

5TH Grade Georgia Milestones Science Study Guide

Landforms and Oceans

Landforms and oceans Earth's oceans and land can be affected in constructive ways and destructive ways by natural processes.

Constructive - Processes that create landforms (deposition, landslides, volcanic eruptions, floods)

Destructive - Processes that destroy landforms (weathering, erosion, landslides, volcanic eruptions, earthquakes, floods) Natural processes that can affect Earth's oceans and land include:

Weathering - Weathering is a term used to describe processes that break down rocks at or near the surface of the earth. Weathering can be either physical or chemical. These processes cause the surface of the earth to dissolve, decompose, and break into smaller pieces.

Weathering can be caused by:

- ☐ Water
- ☐ Plants (roots break apart rocks)
- ☐ Temperature changes (water freezes in cracks of rocks)

Erosion

Erosion is the movement of sediments and soil by wind, water, ice, and gravity.

Deposition

Deposition is the dropping, or depositing, of sediments by water, wind, or ice. It builds new land on Earth's surface, like a delta at the end of a river or the pile up of a sand dune in the desert. Shells on the beach are deposition by ocean waves. Deposition begins with a "D" and Dunes and Deltas begin with a "D".

Chant:

Weathering will break rocks down
Erosion moves it all around
Put it here and then we're done
Now we have deposition

Landslides

Landslides are mass movements of land due to gravity.
Landslides can cause buildings to fall, or power and gas lines to break.
Landslides even occur on the continental slope in the ocean.

Volcanic eruptions

Volcanoes are mountains with openings in Earth's crust through which magma, gases, and ash reach Earth's surface.

When the magma erupts from the volcano the top of the mountain can be changed, either built up or exploded off. The lava and ash can destroy forests and bury fields.

Volcanic eruptions can even change Earth's weather patterns. Volcanic eruptions also occur under the oceans; these volcanoes that are built up are called Seamounts. If the seamount rises above the ocean surface it is called a volcanic island (for example Hawaii or Japan).

Earthquakes

Earthquakes are vibrations on Earth's surface caused by sudden movement in the Earth, often along a fault, a break in Earth's surface.

Some earthquakes cause little damage and some cause a lot of damage.

Large earthquakes can cause landslides.

Earthquakes under the ocean can cause huge waves, called tsunamis that destroy land and cause great damage if they come ashore.

Floods

Floods occur when a large amount of water covers land that is usually dry.

When the flood occurs; rapid erosion can take place and move soil and sediments away.

When the flood recedes; new sediment is left behind and can build up rich soil deposits.

Landforms of the Ocean Floor

Continental shelf

The edges of the continents slope down from the shore into the ocean.

The part of the continent located under the water is known as the continental shelf.

The width of the continental shelf can vary. In some places the continental shelf is fairly shallow and in other place it becomes very deep, but it is not the deepest part of the ocean.

Continental slope

The steep slope where the continental shelf drops to the bottom of the ocean floor is

called the continental slope. The depth of the ocean water increases greatly here.

Mid-ocean ridge

On the bottom of the ocean, there is a central ridge, or mountain range, that divides the ocean floor into two parts called the mid-ocean ridge. Volcanic mountains not formed on the mid-ocean ridge are called seamounts.

Rift zone

In the center of the highest part of the mid-ocean ridge is a narrow trench called a rift. Underwater volcanic activity that adds mountains to either side of the mid-ocean ridge occurs at the rift zone .

Trenches

There are many steep-sided canyons and deep, narrow valleys in the bottom of the ocean. Ocean trenches are the deepest part of the ocean basin and are deeper than any valley found on land.

Ocean basin

Located on either side of the mid-ocean ridge is the ocean basin. It is made up of low hills and flat plains. The flat area of the ocean basin is called the abyssal plain.

Seamounts are generally formed on the ocean basin.

- ☐ Some shorelines are rocky. Shorelines made of sand are called beaches.
- ☐ Shorelines are always changing because of wind and water.
- ☐ Waves can wear away the land and expose a rocky shore or the waves can deposit sand along the shore and form a beach. If the waves reach the beach at an angle, the sand is moved along the coast.
- ☐ Currents, called longshore currents, along the shoreline can move sand from one location to another.
- ☐ Tides can bring in sand, shells, and ocean sediments at high tide and leave them behind when the tide goes out.
- ☐ Storms can cause wave action that removes sand from beaches. Barrier islands
- ☐ Islands are pieces of land surrounded by water on all sides. Islands with sandy beaches are called barrier islands.
- ☐ These barrier islands protect the mainland from the effects of waves on its shore.
- ☐ As the waves deposit sand on the beaches, the shapes of the barrier islands change.
- ☐ Currents can move the sand from one end of the island to the other.

Estuaries

- ☐ All rivers flow into the oceans.
- ☐ The area where a river meets the ocean is known as an estuary.

