

GCS 6th Grade Science Final Exam Study Guide

Unit A Scientific Method

1. Define the following terms:

Variable:

Dependent Variable:

Independent Variable:

Controlled Variable:

Hypothesis:

Inference:

Observation:

Prediction:

Data:

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Unit B - Matter, Properties and Change

6.P.2.1 Recognize that all matter is made up of atoms and atoms of the same element are all alike, but are different from the atoms of other elements.

- There are _____ than 100 elements that combine in a multitude of ways that make up all of the living and nonliving things that we encounter.
- Matter is composed of extremely _____ particles, too small to be seen with a classroom microscope, called _____.
- _____ have all of the properties of matter. Meaning that ALL atoms have _____ and occupy _____.
- Atoms are the _____ part of an element that has the _____ properties of the element.
- All atoms of the same _____ have the same _____. This means that all iron atoms have the same mass and occupy the same amount of space.
- Also, all iron atoms are _____ from carbon atoms or from any other element.

Atoms

- An atom is the _____ particle in matter that has all the properties of that material.
- Atoms are the _____ of all matter.
- One grain of sand on a typical beach contains more atoms than there are grains of sand on the entire beach.
- Atoms _____ be broken into smaller pieces.

Elements

- All the different kinds of matter in the universe are made from approximately 100 different types of atoms called _____.
- An _____ is a substance that _____ be broken down into other substances by chemical or physical means.
- In any element, _____ of the atoms are exactly the _____.
- Each element can be identified by its specific _____ and _____ properties.
- An element is a _____ substance represented by a chemical _____.
- The elements oxygen, carbon, hydrogen and nitrogen make up 96% of all living matter.
- Elements can be represented through graphics. Because elements are pure, they will be represented by one shape or two or more of the same shape.

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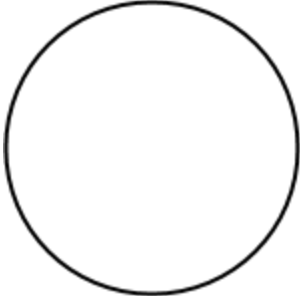
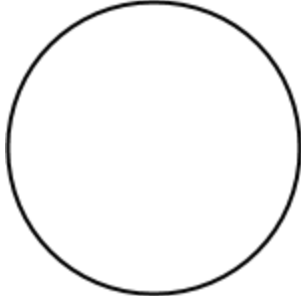
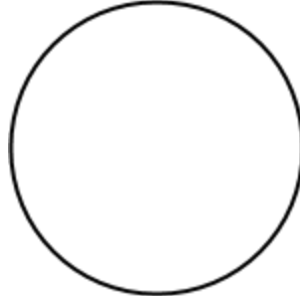
6.P.2.2 Explain the effect of heat on the motion of atoms through a description of what happens to particles during a change in phase.

1. Matter and Energy

- Matter is anything that has _____ and takes up _____.
- Matter makes up _____ in the universe.
- _____ is the ability to do work or cause change.
- _____ can move matter from one place to another (motion).
- Change can also be a change in _____ (solid to liquid).
- _____ is always involved when a change in matter occurs.
- _____ appears in different forms. _____ energy is in the _____ motion of molecules. Atoms and molecules are _____ in motion.
- _____ temperature means _____ energy of motion so most substances _____ when heated.

2. States of Matter

- Particles of matter move more quickly when _____.
- This change in particle _____ is what causes the change from _____.
- The three states of matter are _____, _____, and _____.

State of Matter	<p style="text-align: center;">_____</p> <p>The particles in a solid are packed tightly together and have the _____ energy. They _____ but stay where they are.</p>	<p style="text-align: center;">_____</p> <p>The particles in a liquid move more _____, enough to slide past one another.</p>	<p style="text-align: center;">_____</p> <p>The particles in a gas are the _____ apart and have the _____ energy. They move the _____ with a _____ motion.</p>
Example			
Facts	<p>has a definite shape & volume</p>	<p>has no definite shape but has definite volume</p>	<p>has no definite shape and no definite volumes</p>
	<p>Examples</p>	<p>Examples</p>	<p>Examples</p>

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6.P.2.3 Compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point, and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.

