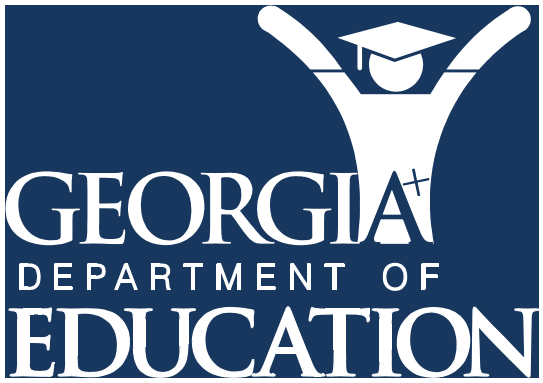


Exam Preparation for Science and Social Studies Program

ExPreSS

June 14 through June 25
2010

STUDENT

Week Two

Monday's June 21
Materials Section

Organization Guiding Questions	
What similarities did groups have in the arrangement of their cards?	
What differences did groups have in the arrangement of their cards?	
What criteria are used by scientist to organize organisms?	
What is the correct organization level?	

Ecological Relationships graphic organizer

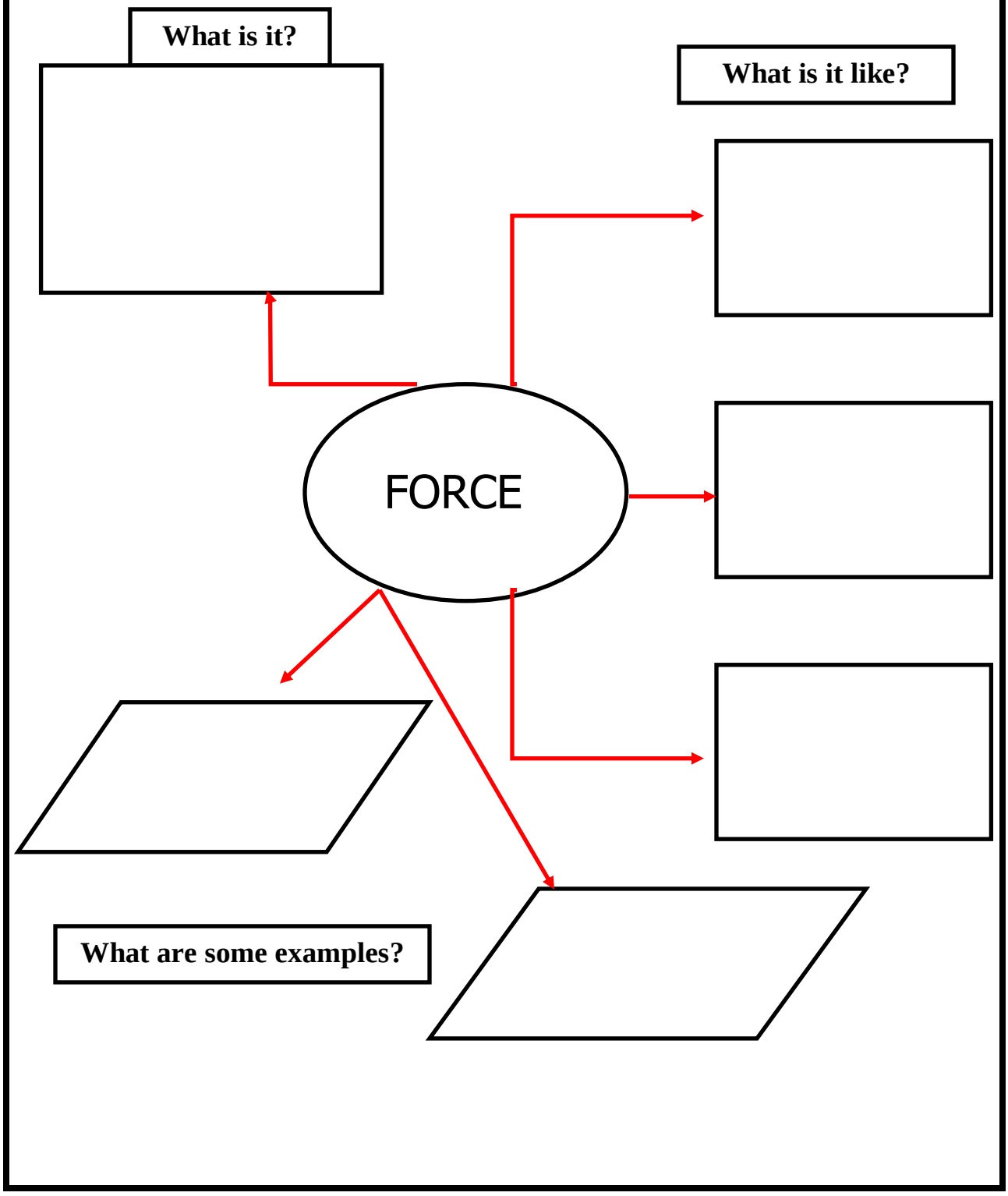
Concept	What I know	What I learn
Predation		
Predator		
Prey		
Symbiosis		
Parasitism		
Commensalism		
Mutualism		

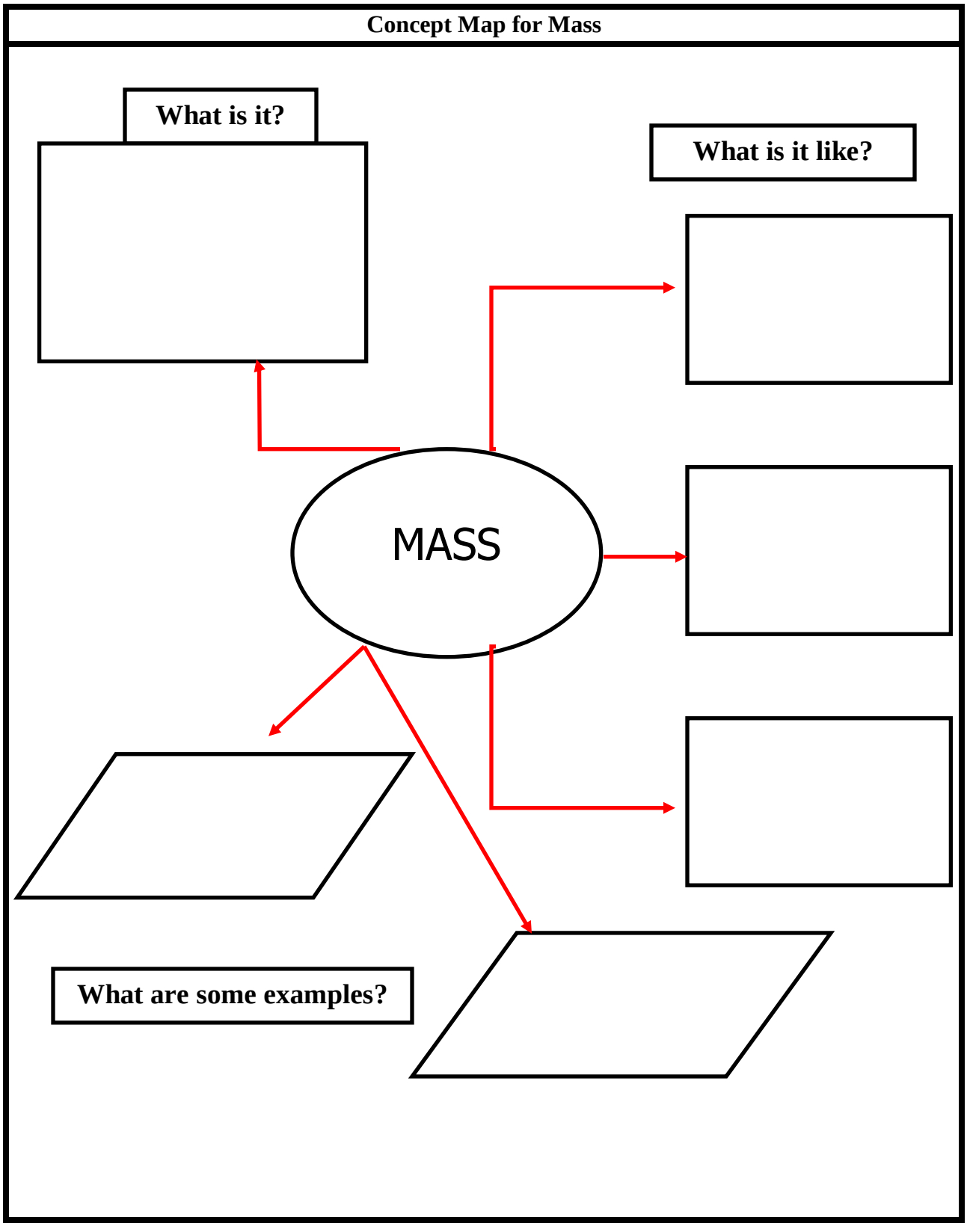
Relationships Between Populations Videos	
When do we say that two species compete with each other?	
What happens when two species fill the same role in an ecosystem?	
What is an example of competition between two species?	
When do we say that an organism is a predator?	
When do we say that an organism is a prey?	
What is an example of a predator-prey relationship? Identify the co-evolutionary traits developed by both the prey and predator.	