- ☐ Estuaries have a mixture of freshwater and saltwater.
- ☐ Waves can deposit sand in the estuaries.
- ☐ At high tide, ocean water brings in sediments and sea life that feed and nourish life in the estuary.

Inlets

- ☐ Inlets are the water-filled spaces between the barrier islands.
 - ☐ As the tides change, the amount of water in the inlet will change.
 - ☐ Ocean currents and storms can change the shape of an inlet opening.
- Large storms, for example hurricanes, can also cause massive construction or destruction of beaches, barrier islands, estuaries, and inlets because they produce high waves, storm surges, and winds. Water can be moved by waves, currents, and tides.

Waves

- ☐ The repeated movement of water is known as a wave.
- ☐ All waves have the same parts. The highest part is known as the crest and the lowest part is known as the trough .
- ☐ Most ocean waves are caused by winds that are blown across the surface of the water.
- ☐ A wave changes shape when it reaches the shore.
- ☐ As the top of the wave curls over it forms a breaker.
- ☐ Sometimes giant sea waves, called tsunamis, are caused by underwater earthquakes, volcanic eruptions, or landslides.

Currents

- ☐ Flowing streams of water that move continually through the ocean in a specific direction are called currents .
- ☐ Some currents flow at the ocean's surface and some are found deeper in the ocean.
- ☐ Surface currents are caused by the movement of Earth and by the force and direction of wind.
- ☐ The movement of Earth and winds causes these currents to flow along curved paths.
- ☐ Warm water and cold water are moved to different regions on Earth as a result of currents.
- ☐ Warm surface currents are driven by Earth's rotation from the tropics to higher latitudes.
- ☐ Cold surface currents are driven by Earth's rotation from the polar latitudes toward the equator.

Tides

- ☐ Several times during the day, the level of water at the ocean shore changes.
- ☐ This regular rise and fall of waters in oceans and seas is called a tide.

- ☐ Tides are caused by the pull of the Moon's gravity on Earth.
- ☐ As the Moon moves in relation to Earth, the water on Earth moves too.
- ☐ As Earth spins on its axis, the part of the ocean facing the Moon will bulge.
- ☐ High tide occurs when the water level is at its highest point.
- ☐ Low tide occurs when the water level is at its lowest point.
- ☐ Tides rise and fall about twice a day.

Human Activity can affect the land and oceans of Earth.

Humans can help protect the land and oceans by preserving the natural resources these areas provide.

Examples of natural resources include: air, water, trees, rocks, minerals, soil, coal, and oil. Using resources wisely is call conservation. Ways to conserve our resources include:

- ☐ Prevent pollution
 - ☐ Reduce, Reuse, Recycle
 - ☐ Clean-up projects
 - ☐ Beach re-nourishment projects to protect sand on beaches
 - ☐ Plant trees, bushes, and trees to improve air quality and keep erosion from carrying away soil
- Pollution is anything that harms the natural environment.

Human activities that can pollute the environment include:

- ☐ Dumping materials from industry, mining, or agriculture onto the land or into the water
- ☐ Careless dumping of trash on land or in oceans
- ☐ Smoke from burning fuels pollutes the air
- ☐ Oil spills harm the oceans

Chapter 3: Physical and Chemical Changes

in Matter Study Guide

What is matter?	Anything that has mass and takes up space
Mass is.....	The amount of matter in an object. Measured in grams, kilograms
Volume is....	The amount of space an object takes up. Measured in milliliters and liters

How would you find the volume of an irregular object, such as a rock, using only a graduated cylinder and water? Describe the process.	Read and record the volume of the water. Drop the rock into the water. Read and record the volume of the rock and the water, then subtract the volume of the water from it.
Describe how particles of matter are arranged in a SOLID . Draw a picture showing this arrangement.	Particles are tightly packed together. They can vibrate, but cannot move out of position.
Describe how particles of matter are arranged in a LIQUID . Draw a picture showing this arrangement.	Particles are further apart, and can flow past one another.
Describe how particles of matter are arranged in a GAS . Draw a picture showing this arrangement.	Particles are much farther apart, rarely coming in contact with one another.
What always happens during a chemical reaction? Give an example of a chemical reaction.	A new substance is produced. Answers may vary
What are physical properties? What are examples of physical properties?	Properties that can be observed using your senses. Color, shape, size, texture, function, density, state of matter.

What are chemical properties? When are you able to observe them?	Properties that describe how matter changes into new types of matter. You are only able to observe them during a chemical change.
What happens to matter in a physical change?	Matter changes physically, but nothing new is created. It is still the same type of matter.
What are some examples of physical changes?	Tearing paper, slicing carrots, water changing to water vapor, etc.
What happens to the particles of matter when heat is <u>added</u> to it?	The particles speed up and start moving faster. Sometimes a phase change can occur.
What happens to the particles of matter when heat is <u>taken away</u> from it?	The particles slow down and move more slowly. Sometimes a phase change can occur.
Describe the phase change during: Melting: Boiling: Condensing: Freezing:	Solid to liquid Liquid to gas Gas to liquid Liquid to solid
In which phase of matter are particles moving fastest? Slowest? Why?	Particles move fastest in gases. They move slowest in solids. Gases have the most thermal energy and solids have the least.