1. Mass

- Mass is the amount of _____ in an object. It is also a _____ property of matter.
- A pebble has _____ mass than a boulder of the same type rock.
- The mass of a specific object _____ changes.
- An object on Earth would have the _____ mass on the Moon or on Jupiter.

2. Weight (Note: Be very careful not to confuse weight with _____.)

- Weight measures the force of _____ on an object.
- Weight for a specific object _____ whenever gravity changes. Jupiter has stronger gravity than Earth. Therefore, you or any object would weigh more on Jupiter than Earth. The Moon has weaker gravity than Earth. Therefore, you or any object would weigh less on the Moon than on Earth.
- Use this chant to remember the difference between mass and weight.

The mass of an object always stays the same.

Weight depends on gravity and it can change.

3. Volume

- Volume is the amount of _____ that something takes up.
- Scientists use a centimeter ruler to measure the volume of a solid rectangular object.
- The formula is volume = length x width x height and the volume is recorded in cm^3 .

4. Freezing, Melting, and Boiling Points

- Liquids change to solids at their _____.
- Solids change to liquids at their _____.
- Liquids change to gases at their boiling point. This is called _____.
- _____ is the process of a gas (like water vapor) changing to a liquid
- Different substances have _____ freezing and boiling points.

5. Solubility

- Solubility means the amount of _____ that can be dissolved in a specific volume of _____ under certain conditions.
- A solute's solubility depends on the chemical nature of the _____.
- Another important factor that influences solubility is the _____ of the system (the solute and the solvent).
- The most common solvent is _____.

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6. Physical Properties

- Physical properties are used to _____, _____, and _____ matter.
- A _____ is a single kind of matter that has distinct physical properties.
- A _____ property is a characteristic of a substance that can be observed _____ changing the substance into something else.

7. Physical Changes

- A change that alters the _____ or _____ of a material but does not make the material into a _____ substance is a physical change.
- Give 3 examples of physical changes:
1. _____ 2. _____ 3. _____

8. Chemical Properties

- Chemical properties are used to _____, _____ and _____ matter.
- A _____ is a single kind of matter that has distinct chemical properties.
- A chemical property describes matter based on its ability to _____ into a new kind of matter with _____ properties.

9. Chemical Changes

- A change in matter that produces a _____ substance is a chemical change.
- Unlike a physical change, a chemical change produces new substances with properties _____ from the original substances
- The formation of a new substance in a chemical change can result in the production of a _____, change in _____, production of a _____, or unexpected _____ change.

Unit C - Energy: Conservation and Transfer

6.P.3.1 *Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result.*

1. Energy can be transferred from one system to another (or from a system to its environment) in different ways:

- A. _____ when a warmer object is in contact with a cooler one
- B. _____ when two objects push or pull on each other over a distance
- C. _____ when an electrical source such as a battery or generator is connected in a complete circuit to an electrical device
- D. Or by its most common form which is _____ waves.

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2. _____ energy is transferred through a material by the collisions of atoms within the material. _____ flows through materials or across space from _____ objects to _____ objects, until both objects are at equilibrium. Heat travels through solids, primarily by _____. Heat is circulated in fluids, both liquids and gases, through the process of _____. _____ is energy that travels across distances in the form of electromagnetic waves. Over time, thermal energy tends to spread out through a material and from one material to another if they are in contact (_____). Thermal energy can also be transferred by means of currents in air, water, or other fluids (_____).

6.P.3.3 Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).

1. Draw a picture which illustrates the three ways of heat transfer in matter.

Conduction	Convection	Radiation

2. There are some things that we use daily that we want to conduct heat easily. Most of these items are made of materials that conduct heat readily: aluminum, steel, copper. We call these materials thermal _____. Similarly, there are things that we do not want to conduct heat (pot handles, spatula, cooking utensils) and these items are generally made of materials that limit heat transfer. We call such materials thermal _____. For example, expansion joint strips in bridges allow for the bridge to expand in hot weather and not break. These same joint strips allow for the bridge to contract in cold weather and not break.