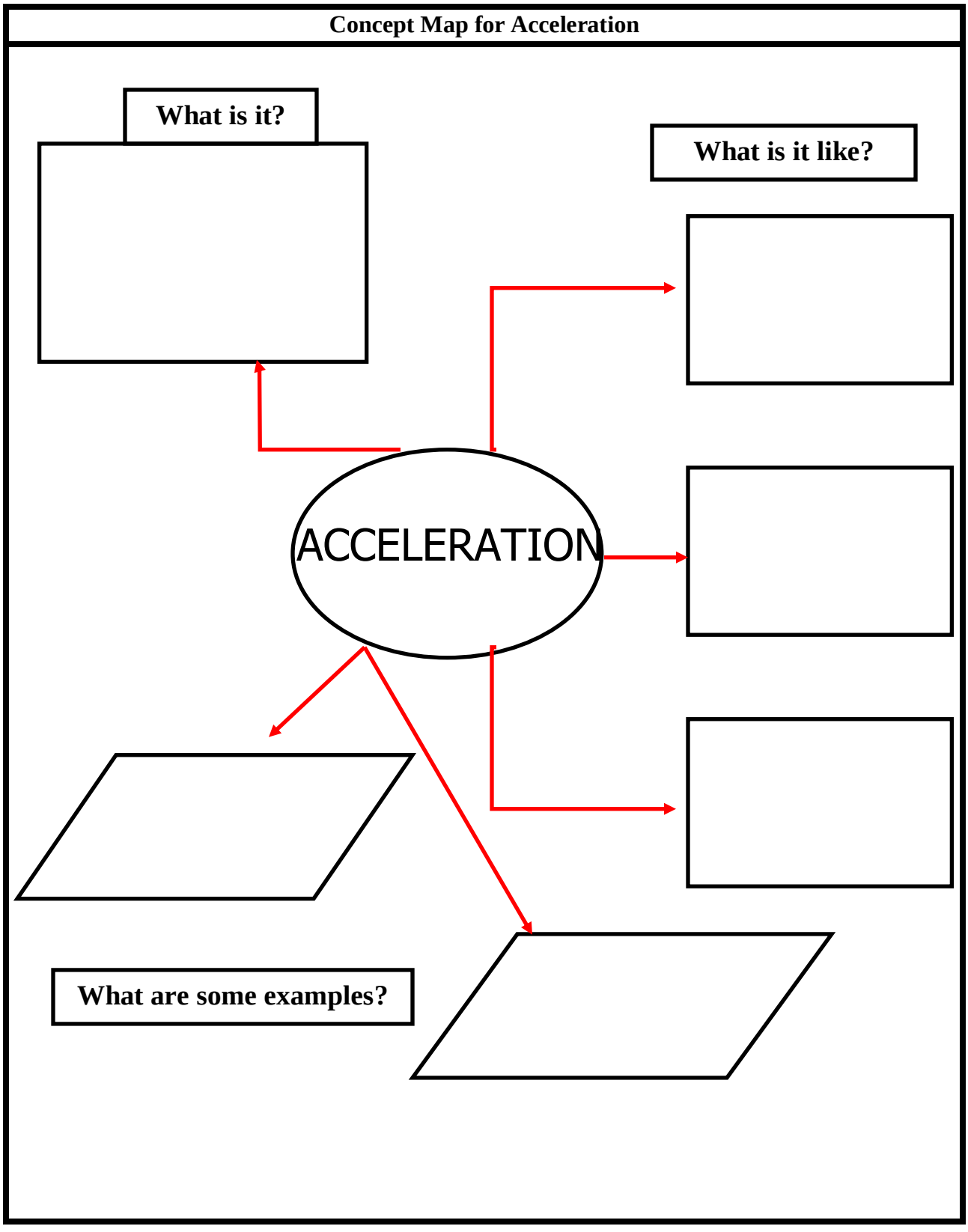
Relationships Between Populations Videos	
Describe three examples of how prey protect themselves against predators.	
What is a symbiotic relationship?	
What are the three types of symbiotic relationships? Provide the definition and give one examples of each type of symbiotic relationship	

Pre-Assessment –Force, Mass, Acceleration	
Name:	Date:
Instructions: This assessment is designed to guide the lessons that we are going to study in this unit. Please answer all the questions the best that you can.	
1. A mass resting on a table is attached to a compressed spring. Describe all the forces acting on the mass while in contact with the spring and after the mass has been push away from the spring.	
2. Why do objects start or stop moving?	
3. There are two objects: one with small mass but large volume and one with large mass but small volume. Explain which object will have a greater acceleration if each object is pushed by the same force.	
4. How does friction affect the motion of objects?	
5. Describe the motion of a spaceship propelled forward by a constant force F for 20 minutes. The force suddenly stops after 20 minutes. Describe the motion of the spaceship after the force F stops.	
6. How are weight and mass related?	

Concept Map for Force




Concept Map for Mass
What is it?
What is it like?
MASS
What are some examples?


Concept Map for Acceleration
What is it?
What is it like?
ACCELERATION
What are some examples?

Students in Motion: A Graphical Representation

Theory:

Drawing graphs is a very useful means of presenting information and making it easily understood. A further advantage of using graphs is that changes and patterns can be quickly recognized. The motion of an object is regularly represented with graphs. Graphs provide information about what is being represented on each axis. The type of curve and its slope provide additional information about the relationship between those two variables.

This laboratory will provide us with an understanding on how to draw and read graphs of position vs. time, velocity vs. time, and acceleration vs. time. Information about the motion of an object can also be obtained from the slope of the line in the graph. The slope of the line obtained when the position of an object is plotted against time represents the velocity with which the object is moving. The shape of the line when position of an object is plotted against time gives us information about the velocity of the object. In the case of a velocity vs. time graph, the slope of the line obtained when plotting the velocity of an object against time represents its acceleration. The shape of the line when velocity of an object is plotted against time gives us information about the acceleration of an object.

It is important to remember that motion is a change in position of an object measured by distance and time. Velocity tells the speed and direction of motion, whereas speed tells us the rate at which an object moves. Finally, the acceleration of an object tells us the rate at which the velocity, speed and/or direction, changes. The slope of a line gives us information about the magnitude of the rate of change, the steeper the slope the higher the rate of change and vice versa.

Research Question: How does the shape of the graph representing the relationship between displacement vs. time, velocity vs. time, and acceleration vs. time offer information about the motion of an object?

Materials:

Graph paper	Timers
Calculator	Meter Sticks or Trundle Wheels
Clipboards	Computers (not essential)

Procedure:

1. Organize the students such that there are enough timers to have two times for each data point (see Figure 1). Make sure that all the students have a copy of the data sheet form (see the data collection section of this laboratory) and a clipboard.
2. Measure 100 meters (if possible conduct this activity on the schools track) and place two students with timers every 10 meters.
3. Some students volunteers need to perform one of the following activities (each activity needs a volunteer):
    a. Walking at a uniform pace
    b. Walking faster and faster
    c. Running at a constant rate
    d. Sprinting
    e. Oscillating (moving back and forth). In this case the student should start in the middle (the 50 meter mark) and move back and forth. It is not necessary for the student to reach the starting and finishing line every time.
    f. A combination of some or all of the previous motions.

Procedure (continuation):

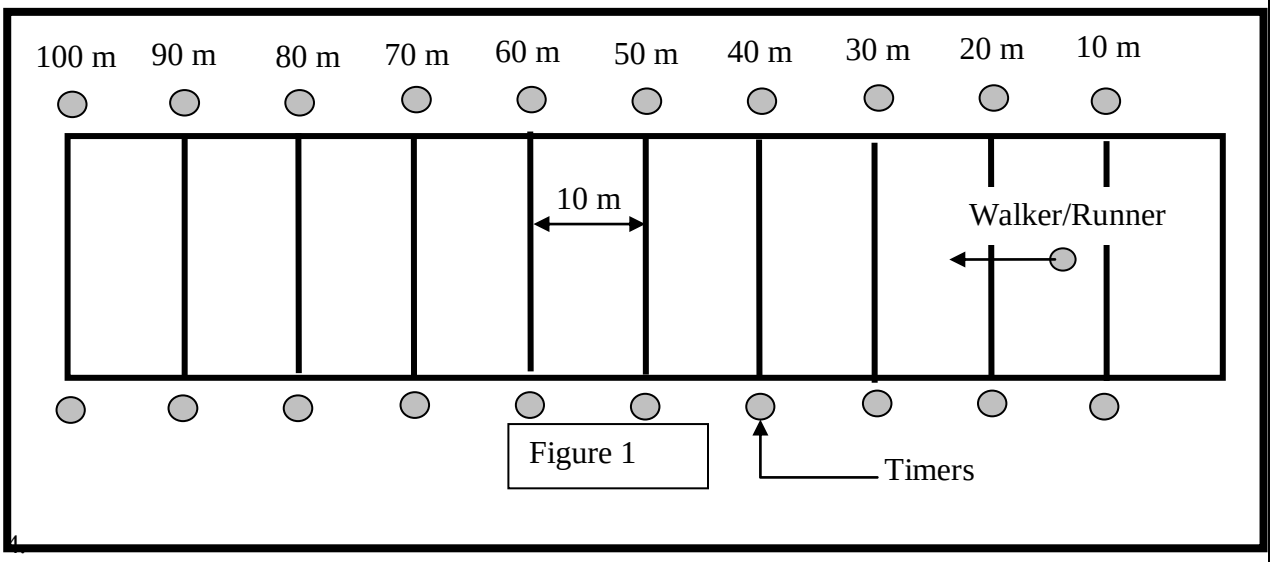


Figure 1

4. The timers need to agree in a signal that all timers can see, and use it to indicate when all the timers will to start their timers.
5. The first student will walk from the starting line (0 meters) to the finish line (100 meters) at a constant pace. As the student passes in front of each pair of timers, the timers should stop their timer and record the time.
6. Repeat this process for each type of motion described on step 3.
7. Students need to share their information. In general the two times for each distance will be very close. If not they are not close, use personal judgment to either accept one or the other, take an average or disregard both times. (Note: I have found that the best way to do this is to have everybody back in the classroom and fill out a blank data sheet placed on an overhead projector or, if available, filling a spreadsheet and then printing enough copies for the whole class).