What is a mixture? Give some examples of mixtures.	A mixture is made up of two or more types of matter that are combined physically, 1. Party mix 2. sand and water 3. Air
What is a solution? Give an example of a solution.	A type of mixture in which substances are thoroughly dissolved and do not separate with gravity. An example is sea water.
How are mixtures and solutions alike? How are they different?	Mixtures and solutions are made of matter that is physically, not chemically combined. In solutions, you cannot see the individual particles because they are dissolved in the substance.
What happens to the particles of matter during a chemical change?	In a chemical change, the particles of matter break apart and form new types of matter with different properties.
Give some examples of chemical changes.	1. wood burning 2. fireworks exploding 3. metal rusting 4. cake baking
What are clues, or evidence, that a chemical reaction has taken place?	Evidence that energy was used or given off, the properties of the new substance are different than the original substances, and the change cannot be easily reversed.

How is a physical change different from a chemical change?	In a physical change, the matter changes form, but nothing new is created. In a chemical change, new substances were formed with different properties.
<u>To prepare for your test, make sure to:</u> 1. Re-read chapters 4 and 5 in the Science book	1. Study through all of your notes and reread in your textbook pgs. 124-163 Lessons 1-3 2. Have someone quiz you over the study guide questions.

Electricity and Magnetism Study Guide

VOCABULARY

charge	A measure of the extra positive or negative particles that an object has
circuit	A path that is made for an electric current
conductor	A material that electric current can pass through easily
electric cell	A device that supplies energy to move charges through a circuit
electric current	A flow of electric charges
electric fields	The space around an object in which electric forces occur
electromagnet	An arrangement of wire wrapped around a core, producing a temporary magnet

insulator	A material that current cannot pass through easily
magnet	An object that attracts certain materials, such as iron or steel
magnetic field	The space all around a magnet where the force of the magnet can act
magnetic pole	The end of a magnet
parallel circuit	A circuit that has more than one path along which current can travel
resistor	A material that resists the flow of current but doesn't stop it
series circuit	A circuit that has only one path for current
static electricity	An electric charge that stays on an object

CRITICAL THINKING

1. What kind of electricity is caused by friction?

Static Electricity is caused by friction.

2. How are charged particles in matter affected when two objects are rubbed together?

All matter is made up of tiny particles that have electric charges. Some of these particles have a positive charge. Other particles have a negative charge. Rubbing two objects together may cause some of the negative charges to rub off one object. The charges move to the second object. This gives the second object a greater negative charge than the first object.

3. How is current electricity produced?

Current electricity is produced when negative charges move along a path.

4. What is a circuit? What are the parts of a circuit?

A circuit is the path along which negative charges move.

There are four parts to a circuit:

- (1) There is a source of electricity Example: A battery
- (2) There is a path along which charges can move. Example: A wire
- (3) There is a switch that opens and closes the circuit. Example: A knife switch
- (4) There is some object that uses the electricity. Example: A light bulb

5. Explain the difference between a complete circuit and an incomplete circuit.

When a switch is closed or turned on, the path of electricity is complete. The charges move. A circuit whose path is complete is called a complete circuit. When the switch is open, or turned off, the path is broken. The movement of charges stops. The path is incomplete. A circuit whose path is incomplete is called an incomplete circuit.

6. Explain how electricity is produced in a flashlight.

A dry cell battery is the source of electricity in a flashlight.

7. What are the three ways to make electricity?

Electricity can be made from chemical energy in dry cell batteries and wet cell batteries, and from mechanical energy in generators.

8. What would show the magnetic field of a magnet?

A magnetic field may can be seen when iron filings are sprinkled near a magnet. The iron filings form a pattern of lines. These lines are called lines of force. Lines of force show where the magnetic field is and what it looks like.

9. Explain the difference between the two poles of a magnet.

The ends of a magnet are called the poles. A magnetic field is strongest at the poles. A magnet has two poles - a north pole and a south pole. The poles are equal in strength.

The north pole of one magnet attracts the south pole of another magnet. The south pole of one magnet attracts the north pole of another magnet. But the north pole of one magnet repels, or pushes away, the north pole of another magnet. In the same way, the south pole of one magnet repels the south pole of a second magnet.

10. How are particles in magnetized iron different from those in unmagnetized iron?

Most magnets are made of iron. The particles that make up iron are like tiny magnets. In a normal piece of iron the particles are all mixed up. They point in different directions. In a magnetized piece of iron the particles point in the same direction.

11. How is magnetism used to produce electricity?

Magnetism can be used to produce electricity. This can be done by moving a magnet through a coil of wire. Electricity is produced as long as the magnet moves through the coil. A generator produces electricity this way.