3. Electrical energy also passes through _____. An electrical _____ is a material through which an electrical current can flow easily. An electrical _____ is a material through which electrical current does not readily flow. Electrical _____ include most metals, while most nonmetallic solids (rubber, glass, porcelain, ceramic) are _____.

4. Light and other _____ waves can warm objects. How much an object's temperature increases depends on how intense the light striking its surface is, how long the light shines on the object, and how much

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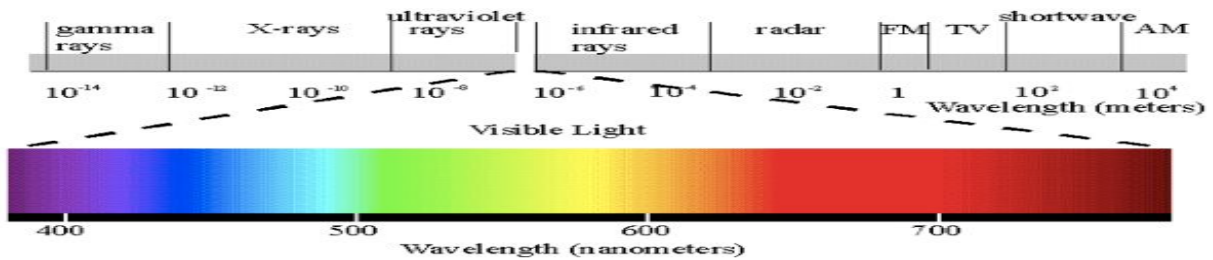
of the light is absorbed. When light interacts with matter it is either absorbed, transmitted, refracted and/or reflected (scattered).

Draw an example of each type of light interaction.

Absorption	Transmission	Refraction	Reflection

6.P.3.2 Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature

1. Identify the 2 parts of this spectrum.



2. The _____ spectrum is the portion of the _____ spectrum that is visible to (can be detected by) human eyes. _____ light has a longer wavelength than visible light and is detected most often by its heating effect. Infrared imaging has applications in space exploration and with satellite imaging. _____ light has shorter wavelengths than visible light. These wavelengths are responsible for causing our sunburns. Most of these waves are blocked from entering Earth's atmosphere by the ozone. Scientists have developed a UV index to help people protect themselves from these harmful ultraviolet waves.

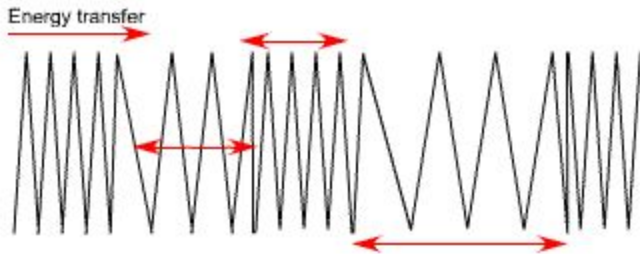
Unit D: Waves

1. **All waves transmit _____ not matter.** Nearly all waves travel through matter. Waves are created when a source (force) creates a vibration. **Provide 3 examples of waves.**

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There are 2 main types of waves. Below you will see examples of both. You will need to be able to identify these and label their parts.

A longitudinal Wave

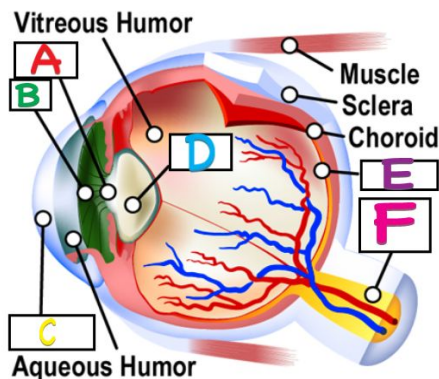


A transverse wave



3. **Light travels in _____ waves.** Something can be "seen" when light waves are emitted or reflected. Human eyes respond to only a narrow range of wavelengths in the electromagnetic spectrum. Differences of wavelength within that range are perceived as different colors of light.

4. Use the diagram below to **identify the different parts of the human eye.** You will need to **know the locations and functions** of the following parts.