Data Collection:

(See following pages)

Data Calculations

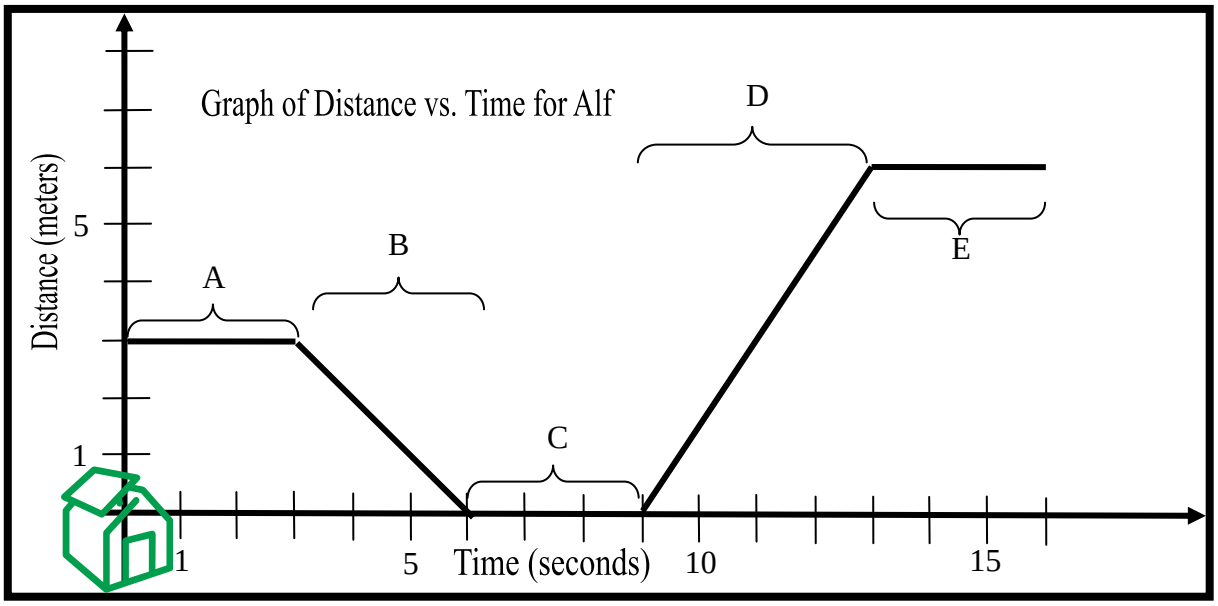
1. Draw a distance vs. time graph for each type of motion studied on this lab. Use a separate sheet of graph paper for each one.
2. Select two of the types of motion and calculate the velocity of the walking/running student on each 10 meter interval. Record answers on the Velocity Data Sheet. Calculate the average speed for each interval using the expression

$$\langle v \rangle = \frac{v_f + v_i}{2} = \frac{d}{t}$$

Where v_f is the final velocity, v_i is the initial velocity, d is the distance travel (10 meters in our case), t is the time that it took for the student to cover the distance d, and $\langle v \rangle$ is the average speed.

Analysis

1. Identify regions that represent one of the two types of motion analyzed in part two of the calculations on each distance vs. time graphs (See example below).



A → Alf was standing still at 3 m from his house for 3 seconds.
B → Alf was moving for 3 seconds with constant speed towards his house.
C → Alf was standing still next to his house for 3 second.
D → Alf was moving away from his house for 4 seconds with constant speed.
E → Alf was standing still for 3 seconds at 6 m from his house.

2. As done for part 1, identify, on each of the velocity vs. time graphs, the particular type of acceleration/deceleration (uniform acceleration, not uniform acceleration) taking place.

Timing Data Sheet																				
	10 m		20 m		30 m		40 m		50 m		60 m		70 m		80 m		90 m		100 m	
Walking at a constant rate																				
Walking faster and faster																				
Running at a constant rate																				
Sprinting																				
Oscillating																				

Timing Data Sheet (Averages)										
	10 m	20 m	30 m	40 m	50 m	60 m	70 m	80 m	90 m	100 m
Walking at a constant rate										
Walking faster and faster										
Running at a constant rate										
Sprinting										
Oscillating										

Average Velocity Data Sheet										
	10 m	20 m	30 m	40 m	50 m	60 m	70 m	80 m	90 m	100 m
Walking at a constant rate										
Walking faster and faster										
Running at a constant rate										
Sprinting										
Oscillating										

Post-Assessment	
Name:	Date:
Instructions: Please answer all the questions the best that you can. Your grade for this assessment is based on the quality of your answers (explanations and thinking) not correctness.	
1. Explain the difference between the concepts of speed and velocity. Give an example of a situation in which you would use each one.	
2. Explain what is meant by saying that a car is accelerating. What is meant by saying that a car is decelerating?	
3. Explain if the following statement is true or false, "if the velocity of an object is zero, its acceleration must be zero"	
4. Explain if the following statement is true or false, "heavier objects fall faster than lighter objects"	

Post-Assessment (continuation)

5. An object moves with constant velocity of 10 m/s for 20 seconds, it then accelerates at a rate of $2 m/s^2$ for 10 seconds and then moves with constant velocity of 50 m/s for 20 seconds. Sketch a graph for the motion of this object.

Tuesday's June 22
Materials Section

Activating Strategy: Pathway of Energy and Matter
Preassessment

	Fruit	Vegetable	Meat
What kind of matter is this? Does it contain carbohydrates, protein, lipids (fat/oil) and/or nucleic acid?			
Does this food provide energy?			
Where is the energy in this food?			
What happens to the food (matter) when it is eaten?			
What happens to the energy that we get from the food?			

Flow of Energy Video	
What do plants do with the energy they receive from the Sun?	
What organisms are producers?	
What organisms are consumers?	
What organisms are primary consumers?	
What organisms are secondary consumers?	
How much energy is passed from one level to the next?	
What is the role of decomposers and scavengers?	

Recycling of Matter Video	
Where does the carbon cycle start?	
What is the role of plants in the cycling of matter?	
How is carbon transferred from plants to other organisms?	
How is carbon released back into the atmosphere?	

Energy Pyramid Manipulative

Instructions

Step 1: Empty the baggie onto a desk and organize the pictures into an energy pyramid using the pieces provided.

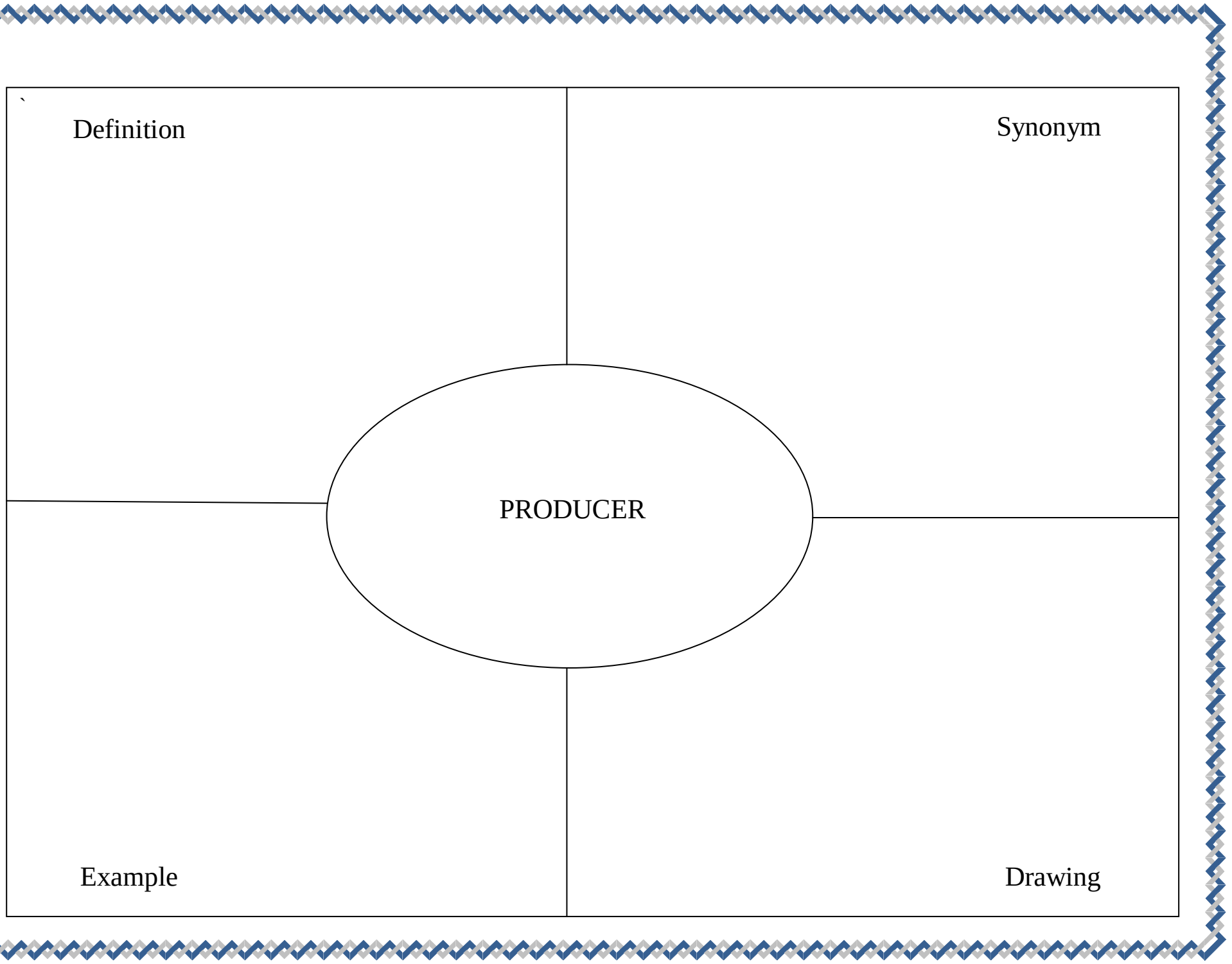
Step 2: Place the name of the producers, primary consumers, secondary consumers, tertiary consumers, and quaternary consumers next to the appropriate part of the pyramid. You may also label autotrophs, carnivores, and herbivores.

