacting systems September 12

- Create a flow chart model of the digestive system
- tissue: a group of similar cells that perform a specialized function
- What type of tissue are tendons made of? Tendons attach muscles to bones or organs.
  - Tendons are composed of connective tissue.
- cell: the most basic unit of life
- cell differentiation: process by which cells become specialized to perform a specific function.

Name

September 17

1) Define abiotic & biotic factors. Give two examples of each.

Abiotic ~~Biotic~~ factors are non living factors

Biotic factors are living things in a system. Humans and animals are examples of biotic factors.

2) Fungi, Algae, Plant

Light and dirt are examples of abiotic factors.

What are the four major earth systems. Give one example of two interacting.

geosphere: all rock material on & below surface

atmosphere: air/gas surrounding earth

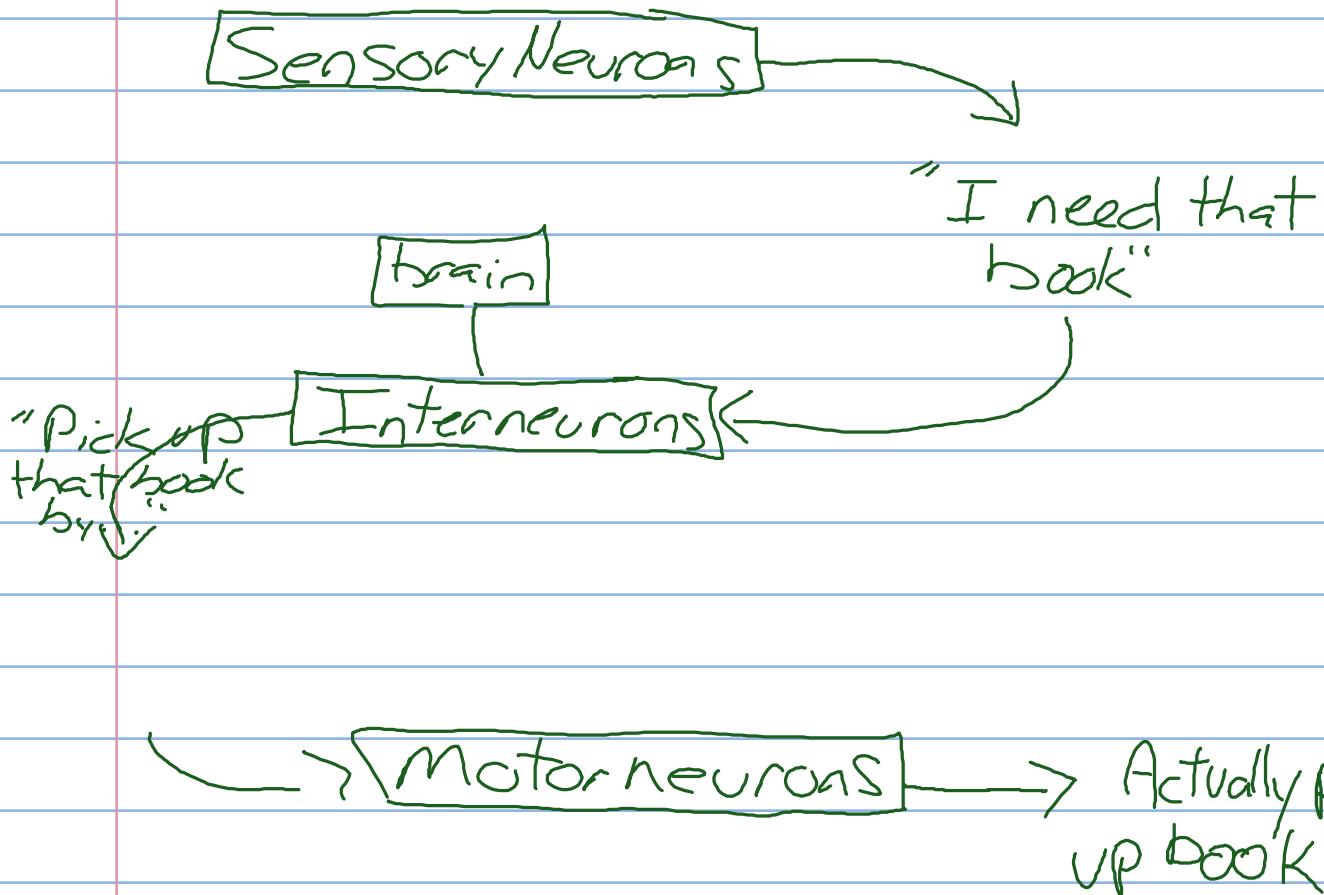
biosphere: all living things on Earth

hydrosphere: all of the water on Earth

The hydrosphere interacts with the geosphere by erosion. Rivers and streams are part of the hydrosphere. They move sediment, part of the geosphere,

# Exploration 1: Interacting Systems

- Draw a flowchart of the nervous system picking up an object



- Three parts of neuron:
  - dendrite:
  - cell body:
  - axon:
- How would the breakdown of the myelin sheath impact neuron function?