6. **Identify the order in which light travels the human eye.**

1) _____ 2) _____ 3) _____ 4) _____

7. **Create a list of conditions which can affect the human eye.**

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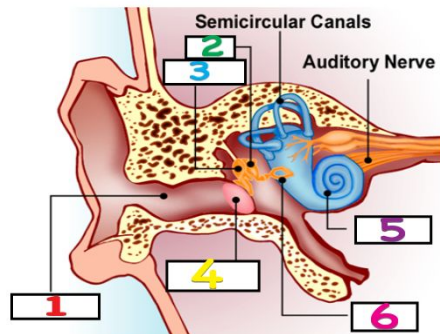
8. **Sound travels in _____ waves.** Something can be "heard" when waves enter the ear. Sound is a form of energy that is caused when vibrating materials produce waves that move through matter. These waves have different characteristics such as frequency and amplitude, which will determine the properties of sound such as pitch and loudness. **Provide a brief definition for each of the characteristics and properties of sound.**

Property/ Characteristic	Definition
1. Frequency	
2. Amplitude	
3. Pitch	
4. Loudness	

9. The form of the human ear can receive sound waves as vibrations and convert them to signals that are processed by the brain. **Identify the order in which sound travels through the ear.**

1) _____ 2) _____ 3) _____ 4) _____

10 . Use the diagram below to **identify the different parts of the human ear.** You will need to **know the locations and functions** of the following parts.

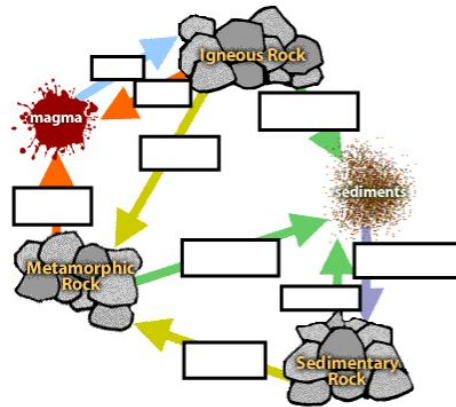


11. **Create a list of conditions which can affect the human ear.**

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Unit E: Rock Cycle/Soil Formation/Soil Conservation

1. Forces deep inside Earth and at the surface produce a **slow cycle that builds, destroys, and changes the rocks** in the crust. Plate movements start the rock cycle by **helping to form magma, the source of igneous rocks**. Plate movements also cause **faulting, folding and other motions of the crust that help to form sedimentary and metamorphic rock**. You will need to know how each type of rock is **formed**. Correctly label the diagram of the rock cycle.



2. List the **5** components that soil is mixture of:

- 1.
- 2.
- 3.
- 4.
- 5.

3. The composition and texture of soil and its fertility and resistance to erosion are greatly influenced by **plant roots and debris, bacteria, fungi, worms, insects, rodents, and other organisms**. Which of the following listed adds air and breaks down organic matter in soil?

4. Different soils have many properties such as **texture, particle size, pH, fertility and ability to hold moisture**. Soil particle size affects a soil's ability to hold moisture. Sand has the largest particle size and allows water to drain at a fast pace. Silt has a medium particle size and drains water at a steady rate. **Clay** has the smallest size and **drains slowly**. Humus creates a loose structure that simultaneously holds moisture and drains well. What conclusion can you make about particle size and the ability to hold moisture?

5. What type of soil has equal parts of sand, silt, and clay? _____

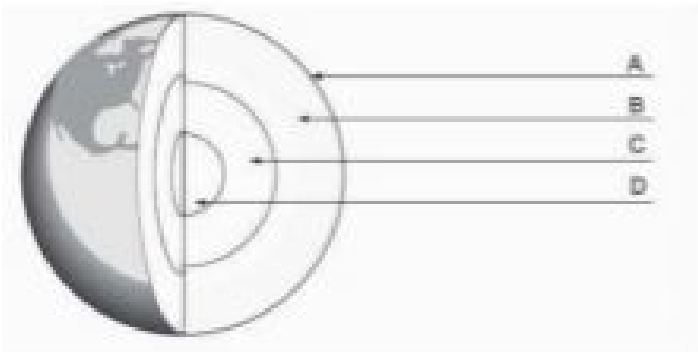
6. Technology, such as _____, has allowed humans to better study the human impact on soil quality and erosional processes so that the soil can be protected and preserved. Over time, _____ information can tell us how humans are constantly changing the surface of the Earth and what impact these changes are likely to produce.