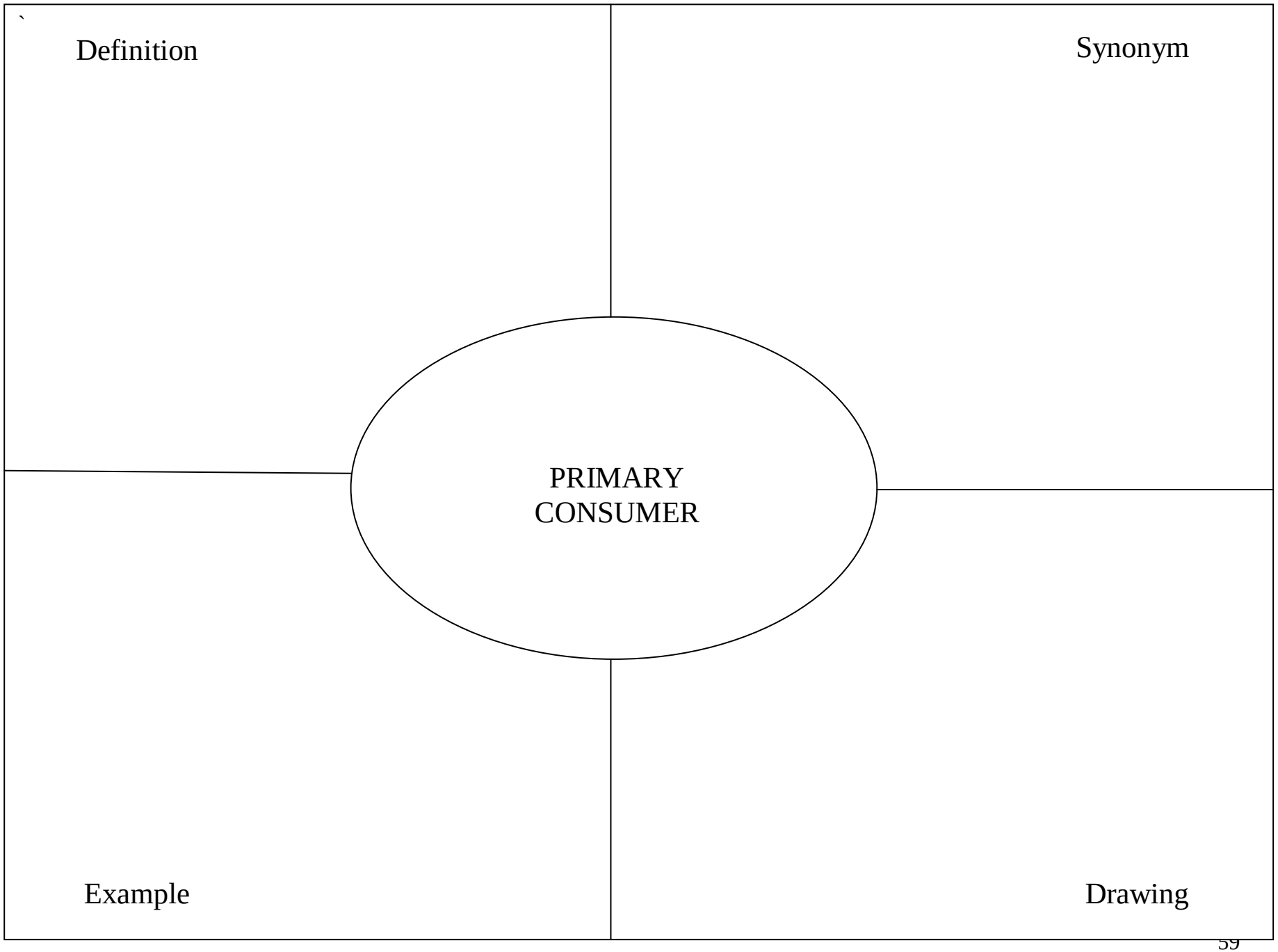
Step 3: Add up all the kCalories available from the producers. Add up all the kCalories available for each trophic level of the other organisms.

Step 4: Determine what percentage is lost as energy moves up the trophic levels. What percentage of energy is actually available from the lower trophic levels to the one immediately above it? What happens to the rest of the energy?

Matter Cycle Jigsaw

Name of cycle	Elements and Compounds involved	What changes do these elements and compounds undergo?	Where do we see these cycles occurring?	Why is this cycle important?


`
Definition
Synonym
PRODUCER
Example
Drawing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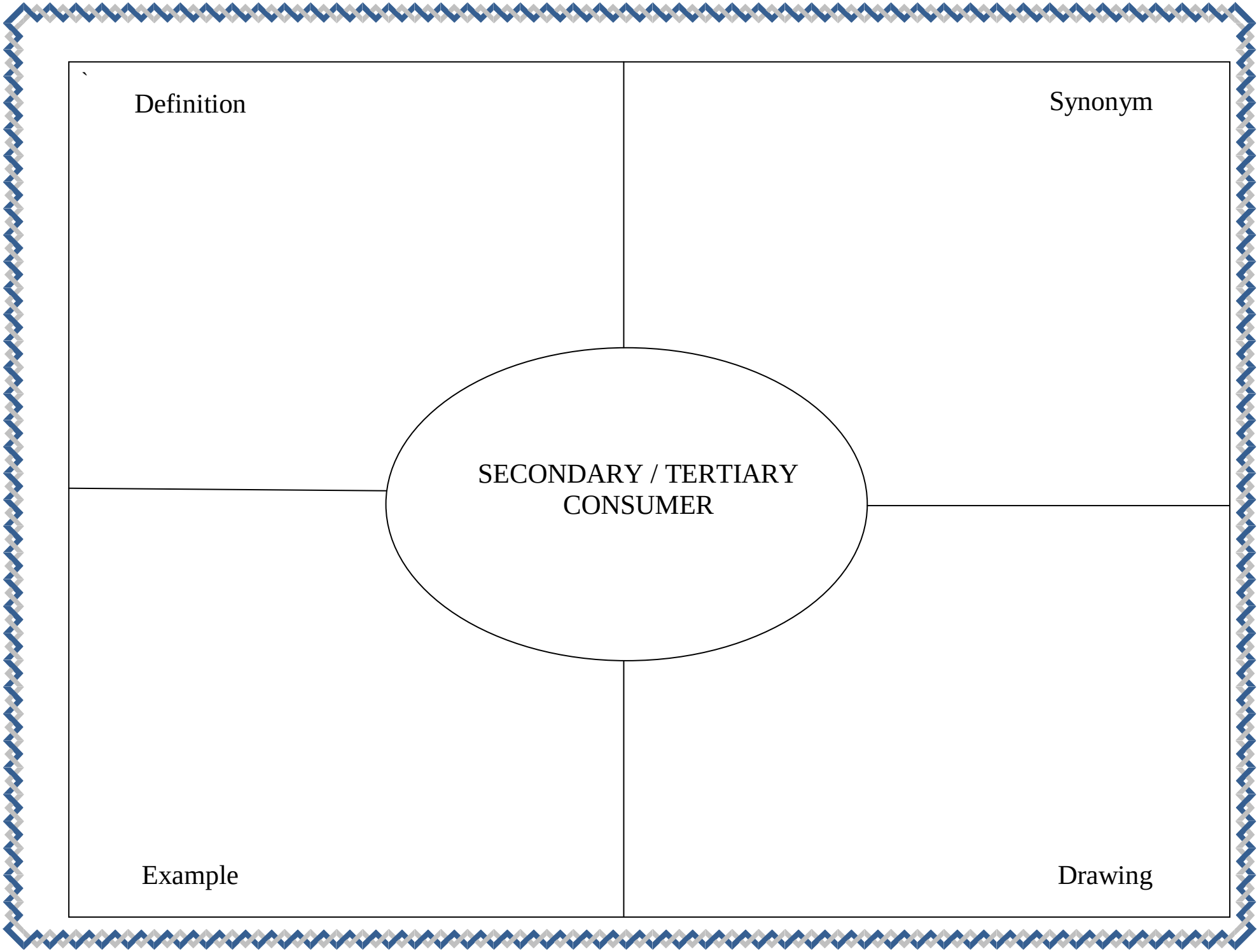
Definition
Synonym
PRIMARY
CONSUMER
Example
Drawing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Definition
Synonym
SECONDARY / TERTIARY CONSUMER
Example
Drawing

Warm-Up Questions
Why can you move a boulder of Styrofoam with your finger but cannot move a rock the same size with your finger?
What keeps a satellite in orbit around the earth?
Explain how a small child on one end of a seesaw can move an adult on the other end?

Inertia, force and mass Demonstrations	
Case 1	
What did I observe?	**What is a possible explanation?**
Case 2	
What did I observe?	**What is a possible explanation?**

Newton's Three Laws of Motion Video	
What causes any type of motion?	
What does the first law of motion state?	
What is inertia?	
Give two examples of inertia	
How are inertia and mass related?	
What does the second law of motion state?	

Newton's Three Laws of Motion Video	
How are acceleration and the magnitude of a force related?	
What does F = ma means?	
What does the third law of motion state?	

Lever Lab

Objective:
Study the mechanical advantage and work done by simple machines.

Materials:
Ring stand and clamp 30 cm ruler with hole drilled (or paint sticks)
100 g mass Spring scale
Meter stick Rubber bands (2) or string

Procedure
1. Construct a second class lever using the ring stand, clamp, and drilled 30 cm ruler (see Figure 1 below).
2. Measure the resistance force of the 100g mass (remember to convert into Newtons) and record on the data table 1.
3. Use the rubber bands to attach the 100 g mass at the 10cm mark on the meter stick and the spring scale at the 30cm mark.
4. Measure the resistance arm (RA) distance (in meters) and record on the data table.
5. Measure the effort arm (EA) distance and record on the data table 1.
6. Pull up on the spring scale to lift the mass 10cm (0.10 meter) above the table. The 10cm would be the resistance distance. Record it on the data table 1.