The breakdown of the myelin sheath would cause a reduction in the speed of transmission of signals along the axon. This causes slow movement in people who do not have myelinated neurons.

Name

## Exploration 2 The Cell System September 19

### Do Now

- How do the different types of neurons interact?

Sensory neurons take in stimuli, then send that signal to the interneurons. The interneurons create a response signal based on the sensory input. The response signal is sent to the motor neurons which carries out the response.

- What is the boundary that separates the cell body from the surrounding environment?
  - The cell membrane is the boundary between the cell body and the surrounding environment.
- The ribosomes in the endoplasmic reticulum create the proteins of neurons.

|

Name

## Exploration 2: The Cell System September 26

dolgi apparatus: stores proteins made by the endoplasmic reticulum

mitochondria: supplies energy to the cell

- Which type of cell would have more mitochondria, a muscle cell or a skin cell? Explain.

Muscle cells require more mitochondria because the function of mitochondria is to provide energy to the cell.

Muscles, which are responsible for movement, require more energy to do so therefore need more mitochondria compared to skin cells.

- cell wall: rigid outer layer of cell that provides protection and gives structure of plants

Name \_\_\_\_\_

## Exploration 2: The Cell Body October 1 Do Now

Evaluate the role of the endoplasmic reticulum in the synthesis and transport of cellular materials. How might a defect in the rough ER or smooth ER affect cellular functions?

The function of the endoplasmic reticulum is to synthesize proteins then transport those proteins to the Golgi Apparatus. A defect in the endoplasmic reticulum would cause protein synthesis to stop therefore the cell would not have the necessary proteins to function. A defect in the endoplasmic reticulum might synthesize proteins properly but fail to transport those proteins to the Golgi Apparatus therefore preventing proper cellular function.

Compare the functions of the cell membrane and the cell wall. How are they similar and how are they different?

The functions of the cell membrane are to protect the organelles, give the cell shape, and to allow certain materials in and out of the cell. The functions of the cell wall are to provide protection for the cell and to give the organism structure. The cell membrane and the cell wall are similar in that they both provide

protection for the cell. The difference between the cell membrane and cell wall is that the cell membrane is found in both animal and plant cells whereas the cell wall is only found in plant cells.

Identify two organelles that are in plant cells but NOT in animal cells

Two organelles that are found in only plant cells are the cell wall and chloroplasts. (central vacoule)

Name

# Connecting Form to Function October 3

Function	Root	Stem	Leaf
D			

Name

# Exploration I: Mechanisms of Homeostasis October 10

- Why do some people shiver when they have a fever?
- Identify a change in your environment that might affect homeostasis. Explain using the terms stimulus, control center, receptors, effectors.

Receptors detect a stimulus that causes an imbalance in homeostasis. is sent to the control center where a

Name

# Exploration 1

## DO NOW

October 11

- Define homeostasis  
Homeostasis is the maintenance of internal conditions within a narrow margin.
- What are the functions for the following organelles  
nucleus - store genetic information  
endoplasmic reticulum -

# Exploration 2: Homeostasis in Human Body October 15

## DO NOW

- 1) Classify a cell as prokaryote & eukaryote. What features do each cell type have?

Prokaryotes are single cell organisms that only have a cell membrane, cytoplasm, and not have organelles. Eukaryotes are multicellular organisms and have membrane bound organelles.

- 2) Define homeostasis, give one example.

Homeostasis is the regulation and maintenance of internal conditions within an organism.

- If a persons blood pressure is too high or too low, how might other organ systems be impacted?
  - If blood pressure gets too low, then organ systems do not get enough oxygen.

Name

## Exploration 2: Homeostasis in Body | October 17

IF a person has too low or too high blood pressure, how are other organ systems impacted?

Name

# Exploration I: Elements/Atoms... October 21

- Describe what happens to the cheeseburger when it is placed in hydrochloric acid.
  - the cheeseburger looks like a "bath bomb"
  - the acid melts the burger
  - the corrosive properties of the hydrochloric acid breaks down the enzymes within the cheeseburger.

<u>Ionic</u>	<u>Both</u>	<u>Covalent</u>
<ul style="list-style-type: none"><li>- one atom gains an electron</li><li>- one atom loses an electron</li><li>- stronger bonds</li></ul>	<ul style="list-style-type: none"><li>- Both atoms held together to create bond</li><li>- Positive to negative charge</li></ul>	<ul style="list-style-type: none"><li>Molecule - 2 or more atoms held together</li><li>- weaker bonds</li></ul>

## DO NOW

- 1) Protons, neutrons, & electrons make up the atom. Protons have a positive charge, neutrons have no charge, and electrons have a negative charge.
- 2) Covalent bonds are a weaker bond where the atoms share electrons.  
Ionic bonds are stronger bonds where one ion gives its electron to another ion

Name

## Exploration 2: Properties of Water October 29

### DO NOW

- 1) How are ionic and covalent bonds different?  
Ionic bond are when ion gives away one or more electrons to another ion. A covalent bond is when electrons are shared between two atoms.
- What characteristics of a water molecule make it unique?