7. How does crop rotation impact the soil?

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Unit E: Earth's Layer/Plates

1. Use the following diagram to label the layers of the Earth:



- A. _____
- B. _____
- C. _____
- D. _____

2. The Earth has a solid _____ core that is surrounded by a _____ outer core. The inner core is contains both _____ metal and _____. The _____ surrounds the core and is thick, hot and **convective**. The crust consists of many _____ and _____ plates that have slowly moved and changed positions over time. Scientists call Earth's crust and upper mantle the _____.

3. What type of heat transfer takes place in the mantle to allow tectonic plates to move? _____

4. Tectonic Plate movement led to the breaking apart of what supercontinent? _____

5. Give an example of a type of geological event that can occur at each of the following plate boundaries:

Plate Subduction: _____

Convergent Plates: _____

Divergent Plates: _____

Transform Plates: _____

6. You will need to know that during an earthquake, energy is released into the Earth as **Body and Surface Waves**. What is the difference between how body and surface waves **travel** on Earth?

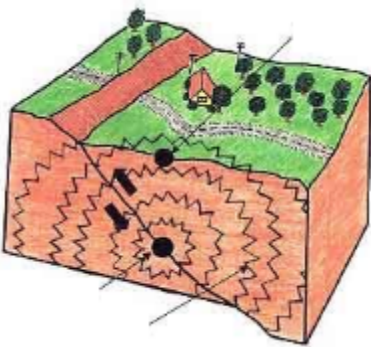
****Primary AND Secondary Waves are both considered Body Waves. Primary Waves can travel through solids and liquids, while Secondary Waves travel through solids.**

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Match the following type of wave with its description:

Primary Waves	Waves that are the slowest, largest, and cause the most destruction
Secondary Waves	Waves that travel the fastest and cause rock material to move back and forth
Surface Waves	Waves cause rock particles to vibrate at right angles

8. Label the following diagram of an earthquake:

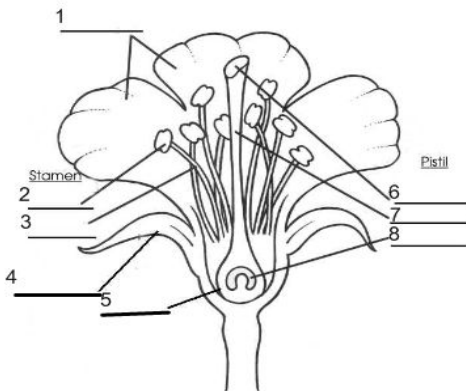


Structures directly closest to the _____ would have the most damage.

What is a **fault**?

Unit F: Structures & Functions of Flowering Plants & Plant Processes

1. Animals and plants have a great variety of body plans and internal structures that contribute to their being able to make or find food and reproduce. The process of reproduction in flowering plants takes place in the flower, which is a complex structure made up of several parts. Some parts of the flower are directly involved in fertilization and seed production. Other flower parts have functions in pollination. A flower is made up of eight parts. **In the diagram below you will need to identify the parts of a flowering plant. You will also need to be able to identify not only the parts, but functions of those parts as well.**



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Part of the Flower	Function
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

2. One of the most general distinctions among organisms is between plants, which use sunlight to make their own food (photosynthesis) and animals, which consume energy-rich foods. Photosynthesis and cellular respiration are complementary processes. Plants carry on photosynthesis and cellular respiration where food is broken down into energy. The requirements of one process are the products of the other. **So that you know these processes, you will need to complete the following table.**

Photosynthesis	Cellular Respiration
Food is _____.	Food is _____.
Water is _____.	Water is _____.
Carbon dioxide is _____.	Carbon dioxide is _____.
Oxygen is _____.	Oxygen is _____.
Produces _____.	Produces _____.
Energy from the _____ helps to create glucose.	Energy of the glucose is then broken down and released as _____.
Happens only in plants, in the presence of chlorophyll.	Occurs in all living things.