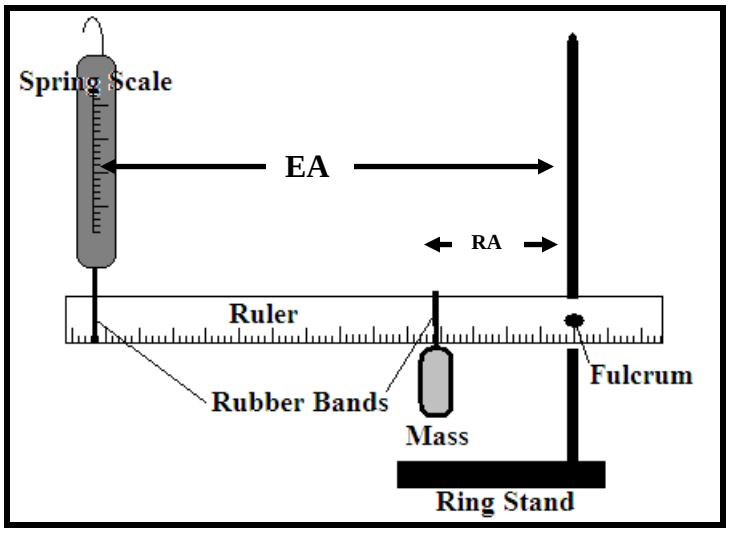


Figure 1

7. Use the spring scale to measure the force needed to lift the mass. This is the effort force (remember to convert into Newtons). Record this measurement on the data table 1.
8. Measure the force (N) required to lift the Effort Arm about 10 cm. Record in table one.

9. Using these measurements calculate for this second class lever the following quantities and record on the data table 2.

a. Ideal mechanical advantage
b. Real mechanical advantage
c. Work input
d. Work output

10. Repeat the above procedure by placing the 10g mass at the 20cm mark this time. Use tables 3 and 4 to record your results and calculations.

Data and Calculations

Weight of mass in Newtons (the resistance force)	
Effort Force in Newtons	
Resistance arm in meters	
Effort distance in meters	

Table 1

Ideal Mechanical Advantage (MA)	**MA = EA / RA**	
Real Mechanical Advantage (MA)	**MA = Fr / Fe**	
Input Work (W_I)	**$W_I = F_e \times d_E$**	
Output Work (W_O)	**$W_O = F_r \times d_R$**	

Table 2

Weight of mass in Newtons (the resistance force)	
Effort Force in Newtons	
Resistance arm in meters	
Effort distance in meters	

Table 3

Ideal Mechanical Advantage (MA)	**MA = EA / RA**	
Real Mechanical Advantage (MA)	**MA = Fr / Fe**	
Input Work (W_I)	**$W_I = F_e \times d_E$**	
Output Work (W_O)	**$W_O = F_r \times d_R$**	

Table 4

Analysis: *Compare the results from the experiments above to answer the following questions.*

1. What was the difference in the mechanical advantage between lifting the load on the levers at the 10 cm mark and the 20 cm mark?
2. Does higher mechanical advantage mean less force is needed to move a load?
3. How much work was needed to move the load in both parts of the experiment? Explain these results.
4. Write a paragraph describing what you have learned about mechanical advantage and the work done by simple machines.

Wednesday's June 23
Materials Section

Exploring What I Know

Instructions:
With your partner, answer the following question as best you can.

You are a member of the coaching staff for the next Olympic track and field team. The chef at your Olympic training facility is asking you for a recommendation for a meal before a competition. Which type of food will you recommend to feed to the athletes so that they will have the energy they will need to run in the events? Why?

Diffusion across a Semi-permeable Membrane
Laboratory

Background information
The cell membrane, in addition to providing protection and support for the cell, also regulates what comes into the cell and what leaves the cell. This movement of material through the cell membrane in either direction is very important. In the cells' normal activities, nutrients are going to need to be supplied, waste materials are going to need to be eliminated and the cell membrane is central to those processes.

Small molecules can move through the cell membrane with little difficulty, passing between the lipid bilayer-construction of the membrane. Larger molecules however need help getting through which comes from proteins embedded in the bilayer membrane.

One of the ways that material can move through a cell membrane is **diffusion.** This is especially true of smaller molecules or dissolved ions which are able to pass between the bilayer-construction of the cell membrane. In diffusion, particles move through the membrane according to concentration; they move from areas of higher concentration to areas of lower concentration. For example, as nutrients are used in the cell, the concentration of nutrients becomes lower in the cell than outside the cell; therefore nutrients move into the cell by diffusion. Wastes, on the other hand, will accumulate inside the cell and be at a higher concentration than outside the cell. Wastes will then move out of the cell. Some particles are too large to pass between the molecules making up the membrane.

In this activity, we will use a sandwich bag to model a cell membrane and we will observe the movement of some materials through the bag. We will use glucose or dextrose as a monosaccharide (small enough to move through the membrane) and cornstarch, a polysaccharide (too large to pass through the membrane). The indicators that we will use will be glucose test strips to detect the presence of glucose and iodine to detect for the presence of the starch. Your teacher will demonstrate what the iodine test looks like when placed in a starch solution and what the glucose test strip will look like when placed in a sugar solution.

Materials:

For each group you will need:
1-250 ml beaker
1-sandwich bag
1-rubber band
Cornstarch

Dextrose or glucose
Water
Iodine solution
Glucose test strips
Scoop or spatula

Procedure: (Part 1)
This part of the procedure should be done on the previous afternoon or first thing in the morning of the day on which the activity will be conducted.

1. Place about 100 ml of water, a scoop of cornstarch in the bag and mix thoroughly. Since we know that starch is present in the baggie, record starch present in the 'before' column of the data table.
2. Place about 150 ml of water in the beaker along with 2 scoops of glucose or dextrose and dissolve. In the 'before' column of the data table, record that sugar is present.
3. To the contents of the beaker, now add a couple of drops of the iodine indicator. Describe the color of the solution in the beaker after adding the iodine. Is it showing the same color that you saw when the demonstration was done with iodine and starch? Is starch present in the beaker? Record in the 'before' column of the data table.
4. Seal up the baggie by twisting/folding/rubber band and submerge it in the beaker, taking care not to allow the contents to overflow.
5. Label and place the beaker aside for use later.

Procedure: (Part 2)
This part of the procedure should be done app. 3 hours after Part 1 is set up to allow for the movement of any material across the bag membranes.

1. Remove the baggie carefully from the beaker and place on some paper towels. Notice any changes in color that occurred compared to the original colors when you set up the activity.
2. Based on the positive starch test, did any starch move out of the bag? Record on the data table in the 'after' column.
3. Based on the positive starch test, what must have moved through the membrane to the inside of the bag to account for the color?
4. Using the glucose test strips, test the contents of the bag. Is glucose present in the bag? Record on the data table in the 'after' column.

Data table

	Before submerging		After submerging	
	Initial color	Substance(s) present	Final color	Substance(s) present
Solution in baggie				
Solution in beaker				

Analysis:
Based on your observations and data answer the following questions:

1. Based on your observations, what substance(s) moved, the iodine, starch, and/or glucose?
2. How did you determine this?
3. The plastic baggie was permeable to which substance?
4. Is the plastic baggie selectively permeable? Explain.
5. Sketch the cup and baggie in the space below. Use arrows to illustrate how diffusion occurred in this lab.

Diffusion and Osmosis Guiding Questions
Instructions: Your research on diffusion or osmosis must answer the following questions
What is osmosis?
What is diffusion?
What is the difference between diffusion and osmosis?
What is passive transport?
What is active transport?
What is the role of mitochondria in the active transport process?

Macromolecules Information: Carbohydrates	
Instructions: Complete the following information sheet for the molecule assigned to your group. Work with your teammates to get the best answer to each question.	
What elements make carbohydrates?	
What is the more important sugar for life? What is its chemical composition?	
What are polymers? What is an example of a polymer found in plants?	
What is the main function of polymers?	

Macromolecules Information: Lipids	
Instructions: Complete the following information sheet for the molecule assigned to your group. Work with your teammates to get the best answer to each question.	
What elements make lipids?	
What is the main function of lipids in living organisms?	
Where are lipids stored?	

Lipids

Lipids are present in all living cells, but the proportion varies from tissue to tissue. They are organic compounds, insoluble in water, but that dissolve readily in other lipids and in organic solvents such as alcohol, chloroform, and ether. Lipids contain carbon, hydrogen, oxygen, and sometimes phosphorus. They are classified according to their solubility and include neutral fats (triglycerides), phospholipids, and steroids.

The triglycerides accumulate in certain areas, such as adipose tissue in humans and in the seeds of plants, where they represent a form of energy storage. The more complex lipids occur closely linked with protein in the membranes of cells and of subcellular particles. More active tissues generally have higher complex lipid content; for example, the brain, liver, kidney, lung, and blood contain the highest concentration of phosphatides in the mammal.

In living organisms lipids serve as the basis of cell membranes and as a form of fuel storage. Often lipids are found conjugated with proteins or carbohydrates, and the resulting substances are known as lipoproteins and lipopolysaccharides. The fat-soluble vitamins can be classified as lipids.

Lipids (fats and oils) have borne the brunt of the blame for the degenerative diseases (heart disease and cancer) that are the major causes of death in the developed world. The negative view of lipids has obscured their essentiality for human health. If a problem exists, it is one of quantity, in general, and specific lipids in particular.

Lipids are important for maintenance of human health and well-being in a number of ways. Probably the most important function of lipids is provision of an efficient energy source. Fat provides 9 calories of energy per gram or 2.25 times as much as either carbohydrate or protein. Carbohydrate is not stored in the body and protein stores are predominantly muscle, whose breakdown entails serious health consequences. Fat is stored as such and can be easily mobilized if needed.