12. What are some uses of electromagnets?

Electromagnets are often used in scrap yards to lift metal and move it. Many electromagnets are strong enough to lift heavy objects, such as cars. Electromagnets are also used in telephones.

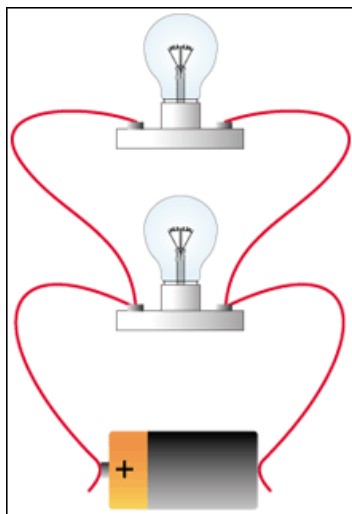
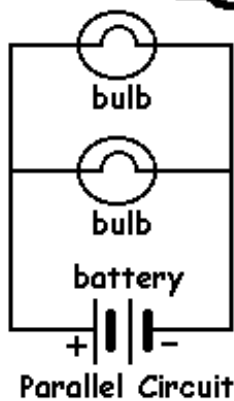
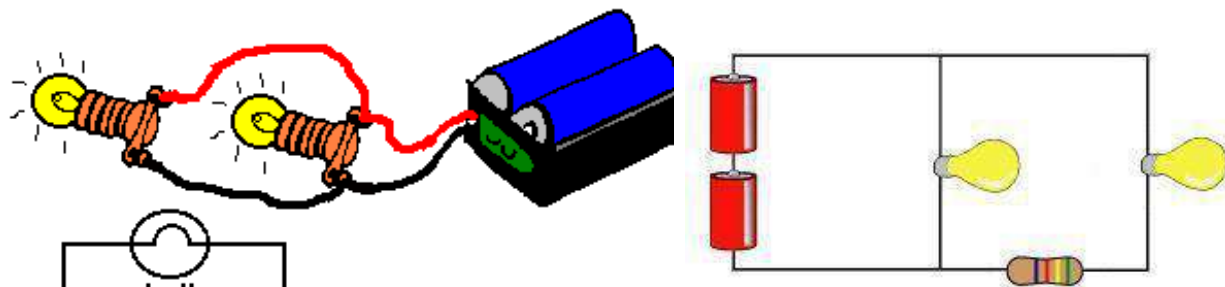
13. In what ways are electricity and magnetism alike?

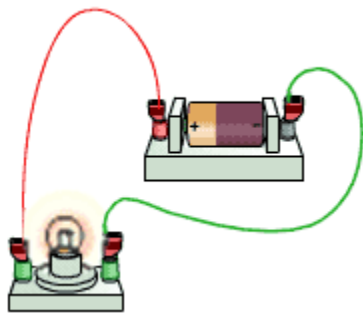
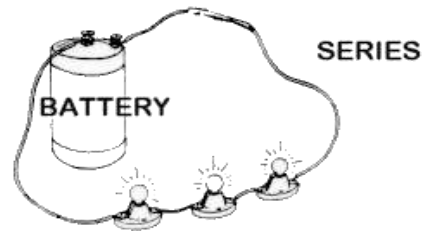
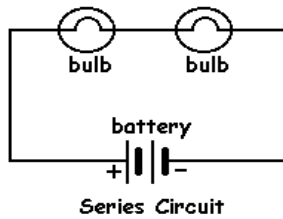
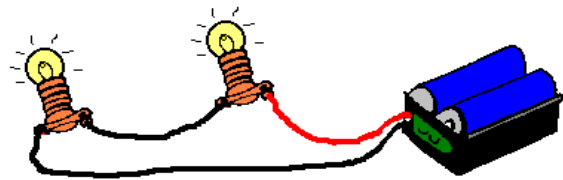
Electricity and magnetism both produce a force that can pull or push things without touching them. They both have opposite states: electricity has positive and negative, and magnetism has north-seeking and south-seeking. In both, opposite states attract and same states repel.

14. What will happen if you put a compass next to an electromagnet that is switched on?

The compass needle will turn because an electromagnet produces a magnetic field. The magnetized compass needle will move to line up with the field lines.

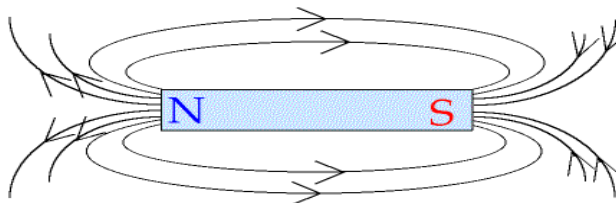
Series and Parallel Circuits





Magnets

Bar Magnet



If spins align, attraction occurs, otherwise magnets repel.



Attraction



Repulsion

Microorganisms and Cells Study Guide

Vocabulary Terms to Know

Bacteria – Kind of microorganism shaped like rods, spirals, or balls.