3. Leaves have an epidermis with a waxy cuticle and stomata that help prevent water loss. Guard cells that surround and control the size of the opening in stomata. **The loss of water through the stomata is called _____.** The opening and closing of guard cells regulate this plant process.

4. Changes in environmental conditions can affect the survival of individual organisms and entire species, this includes plants. _____ **is a period of inactivity in a mature seed prior to germination; seed**

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remains dormant until conditions are favorable for growth and development of the new plant. Provide an example of this plant response.

5. Plants have mechanisms that enable them to respond to their environment. Plants grow, reproduce, and shift the position of their roots, stems and leaves in response to environmental conditions such as gravity, sunlight, temperature and day length. A _____ is a plant's turning or bending movement of an organism toward or away from an external stimulus. If it is _____, the plant grows toward the stimulus. If it is _____, the plant grows away from the stimulus. This enhances the survival rate for that plant in a given environment. Provide an example of each type.

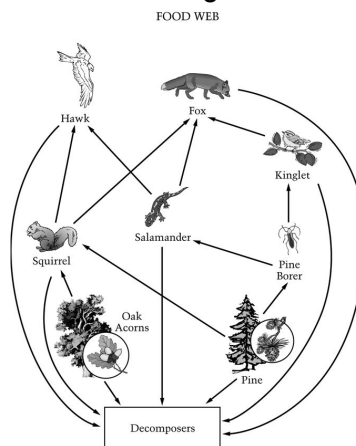
Unit G: Ecosystems

1. A(n) _____ is all the living organisms that live in an area and all the nonliving features of their environment. Food provides molecules that serve as fuel and building material for all organisms. Plants use the energy from light to make sugars from carbon dioxide and water. Green plants are the _____ of food that is used directly or indirectly by _____. Energy flows through ecosystems in one direction, explain how energy flows in an ecosystem.

1) _____ 2) _____ 3) _____ 4) _____

2. What type of diagram shows a linear connection between producers, consumers and decomposers? Create an illustration that shows this flow of energy in an ecosystem.

3. The following question refers to the diagram below, showing a food web. Explain how food webs show the flow of energy in an ecosystem, and the roles of these organisms in the ecosystem.



4. What type of diagram shows the amount of "biomass" available at each energy level in the food chain or food web? Create an illustration that shows this flow of energy in an ecosystem.

5. Matter is transferred from one organism to another and between organisms and their environments. Water, nitrogen, carbon dioxide, and oxygen are substances cycled between the living and non-living environments. In the table below, fill in the appropriate processes that correspond with the different cycles of nature.

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Know these processes and their function in the cycle.

Cycle of Nature	Processes
1. Water	
2. Carbon/Oxygen	
3. Nitrogen	

6. The world contains a wide diversity of physical conditions, which creates a wide variety of environments: freshwater, marine, forest, desert, grasslands, mountain, and others. In any particular environment, the growth and survival of organisms depend on the physical conditions. **Environmental factors that affect an organism's ability to survive in its environment, such as food availability, predators, and temperature, are _____ factors. A _____ factor is any biotic or abiotic factor that restricts the existence, number, reproduction, or distribution of organisms. Using the environments above, create a specific list of factors that can limit the size of a population in an ecosystem.** For example, at high elevations, temperatures are too low, winds too strong and the soil too thin to support the growth of large trees.