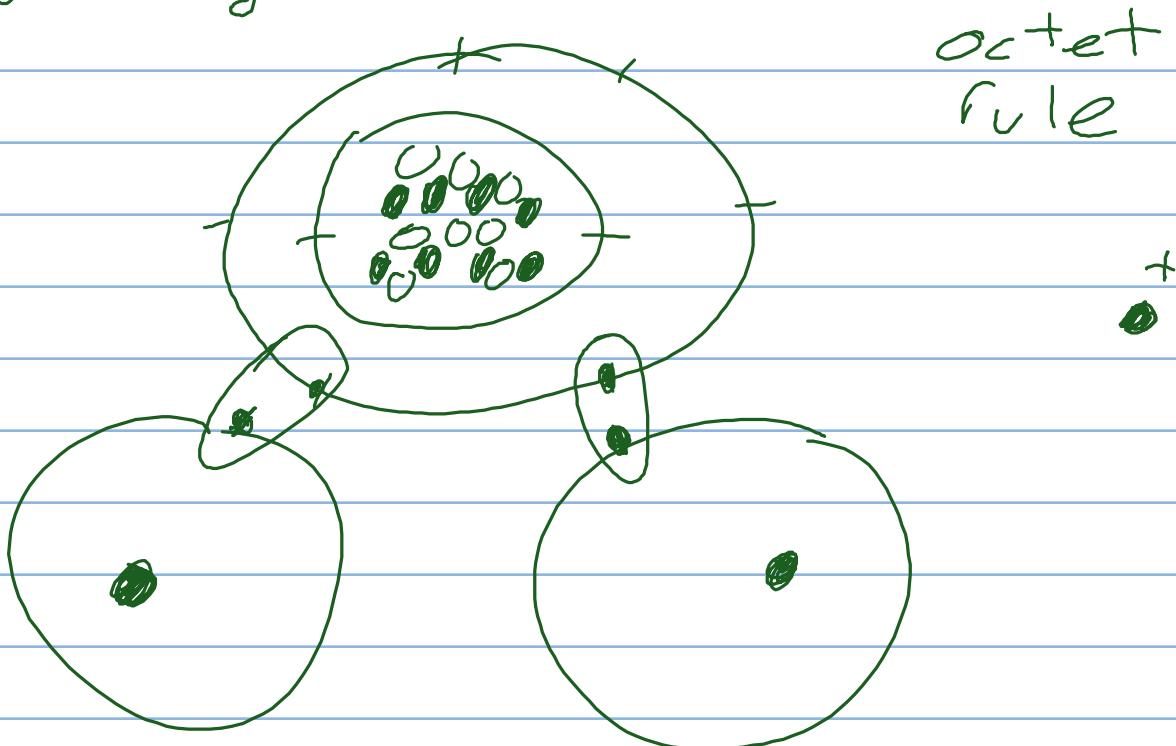
- How are hydrogen bonds similar to ionic bonds?

Hydrogen bonds are similar to ionic bonds in that they both require one ion to donate an electron to another ion.

### Characteristics of Water Molecules

- 1) Specific heat capacity: ability to resist temperature change
  - High specific heat capacity means that substance does NOT change temperature easily
- 2) Cohesion: attraction between molecules of the same substance
- 3) Adhesion: attraction between molecules of different substances

- Why is a solvent that can dissolve many different things important for organisms?
  - \* Organisms require a wide variety of substances to maintain cellular function, therefore it is important to have a solvent that can break down a wide variety of things.



Name

## Exploration 3: Reactions & Enzymes October 31

### DO NOW

1) What are three properties of water?

- adhesion: sticks to other molecules
- cohesion: stick to like molecules
- specific heat capacity: ability to resist temp change
- polar solvent: dissolves polar molecules

2) How are hydrogen bonds different than covalent?

Covalent bonds are when two ions share electrons to form a bond. Hydrogen bonds are very weak due to the small size of hydrogen.

- chemical reaction: change substances into different substances by breaking chemical bonds and creating new chemical bonds.
- Conservation of matter: matter cannot be created or destroyed.

- All chemical reactions follow this law !!!!

1) The bonds changed because in the reactants, there were two oxygen bonded to two hydrogen. In the product, we had one oxygen bonded to two hydrogen, and two oxygen bonded to each other.

- 2) The input is hydrogen peroxide, the outputs are water and oxygen.
- 3) We know that matter was conserved because there were the same number of oxygen and hydrogen on both sides of the chemical equation.