Macromolecules Video Information: Proteins	
Instructions: Complete the following information sheet for the molecule assigned to your group. Work with your teammates to get the best answer to each question.	
What elements make proteins?	
What determines how a protein functions?	
What are some examples of proteins in the human body? What is their function?	
What are enzymes?	

Macromolecules Video Information: Nucleic Acids	
Instructions: Complete the following information sheet for the molecule assigned to your group. Work with your teammates to get the best answer to each question.	
What elements make nucleic acids?	
What is the function of the nucleic acids?	
What are the two classes of nucleic acids? What is their importance for living organisms?	

Nucleic Acids

Nucleic acids are extremely complex molecules that are found in living cells and viruses and constitute the fundamental substances of living things. Their name comes from their initial isolation from the nuclei of living cells, but they also occur elsewhere in cells. Their functions include the transmission of hereditary characteristics from one generation to the next and the triggering and controlling of the manufacture of specific proteins.

The two classes of nucleic acids occurring naturally are DNA, or deoxyribonucleic acid, and RNA, or ribonucleic acid. The backbones of DNA and RNA molecules are generally shaped like helical strands. A typical strand consists of a chain with a great number of links. Each of the links of the chain includes a phosphate group and a particular type of sugar: deoxyribose for DNA and ribose for RNA--a deoxyribose molecule has one less oxygen atom than does ribose. Also, to each of the sugar subunits in the backbone there is connected a smaller molecule, or "side group," which belongs to the class of chemical compounds known as bases. These side-group bases contain nitrogen and, for each type of nucleic acid, only four specific bases are allowed. The combination of the three subunits--sugar, base, and phosphate--is called a "nucleotide."

The sequence of these bases on the strand determines the code of the particular nucleic acid. This code, in turn, signals the cell how to produce a duplicate of itself or the proteins it requires for survival. In all living cells and most viruses, DNA carries the genetic code; in some viruses, known as RNA viruses, or riboviruses, RNA serves as the genetic material. RNA, for its part, plays an important role in the transfer, expression, and replication of the genetic information carried by DNA.

Anticipation Guide: Waves

Instructions:

In the column labeled "Before the Lesson", place a check next to any statement with which you agree. After the classroom discussion, compare your opinions with those presented during the lesson.

Before the lesson	After the lesson	Statements
		1. All waves travel at the same speed.
		2. Sound waves travel better in air than in water.
		3. Waves transport energy not matter.
		4. Only mechanical waves must travel through a medium.
		5. An electromagnetic wave in vacuum travels at the speed of light.
		6. Light is one form of an electromagnetic wave.
		7. Frequency and wavelength are the same.
		8. The energy of an electromagnetic wave is associated with its wavelength.
		9. Long wavelength electromagnetic waves (red light) have more energy than short wavelength electromagnetic waves (blue light).
		10. Radio waves are electromagnetic waves.

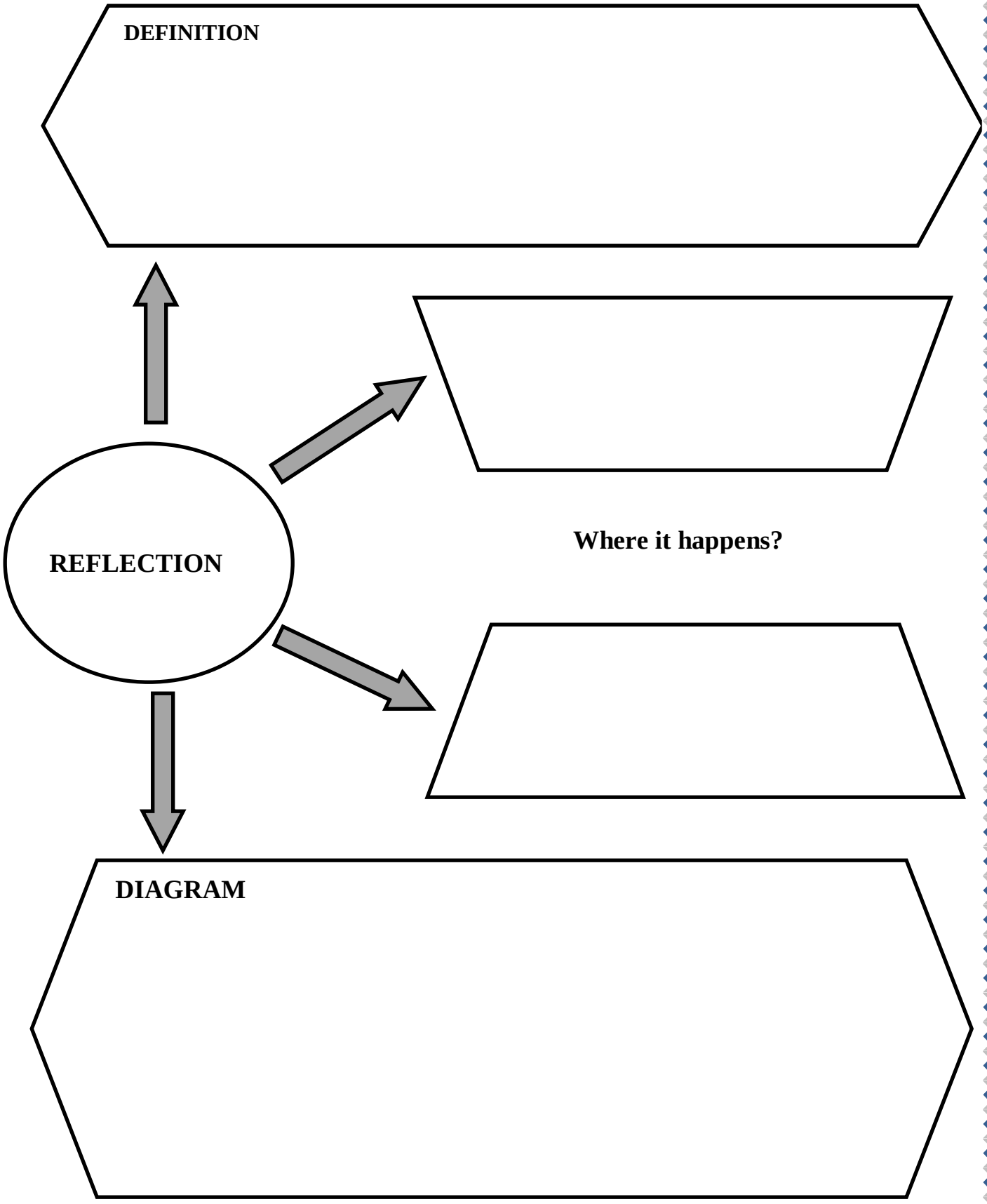
Mechanical and Electromagnetic Waves Videos	
Provide three examples of forms in which energy is transported by waves.	
What are the two basic types of waves?	
How is energy transported on a transverse wave? Sketch this phenomenon.	
How is energy transported on a longitudinal wave? Sketch this phenomenon.	

Mechanical and Electromagnetic Waves Videos	
What is frequency?	
What is the Amplitude of a wave?	
What limits the velocity of a wave?	
How are all waves similar?	
What causes sound? How is sound transmitted?	
What is another term for sound wave? Why is this?	

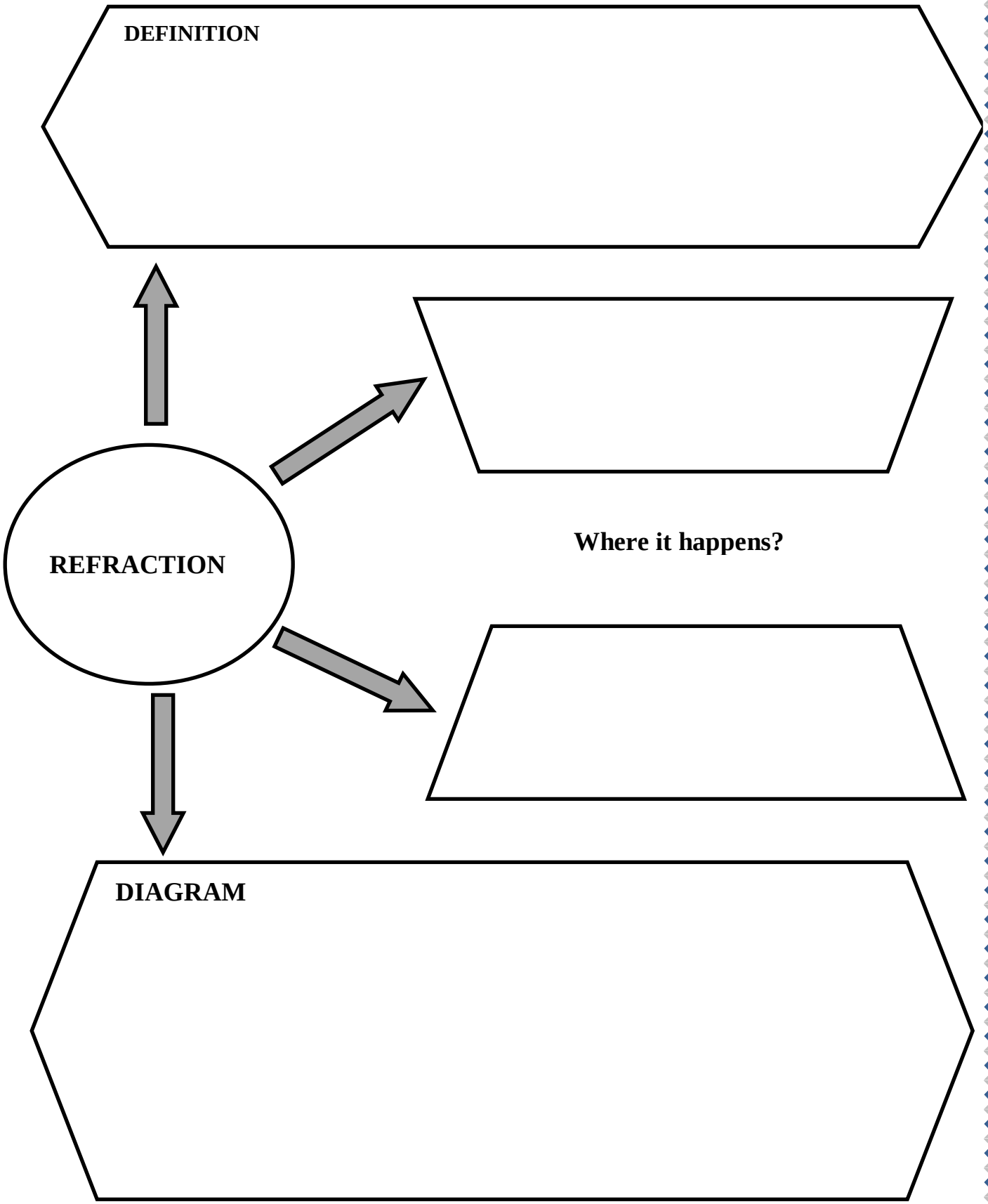
Mechanical and Electromagnetic Waves Videos	
What is necessary for sound waves to propagate? Why?	
What is the relation between pitch and frequency?	
What is the cause of the electromagnetic waves? What type of waves does it generate?	
Through what materials can the different electromagnetic waves travel?	
What is the velocity at which all electromagnetic waves travel?	