Freshwater=

Marine=

Forest=

Desert=

Grassland=

Mountains=

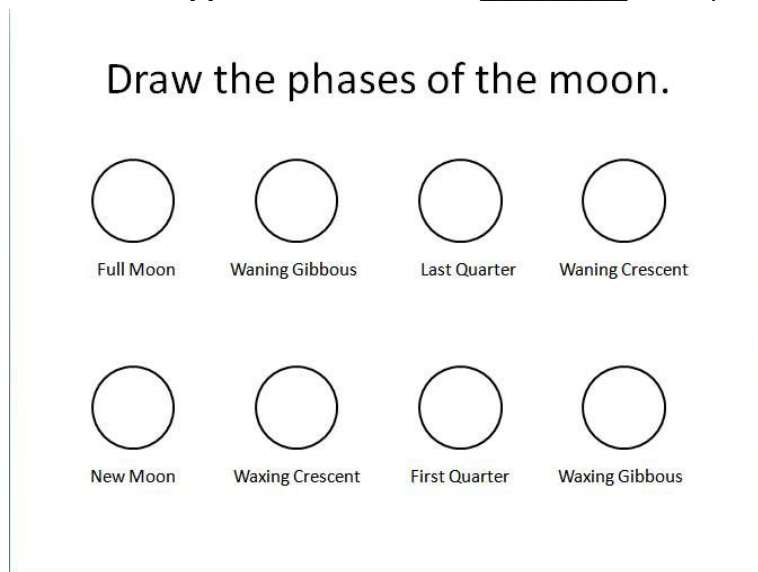
7. Another factor for survive is the ability of an organism to withstand fluctuations in biotic and abiotic environmental factors. The limits of an organism's tolerance are reached when the organism receives too much or too little of some environmental factor. Organisms become fewer as conditions move toward either extreme of the range of tolerance (too much or too little). **Create a list of 5 biotic and 5 abiotic environmental factors that can affect the survival of a species in a particular ecosystem.**

Unit H: Earth in the Universe

1. **The moon and the Sun each exert a _____ pull on the Earth.** These forces can be aligned or in opposition to one another. The _____ is the force which **keeps our universe in alignment and the planets in their orbit**, it is also the major source of heat and light. The _____ is the force which **has a major impact on the Earth's ocean tides.**
2. The alignment of the Sun, Earth and Moon can **produce shadows on the Earth or Moon resulting in _____.** They can sometimes be predictable. **What happens in each of them? (Remember there are 2 of them!)**

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3. The Earth's north-south axis is _____ at an angle, as compared with the plane of its orbit around the Sun. The _____ (23.5 degrees) of the Earth causes all parts of the Earth to experience periods of daylight and darkness. The _____ (23.5 degrees) of the Earth around the Sun on its axis along with its daily _____ causes varying lengths of daylight on the Earth's surface as well as changes in the directness and intensity of sunlight. How long does it take Earth to complete this?
4. The Earth's _____ around the sun in the path of an ellipse results in a yearly cycle of _____ for much of the Earth's surface. The _____ of the Earth's axis also results in the _____ being 'reversed' in the Northern and Southern hemispheres. (e.g.: winter in North America corresponds to summer in South America.) How long does it take Earth to complete this?
5. The Earth's _____ revolves around the Earth as both go through space and revolve around the Sun. From Earth, it appears in a series of _____ that repeat in a regular cycle.



6. Since the rotational period of the moon is the same as its period of revolution around the Earth, the same side of the moon is always viewed from Earth. What is the period of time it takes for the moon to rotate/revolve around the Earth?
7. Create a list of objects that help to make up our solar system.
8. Planets are the largest objects in the solar system and due to the Sun's gravitational pull, they revolve around the sun with known frequencies. Eight planets of very different size, composition, and surface features move around the sun in nearly circular orbits. Some planets have a variety of moons and even flat rings of rock and ice particles orbiting around them. Some of these planets and moon show

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evidence of geologic activity. **Fill in the following chart listing the planets (in the correct order from the sun) and their defining characteristics.**

Planet	Outer or Inner Planet	Defining Characteristics
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

9. The planet Earth formed in just the right place with just the right ingredients for life to flourish. **What are these “ingredients” that allow for Earth to be the only planet in our Solar System to sustain life?**
10. _____ **has allowed humans to learn much about the workings of the solar system, the composition of planets and moons, and the effects of many types of solar radiation on the Earth and its inhabitants. In preparing for the challenges of _____, people have developed tools and products that have become very important in enriching our lives. List some of those tools and products which were developed to help this effort.**