Organ system- Organs that work together to do a job for the body.

Cell – The basic unit of structure and function in living things

Microorganism- Living thing that is too small to see without a microscope.

Tissue- Cells that work together to perform a specific function.

Organ- Groups of tissues that work together to carry out a certain function.

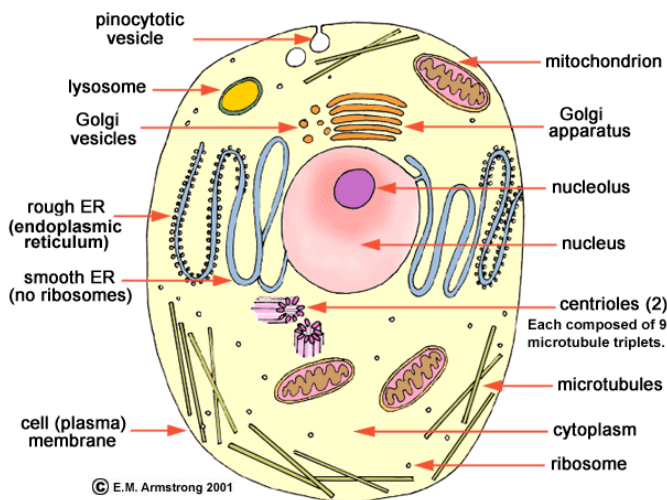
Mold- A fungus that is a microorganism.

Protist- Microorganisms that include algae and protozoans.

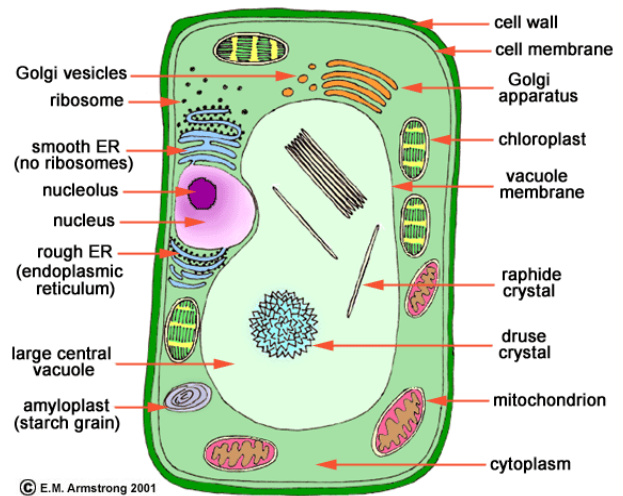
Concepts to Know

1. Parts of an animal cell and a plant cell.

Animal Cell



Plant Cell



2. What is the difference between a plant and animal cell? One is found in plants and the other is found in an animal. Plant cells are square shaped and the animal cell is more circular shaped. You can find a cell wall in a plant cell along with chloroplasts; neither can be found in an animal cell.

3. What is connective tissue and where it can be found? Connective tissue is Connective Tissue is the tissue that supports and connects the various parts of the body in your bones

4. What microorganisms are and what they do (helpful or harmful)?

Microorganisms living organisms that are too small to be seen with the naked

eye. Some types of microorganisms are bacteria, viruses, fungi, algae, and protozoa. Some are harmful and some are helpful.

5. What basic structure and function of all living things is? The basic structure of all living things is a cell.

6. Compare and contrast single celled and multi-celled organisms. Cells in single celled organisms carry out all their life's functions. Cells in a multi-celled also carry out all the functions necessary to stay alive. In addition, cells in multi-celled organisms work together with other cells to keep the organism alive.

7. What would happen if a cell was without a nucleus? A cell would probably not function without a nucleus. The nucleus directs all the cell's activities. Without a nucleus, the cell may not be able to do everything it needs to for survival.

8. How do your muscles affect your circulatory system? Without muscle tissue, the circulatory system would not be able to pump blood to all the parts of the body.

Plant and Animal Classification

1. A flowering plant that has seeds protected by fruit is an angiosperm.
(Example: Apple Tree)
2. Gymnosperm is a plant that has naked seeds. (Example: Pine Tree)
3. You should know that ferns reproduce with spores, not seeds. You should know that pine trees reproduce with seeds in cones, not flowers.
4. Vascular tissue is a tube like material that supports a plant and allows water and nutrients to move through the plant. There are two types of vascular tissue. (xylem and phloem)
5. Tissue that carries water and nutrients from the roots to every part of the plant is called xylem.
6. Phloem is a tissue that carries food from a plant's leaves to its cells.
7. Invertebrates are a group of animals without backbones.
8. A group of animals with backbones is vertebrates.