-chemical equilibrium: reversible chemical reactions that maintain balance.

-activation energy: amount of energy needed to start a chemical reaction

-exothermic reaction: products have lower bond energy than reactants

-endothermic reaction: products have more bond energy than the reactants

- 1) How do endothermic and exothermic reactions differ in energy?

Endothermic reactions mean that the product has a higher bond energy whereas exothermic reactions have lower energy in the product.

- 2) Is activation energy part of the overall difference in the energy of reaction?

The activation Energy is part of the overall energy of the reaction.

The greater energy needed to start reaction, the more overall energy in reaction.

3) Exothermic reactions release energy which is why they feel warm. Endothermic reactions absorb energy which is why they feel cool.

Name

November 7

### DO NOW

1) What are the components of a chemical equation?

Reactants, products, catalyst

2) How does the Law of Conservation of matter work?

Matter cannot be created or destroyed

catalyst: substance that increases the rate of a reaction

- How does a catalyst increase the rate of a chemical reaction?

- A catalyst increases the rate of a reaction by reducing the activation energy needed to start reaction.

- enzyme: catalyst used inside of organisms

↳ enzymes are a PROTEIN that change based on temperature and pH.

- Why is having a high fever dangerous for organisms? Cite evidence related to enzymes.

Claim: A high fever is dangerous for organisms.

Evidence: Proteins, which make up enzymes, unwind when exposed to high temperature.

Reasoning: Enzymes that are damaged due to high temperature are no longer able to bind to their substrate. This is because the shape of the activation site is changed.

1) What happens in terms of bonds in a chemical reaction?

During a chemical reaction, bonds break or are made.

2) How are energy inputs and outputs related to chemical reactions?

The input of a chemical reaction is called the reactant, the output called the product. The product and reactant have the same amount of matter.

3) How do enzymes help organisms carry out life functions? Enzymes help organisms carry out life functions by increasing the rate of chemical reactions.

Name

# Exploration 1: Properties of Carbon November 12

## DO NOW

1) How are covalent and ionic bonds different?

Ionic bond - electron removed/gained  
Covalent bond - electrons shared

2) What does it mean for a molecule to be classified as Polar?

A polar molecule has one end that is positive and the other end is negative.

3) What is the function of an enzyme? What surface feature of an enzyme allows it to carry out its function?

An Enzyme increases the rate of a chemical reaction  
Structure carries out its function.

4) What are three unique properties of water? Why does water have these properties (think bonds)?

- Adhesion, cohesion, specific heat capacity
- Hydrogen bonds

5) What are the parts of an atom? How does an atom become an ion?

Name

## Exploration 2: Structure & Function...

November 19

### DO NOW

- 1) What elements make up carbohydrates and lipids?

Hydrogen, carbon, and oxygen.

- 2) How are saturated and unsaturated fats different?

Saturated fats are straightish whereas unsaturated fats are not straight due to double bonds between carbon.

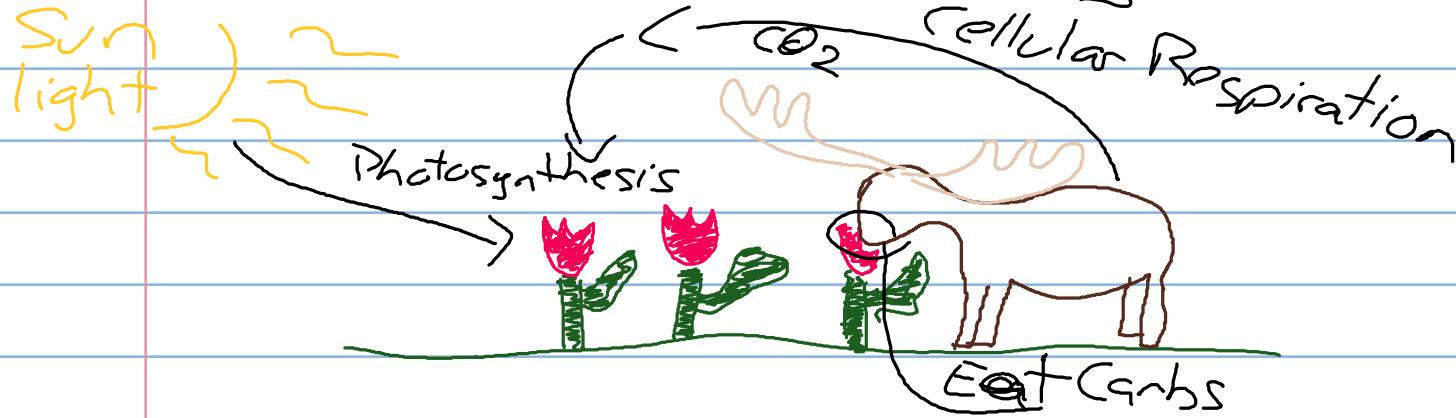
- Waxes are a type of lipid that are on the outside of leaves, why?