Electromagnetic Spectrum Video	
What characteristic of electromagnetic waves differentiate the various parts of the spectrum?	
What electromagnetic waves have the longer wavelength?	
What are two uses for microwaves?	
How does a microwave oven heat food?	
What are two types of radiation that we cannot see that are given off by the sun?	
Why is it not a good idea to sit out in the sun without a strong sun block?	

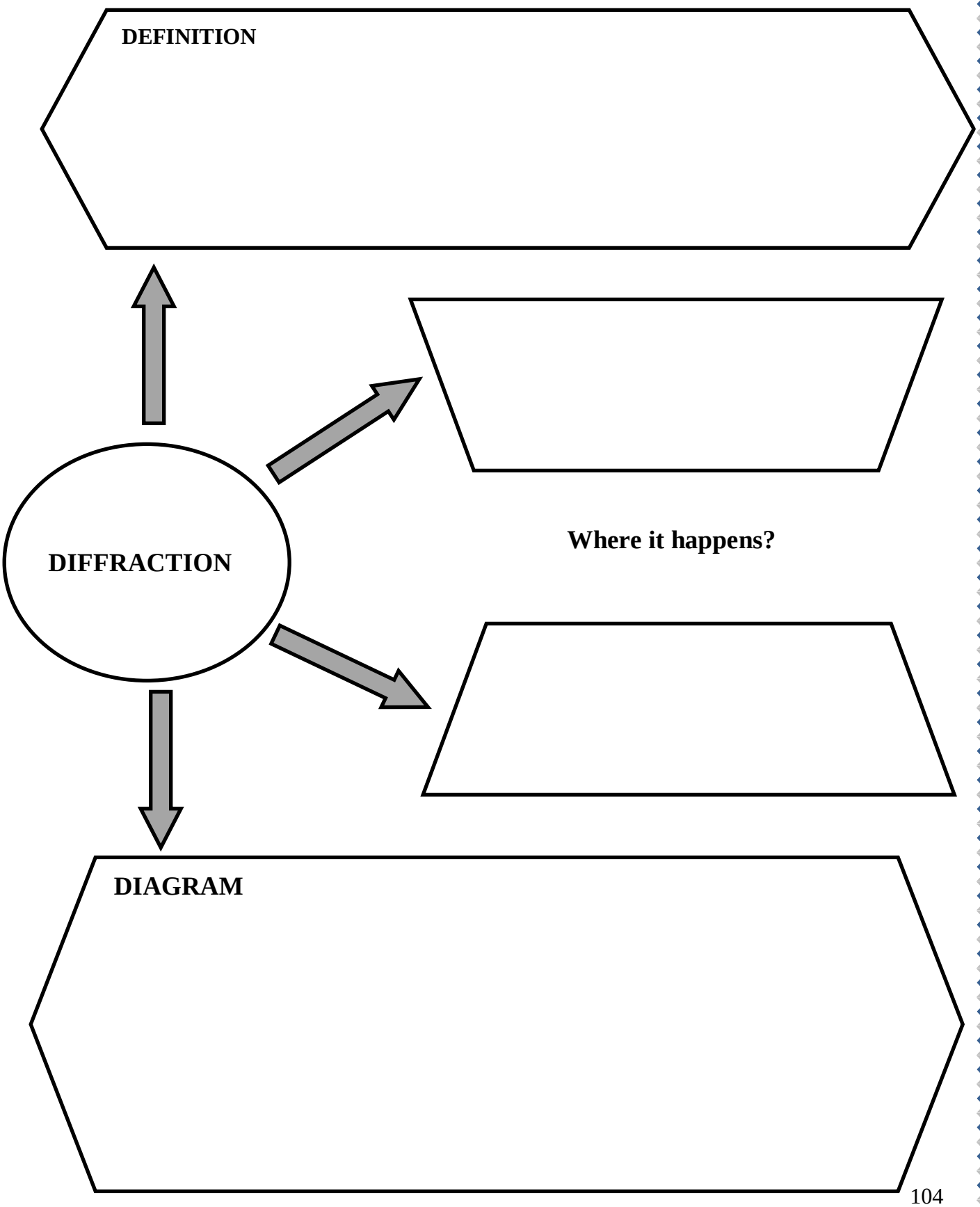
Concept Map: Wave Phenomena



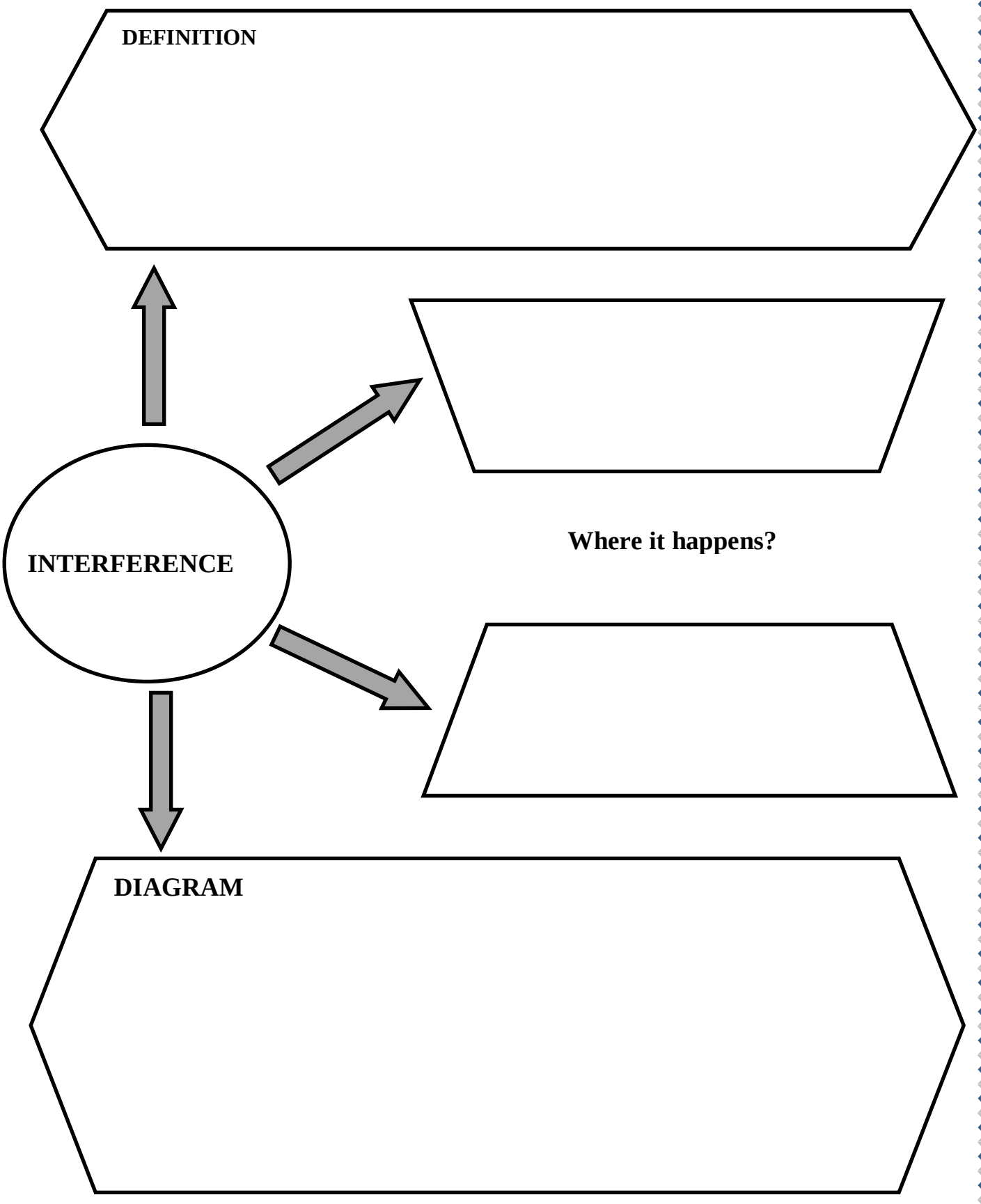
Concept Map: Wave Phenomena



Concept Map: Wave Phenomena



Concept Map: Wave Phenomena

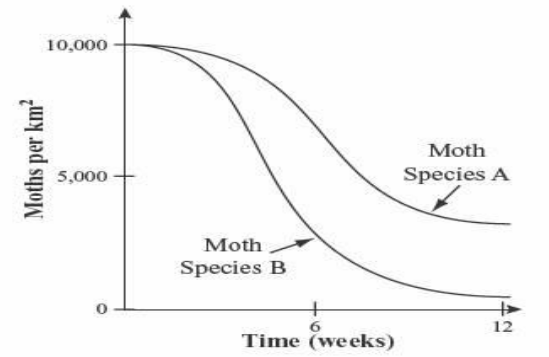


Thursday's June 24
Materials Section

Guiding Questions
The role of organisms within food chains and webs

What is an example of ecological succession?