9. Classification is organizing things into groups based on how the things are alike. One reason scientists classify living organisms is because it makes finding and sharing information easier.
10. The seven parts of the scientific classification system from largest to smallest. (Kingdom, Phylum, Class, Order, Family, Genus, Species)
11. Species is the smallest group for classifying living things
12. Kingdom is the largest group for classifying living things.
13. There are more invertebrates than vertebrates.
14. The main difference between members of the plant kingdom and members of the animal kingdom is that plants make their own food and animals eat other living things.
15. Vascular plants use tubes to get water and nutrients where they need to go and they usually grow much taller than non-vascular plants. An example of a vascular plant is a tree .
16. A non-vascular plant does not have tubes. Water travels from cell to cell in a non-vascular plant. An example of a non-vascular plant is moss.
17. Mammals and birds are warm-blooded
18. Mammals are a group of vertebrates that give birth to live babies.
19. Fish, Amphibians and Reptiles are cold-blooded.
20. Amphibians live on land and in water at various times during their life.
21. Cold blooded – animals whose body temperature changes with their surroundings
22. Warm Blooded – animals whose body temperature stays the same no matter how the temperature changes around them.
23. Classify – to group things using a set of rules.
24. Vascular – plants that have tubes
25. Non-vascular – plants that do not have tubes
26. Pollen – a special dust that helps plants reproduce

27. Spore – a tiny cell that grows into a new plant

**You should be able to label the diagram that we placed in your science notebook that starts with animals then breaks down into vertebrates and invertebrates, warm-blooded, cold-blooded and finally into mammals, birds, fish, amphibians and reptiles. (This diagram shows you how we group animals.)

** (You should be able to label the diagram that we placed in your science notebook that starts with plants, then breaks down into vascular and non-vascular, seeds, no seeds, flowers, no flowers. (This diagram shows you how we group plants)

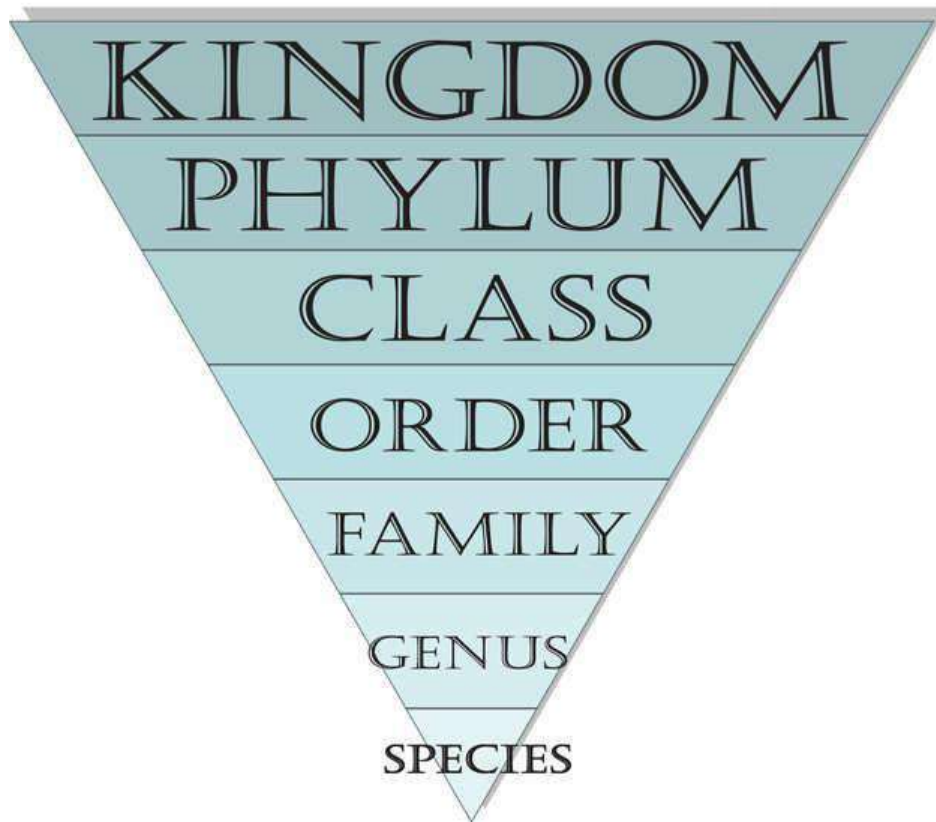
**You should be familiar with the characteristics of the five types of vertebrates we discussed: Mammals, Birds, Fish, Reptiles and Amphibians. You drew five charts with the characteristics of these animals and placed them in your binder. If I give you an example of an animal, based on its characteristics, you should be able to tell me which of the five groups of vertebrates that it belongs in.

Plant and Animal Kingdoms

The Five Kingdoms

Animal, Plant, Bacteria, Fungi, Protists, and Plant Kingdom

The Animal Kingdom is divided into:



Vertebrates and Invertebrates

Vertebrates

The five most well known classes of vertebrates are mammals, birds, fish, reptiles, amphibians. They are all part of the phylum chordate.