Wax prevents the leaf from getting too much water. Roots absorb water, not leaves.

Name

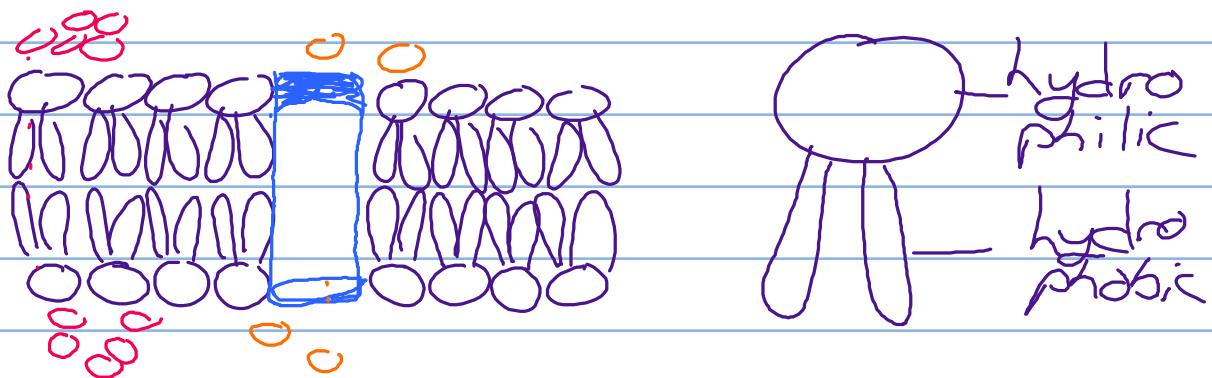
### Exploration 3: Chemical Energy

November 21



# Exploration 4: The Cell Membrane December 5

- cell membrane: allows for materials to go into and out of the cell.
  - Structure → Phospholipid Bilayer



- Passive Transport: no energy required
  - 1) Diffusion - transport of molecules from high concentration to low concentration
  - 2) Facilitated Diffusion: Transport protein required for diffusion
  - 3) Osmosis: diffusion of water from low concentration of solute to high concentration of solute.

- How do structures within the cell membrane allow the cell to function as part of a larger system?

The structure of transport proteins allows the diffusion of specific molecules into and out of the cell. The phospholipid bilayer provides the same function for other molecules.

# Exploration 4: The Cell Membrane December 10

- active transport: movement of molecules from low concentration to high concentration.
  - **REQUIRES ENERGY**

1) Endocytosis: large molecules or liquid are transported into the cell by the creation of a vesicle.

2) Exocytosis: large molecules or liquid are transported out of the cell by the creation of a vesicle.

# Exploration I: Matter & Energy in Photo... January 21

- If you colonize another planet, you will need to grow plants. What inputs are required to grow plants? How would you bring those to a new planet?
- The inputs for photosynthesis are sunlight, water, and carbon dioxide. Sunlight will travel through space on its own. Not sure about water and CO<sub>2</sub>. Theoretically, CO<sub>2</sub> could be provided from earth.
- producers: capture light energy and convert it into chemical energy to carry out cell processes.
- photosynthesis: process by which solar energy is captured then converted into chemical energy.
- How is energy transferred from plants to the very cute pandas?
  - Bamboo performs photosynthesis which creates glucose. The very cute panda eats the bamboo (glucose) which is used as an input for cellular respiration

Name \_\_\_\_\_

# Exploration 1 - Matter & Energy in Cellular Respiration Feb 4

## DO NOW

What are the inputs & outputs of photosynthesis?

inputs:  $\text{CO}_2$   $\text{H}_2\text{O}$

outputs:  $\text{C}_6\text{H}_{12}\text{O}_6$   $\text{O}_2$



Name

## Exploration 2-Using Chemical Energy

February 11

### DO NOW

- Justify the following

claim using evidence  
and supporting reason

OR write a counter

claim using evidence  
and supporting reason

Claim: Cellular respiration is  
an endothermic reaction.

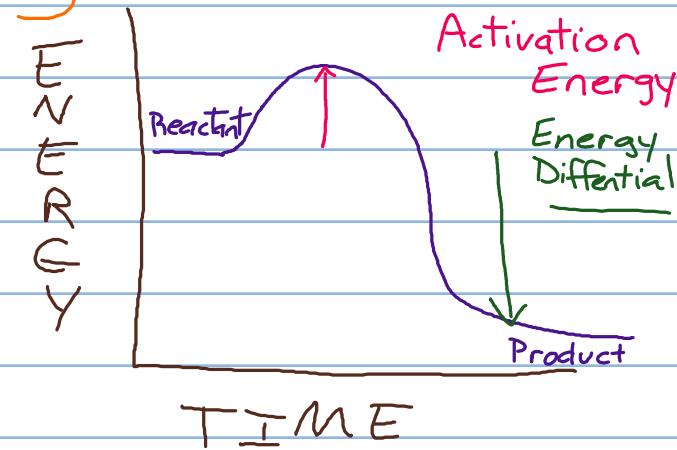
Counter: Cellular respiration is an  
exothermic reaction.

Evidence: The energy differential decreases  
as the chemical reaction happens.

Reason: An exothermic reaction is a reaction  
that releases energy. The energy  
differential decreasing indicates that  
energy is leaving the system therefore  
an exothermic reaction.

### Exit Slip

What are the two most  
important items to know from  
Exploration 2?



Name

# Exploration I - Introduction to Ecosystems February, 13

What living & nonliving things are in the ecosystem of a very cute gray fox?

Living

Birds Animals

Insects Plants

Non Living

Rock Water

Precipitation Temperature

- **biome:** major regional or global distribution of organisms adapted to live in that area

- **biodiversity:** the number of organisms that live in an area.

- Classified by the temperature & plant types in a given area

1)

	$X^B$	$Y$	
$X^R$	$X^R X^B$	$X^R Y$	
$X^R$	$X^R X$	$X^R Y$	

Female calico      male orange

2)

	$X^B$	$X^R$	
$X^R$	$1 X^B X^R$	$2 X^R X^R$	
$Y$	$3 X^B Y$	$4 X^R Y$	

1) female calico      2) female orange      3) male black      4) male orange

Sex      Color

male 50% orange  $\frac{2}{4}$   
 female 50% black  $\frac{1}{4}$   
 calico  $\frac{1}{4}$

2)

$X^R$	$X^R$	$Y$
$X^R$	$X^R X^B$	$X^B Y$
$X^B$	$X^R X^B$	$X^B Y$

Sex  
 50% Female  
 50% Male

1) calico

Color

2) orange      orange

25%

3) calico      black

25%

4) black      calico

50%

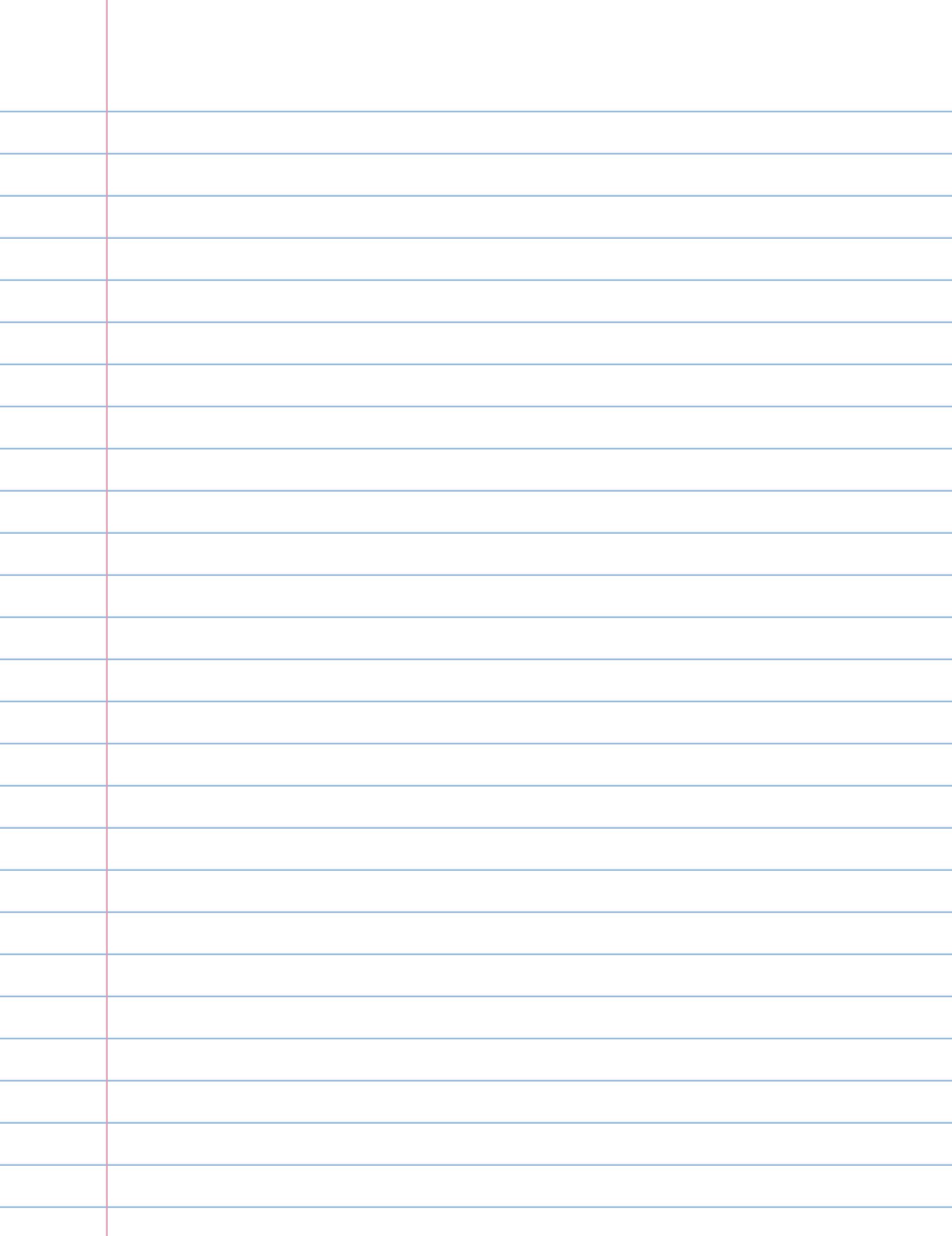
# Exploration I: Molecular & Genetic Evidence April 25