Mammals

People are mammals. So are dogs, cats, horses, duckbill platypuses, kangaroos, dolphins and whales. If an animal drinks milk when it is a baby and has hair on its body, it belongs to the mammal class. [Dog](#), [Coyote](#), [Polar Bear](#), [Elephant](#), [Giraffe](#), [Camel](#), [Dolphin](#), [Vampire Bats](#), [Horse](#), [Fox](#)

Birds

Birds are animals that have feathers and that are born out of hard-shelled eggs. Some people think that what makes an animal a bird is its wings. Bats have wings. Flies have wings. Bats and flies are not birds. The truth is that it is the feathers who makes an animal a bird and not wings. All birds have feathers and birds are the only animals that do. The feathers on a bird's wings and tail overlap. Because they overlap, the feathers catch and hold the air. This helps the bird to fly, steer itself and land. [Crow](#), [Peafowl](#), [Birds](#), [Duck](#), [Owl](#), [Pigeon](#), [Flamingo](#), [Woodpecker](#), [Ostrich](#), [Sparrow](#), [Chicken](#)



Fish

Fish are vertebrates that live in water and have gills, scales and fins on their body. There are a lot of different fish and many of them look very odd indeed. There are blind fish, fish with noses like elephants, fish that shoot down passing bugs with a stream of water and even fish that crawl onto land and hop about! [Fishes](#)

Reptiles

Reptiles are a class of animal with scaly skin. They are cold blooded and are born on land. Snakes, lizards, crocodiles, alligators and turtles all belong to the reptile class. [Reptiles](#), [Crocodile](#), [Chameleon](#), [Tortoise](#), [Turtle](#)

Amphibians

Amphibians are born in the water. When they are born, they breath with gills like a fish. But when they grow up, they develop lungs and can live on land. [Frog](#)

Invertebrates

There are also a lot of animals without backbones. These are called invertebrates and are part of the phylum arthropoda (arthropods). Two of the most commonly known classes in this phylum are arachnids (spiders) and insects.

Arthropods

Arthropods is a huge phylum of animals -- it includes eleven animal classes: Merostomata, Pycnogonida, Arachnida, Remipedia, Cephalocarida, Branchiopoda, Maxillopoda, Malacostraca, Chilopoda, Diplopoda, and Insecta.

Any animals that have more than four, jointed legs are arthropods. Insects, spiders and crustaceans all belong to this class of animals.

[Insects](#), [Spider](#), [Grasshoppers](#), [Praying Mantis](#), [Dragonfly](#), [Butterfly](#), [Bees](#)



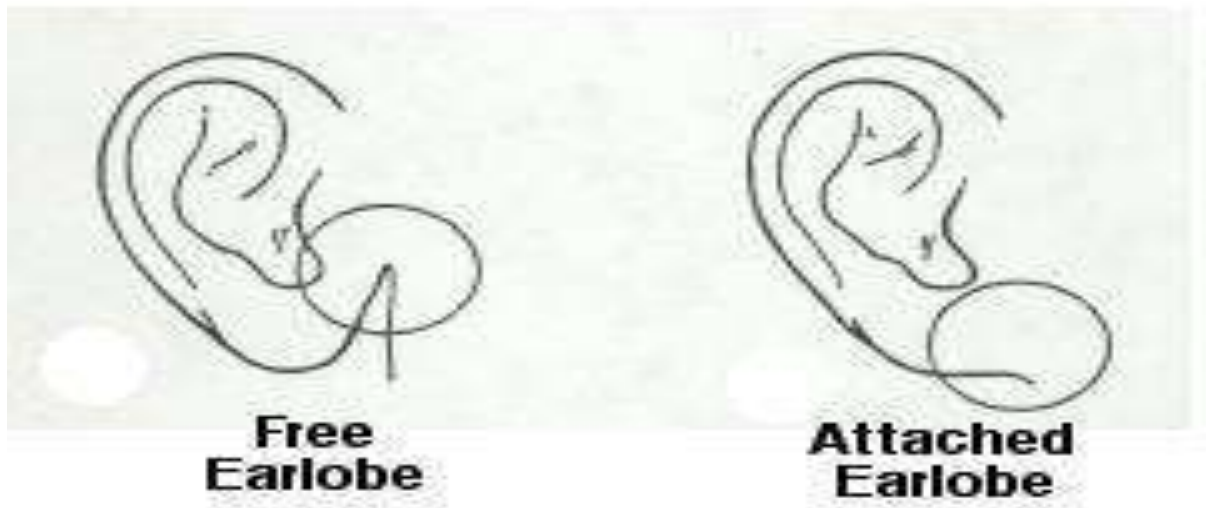
Growth and Inheritance

Humans and other animals are a mix of characteristics from their parents and behaviors they learned on their own. A physical characteristic that is passed from a parent to their baby (offspring) is an inherited trait.

Inherited Traits

- Eye color
- Skin color
- Hair color
- Curly or straight hair
- Dimples
- Freckles
- Height

- ✓ Are your ear lobes attached to the side of your head, or do they hang free? The shape of your ear lobe is an inherited trait.