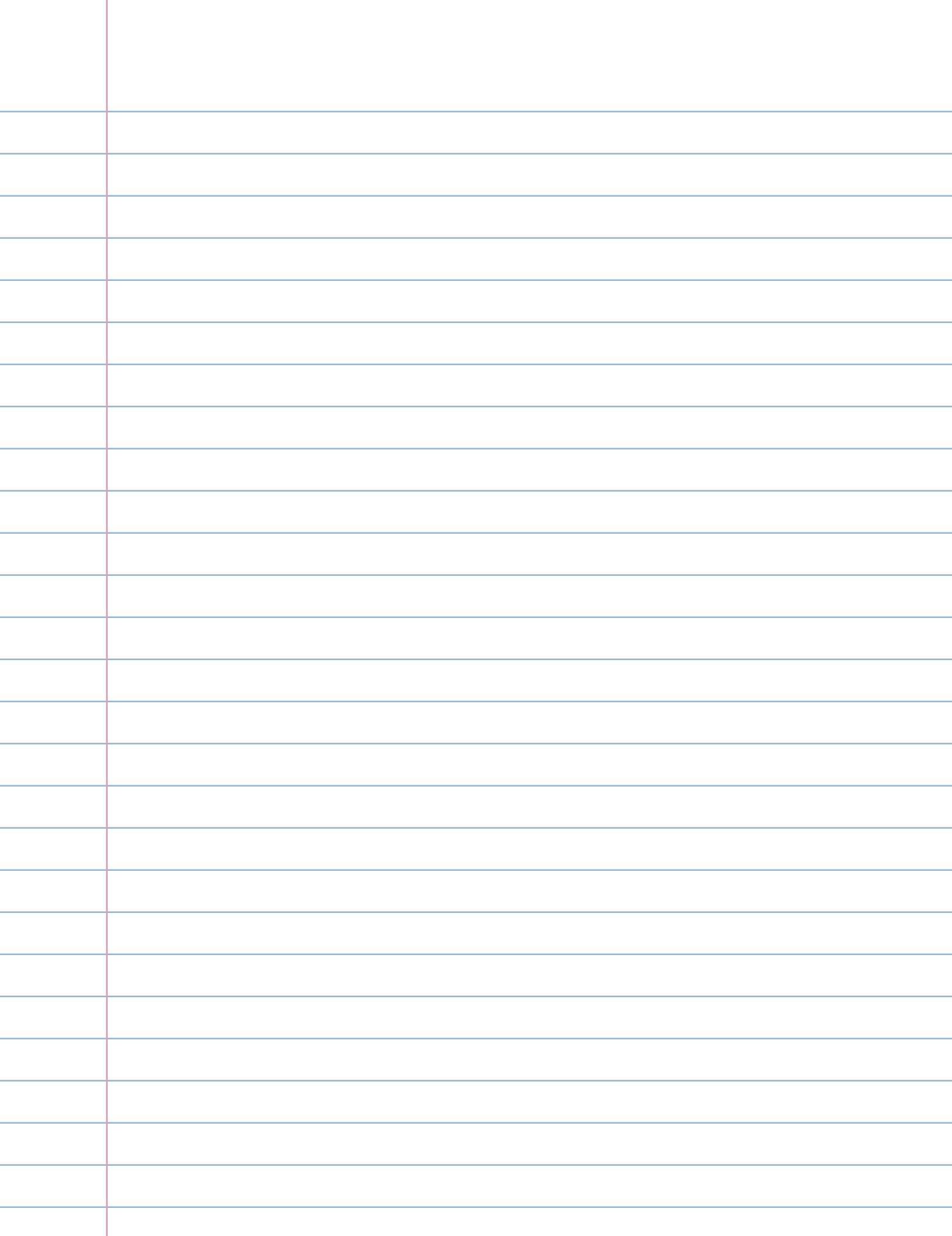
How do patterns in DNA support the claim that living things share a common ancestor?