Inherited Behaviors

- A behavior is a way of acting. Behaviors can be inherited too.
- Inherited behaviors are called instincts.
- Many animals are born with instincts that help them survive.
- Can you think of any animal instincts?

Inherited Behavior examples...

- When the weather turns chilly in the fall, animals prepare for the winter by instinct.
- Some animals head for warmer climates during the winter. Other animals find a safe spot and curl up for a long sleep.
- No one taught these animals how to survive winters. They know what to do by instinct.
- Birds protect their eggs and babies by instinct.
- Frogs are not born with this instinct. They leave their eggs to hatch-or die- on their own.
- Can you think of any additional inherited behaviors (instincts).

Learned Behaviors

- Are you better at using the computer than some of the adults in your family? If so, you learned how to do this. You did not inherit this behavior from your parents.
- We learn many behaviors that help us every day. These behaviors include how to make a sandwich, wakeboard, and be polite to others.

Science Process Skills

Observing

We observe when we use one or more of our senses to find out about objects, events, or living things. An observation is a fact learned directly through the senses.

- ☐ Don't just look - use more than your eyes
- ☐ Use all of your senses
- ☐ Fully describe what you sense – add details
- ☐ Be sure to observe how things change (before, during, and after an event)

There are two types of observations:

1) **Qualitative Observations** are those that describe what something looks, smells, tastes, sounds, or feels like.

Example: The flower is red and smells sweet.

2) **Quantitative Observations** are those that provide some type of measurement or comparison.

Examples: The rock has a mass of 5 grams. The boy has two arms. There are fewer students in the science class than the math class.

Communicating

We communicate when we send or receive information. Be clear and use details when you communicate.

- ☐ Use several ways to communicate
- ☐ Describe an object or event, include changes if there are any
- ☐ Use simple, clear language

Classifying

We classify when we use observations to group objects or events according to how they are similar or different.

- ☐ What are the properties of the objects or events
- ☐ Divide into two groups and then see if each group can be divided into smaller groups

☐ Be sure to write down how you classified the objects or events so that you can tell someone else how you did it

Measuring

We measure when we compare something to standard or nonstandard units. Length, mass, and time are the basic units of measurements.

In science, always use metric units

- ☐ Be as accurate as possible
- ☐ Be sure to use the right units and the right instrument to measure

Inferring

We infer when we use what we already know to draw conclusions and figure out reasons for events that we don't witness.

- ☐ Make an observation.
- ☐ Think of several inferences as to what you are seeing.
- ☐ Think of ways that you can find out which one is right.

Inference – an explanation of an observation based on prior knowledge (experience or facts).

Example: The holes in the leaf were made by an insect.

Predicting/Hypothesizing

We predict (make hypotheses) when we make a forecast about what will happen in the future. The prediction is based on what you already know and data that you have collected.

- ☒ **Make observations and measurements (collect data)**
- ☐ Look for patterns in what you have observed
- ☐ Make a prediction based on what you know
- ☐ Test your prediction to see if you are right
- ☐ **Make a prediction if you are wrong**

(Prediction) – tell what will happen next.

Example: The Clemson Tigers will win their next football game. 3

Science Investigation

A **fair test** is one in which only one variable is changed or tested. A **manipulated (independent) variable** is the one factor that is changed or tested by the student doing the investigation. Always put it on the x-axis. This is what is changed on purpose by the investigator.

Think: —I|| in independent variable is what —I|| change.

A **responding (dependent) variable** is the result of the changing of the manipulated variable. Always put it on the y-axis. Think: —D|| in dependent variable —depends|| on what —I|| change.

Controlled variables stay the same or unchanged during the investigation.

Steps to an Investigation

1.) **Question** – Ask a question that can be tested. 2.)

Research - the topic

3.) **Prediction** – What do you predict will happen?

4.) **Design Your Experiment** – Materials and Procedure 5.)

Record and Organize Data – graphs, table, charts.

6.) **Explain Results**– What happened? Compare the results to your prediction.

Example of an Investigation

Sam sets up an investigation to find out how sunlight affects plant growth. He gives 2 plants the same amount of water each day, but he

places one plant in the sunlight, and the other plant in the shade. The plant in the sunshine grows 5 cm taller than the plant in the shade during the 2 weeks of the investigation.

The **Independent Variable** is the location of the plants. The **Dependent Variable** is the height of the plants.

The **Controlled Variables** include the type of plants and the amount of water. 4 How can tools and instruments (including a timing device and a 10x magnifier) be used safely and accurately when conducting a scientific investigation?

Science Tools Chart	When used	Units measured
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Name of tool		
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Eyedropper	Move small amounts of liquid	Drops or ml
Magnifier	Make objects look larger	
Ruler	Measures length and width	cm and mm
Pan Balance	Compare mass of objects	Grams
Thermometer	Measure temperature	degrees Celsius
Beaker	Measure volume of liquids	L and ml
Forceps / Tweezers	Pick up / hold small objects	