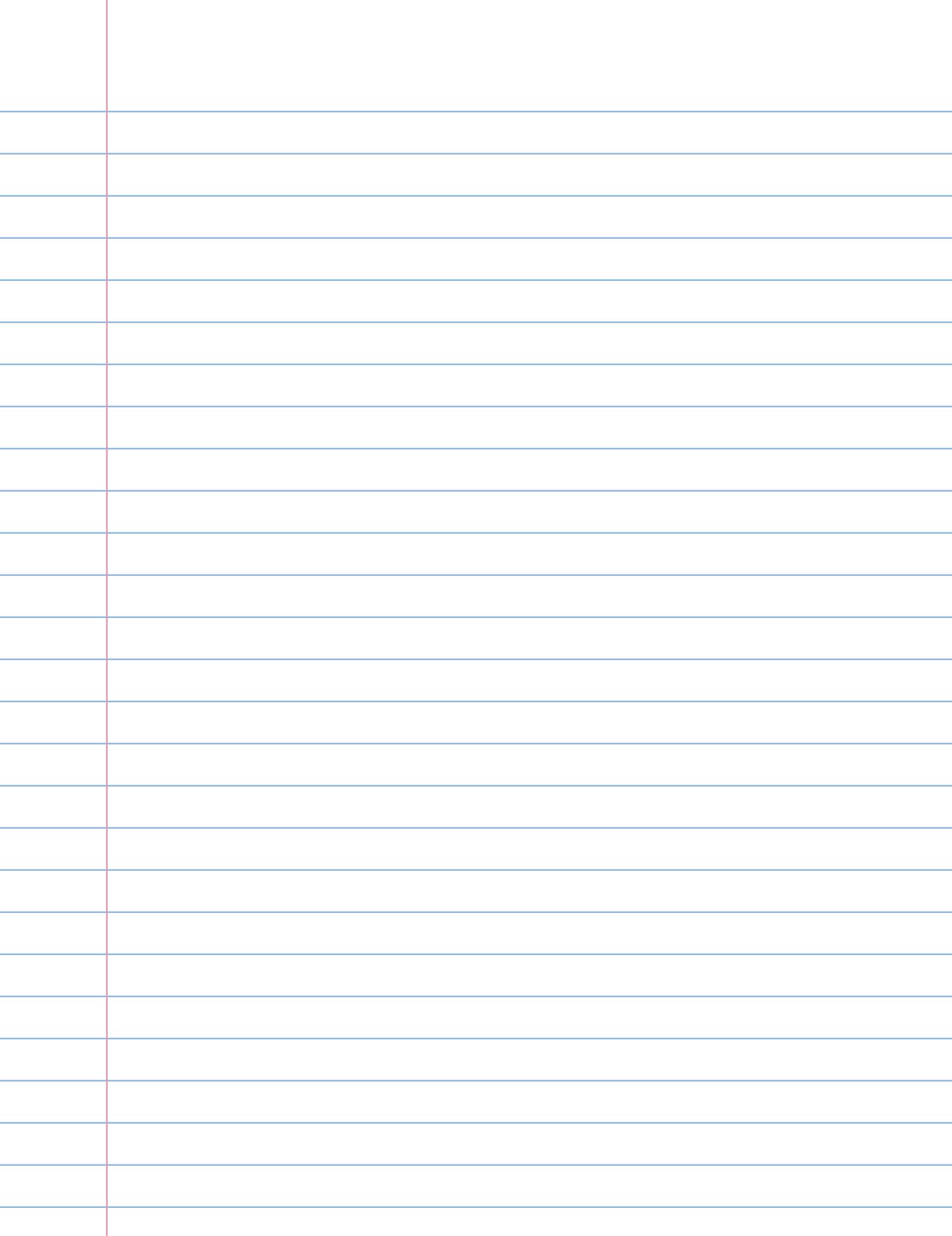
claim: Living things share a common ancestor

evidence: DNA sequencing shows that there are similar nucleotides that make up all DNA.

reason: All organisms are made up of the same nitrogenous base pairs, therefore they are related in some way.







# Carbon Based Macromolecules

	Carbohydrate	Lipid	Protein	Nucleic Acid
Monomer	Monosaccharide	Fatty acid	Amino Acid	Nucleotide
Polymer	Polysaccharide	Fatty acid chain	Polypeptide	Nucleic Acid
Elements	Carbon, Hydrogen, Oxygen	Carbon, Hydrogen, Oxygen	Carbon, Hydrogen, Oxygen, Nitrogen	Carbon, Hydrogen, Oxygen, N, P
Structures	Straight Branched Ring	Saturated Unsaturated	Primary Secondary Tertiary Quaternary	DNA RNA

Name

## Exploration 2: Energy & Matter Flow in Ecosystems February 20

1) As trophic levels increase, the numbers of organisms in those trophic levels decreases. For example, there are way more rabbits in an ecosystem than there are bald eagles.

Name

# Exploration 3: Energy & Matter Distribution February 25