The praying mantis is a predatory insect that often eats moths. The graph below shows the relative numbers of two species of moths over 12 weeks after the introduction of the predatory praying mantis.



What characteristic of this ecosystem is **best** indicated from this graph?

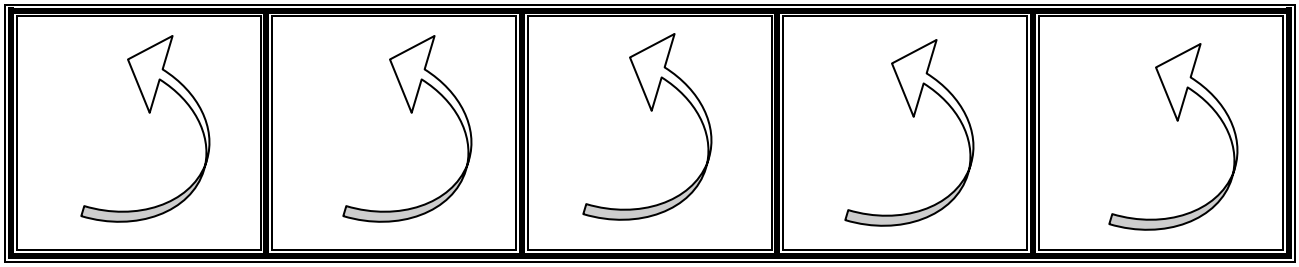
Organisms in their Environment Video Notes	
What are ecosystems?	
What factors help define the characteristics of a particular ecosystem?	
What is a population?	
What is a niche?	
What are species?	
What is a habitat?	
What are food chains?	
What are food webs?	

Organisms in their Environment Video Notes	
What are food producers?	
What are the first order consumers?	
What are the second order consumers?	
What are decomposers?	
What is a pyramid of energy?	
How much energy passes from one level to the next?	

Food Chain Activity

Instructions:

1. Place the organisms in the correct order of the terrestrial food chain.
2. Lay the proper term beside each organism that defines its role in the food chain.
3. Use the arrows and "gives energy to" signs to indicate the direction of energy flow.
4. Use your threat scenario cards in the lower half of you whiteboard poster. Explain what you think would happen to the food chain after the event on the threat card occurs at the bottom of your white board using the dry erase marker.



Gives energy to	Terrestrial Food Chain			
Gives energy to	Gives energy to	Gives energy to	Gives energy to	Energy Source

Food Chain Manipulatives
(Continuation)

	 1000kCal	 2 kCal
 200 kCal	 50 kCal	 10 kCal

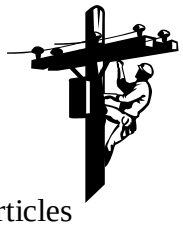
Card for students who are not familiar with ecosystems in Georgia or who show confusion as they attempt this activity:

In a sunny field containing a small pond in Georgia, organisms cycle nutrients and pass energy in one direction through a food chain. In this ecosystem, grasshoppers love to eat the leafy plants surrounding the pond but must watch out for hungry frogs. The frogs are the favorite food of the snakes which are careful to hide their movements from the hawks that use them as a primary food source.

Food Web Manipulatives

Directions:

1. All of these organisms make up the community of a portion of Georgia's Okefenokee swamp. Use the organisms in your baggie to construct a possible food web for the Okefenokee. Use a dry erase marker to show the movement of matter and energy from one organism to another.
2. Create a question to ask other student groups about your food web. Write that question at the end of your white board. You pose a question about a possible disruption threat or about the relationships between organisms, populations, communities, ecosystems, and biomes you have reviewed earlier in the week. Be creative!!!
3. Once you have completed your web and written the question you are asking about your web and the bottom of your whiteboard, circulate with the other members of your group and respond to the questions created by other groups using the dry erase markers. Make sure to include the names of your group members with the responses you make to the other groups' food webs.



Electricity and Magnetism Assessment Probe

One of the four fundamental forces, electromagnetic force, operates between charged particles (like protons and electrons) and electromagnetic fields that they create. Like charges repel and unlike charges attract. This basic law of nature results in many phenomena known as "electricity", "magnetism" and "electromagnetism". Listed below are some terms. Check all the ones you think are associated with electricity and magnetism. On right column of the table write a brief explanation outlining how each of the words you checked is associated with things that surround you.

	Current	
	Direct Current	
	Generator	
	Electromagnet	
	Motor	
	Resistance	
	Battery	
	Series circuit	
	Conductor	
	Voltage	

Series and Parallel Circuit Activity

Materials

1 AA battery
5 Christmas tree lights
Wires from the lights cut in different lengths

Directions

1. Construct a series circuit by using three or more tree lights (see figure 1 below).

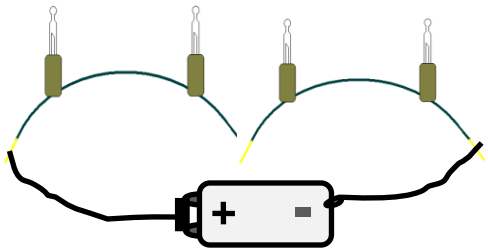


Figure 1

2. Complete the table below with your observations.

OBSERVATIONS	
1	
2	
3	
4	
5	

3. Modify your circuit if necessary to find out the answers to the questions on Table 2.

Inquiry Questions	
Are all the tree lights equally bright?	
What happens when one tree light is removed from the circuit and the remaining stay connected?	
	Why?
What happens if one of the lights burns out?	
	Why?

4. Construct a series circuit by using three or more tree lights (see figure 2 below).

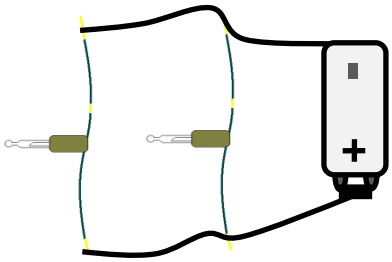


Figure 2

5. Complete the table below with your observations.

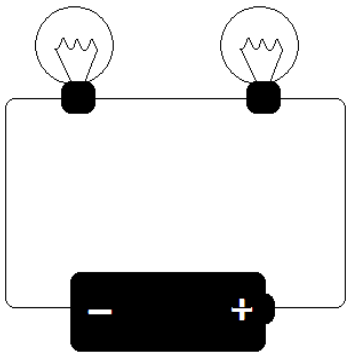
OBSERVATIONS	
1	
2	
3	
4	
5	

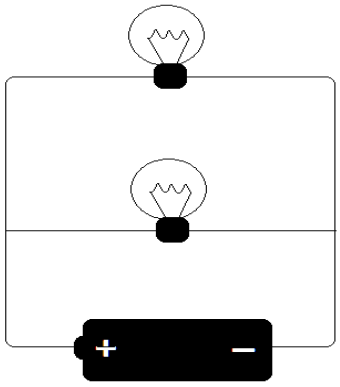
6. Modify your circuit if necessary to find out the answers to the questions on Table 2.

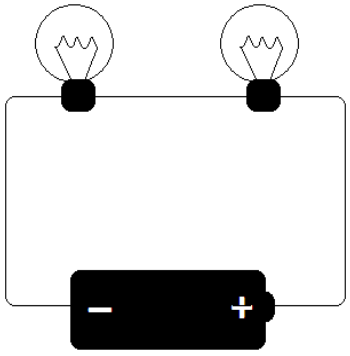
Inquiry Questions	
Are all the tree lights equally bright?	
What happens when one tree light is removed from the circuit and the remaining stay connected?	
	Why?
What happens if one of the lights burns out?	
	Why?

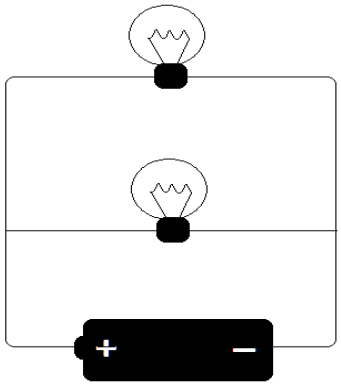
QUESTIONS:

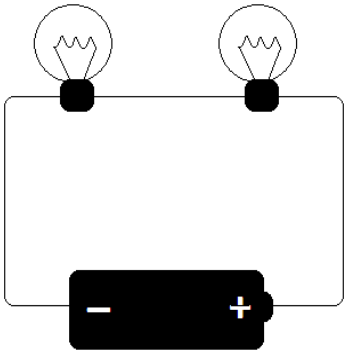
Look at the diagrams of the circuits below. Label each circuit as a series circuit or a parallel circuit. Draw some switches at various places in the circuit and describe what will happen to the flow of current if the switch is opened.

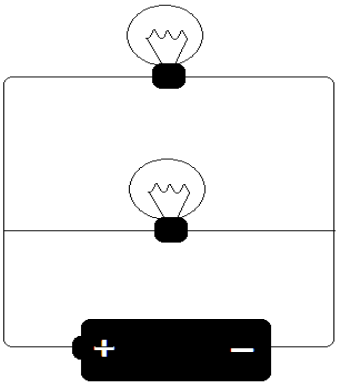












Video Handout Electricity and Magnetism: The Magic of Magnets	
1. How did Oersted discover that electricity and magnetism are related?	
2. What materials does one need in order to make an electromagnet?	
3. Why is an electromagnet considered a “temporary” magnet?	
4. What are some uses for electromagnets?	
5. What are some variables that you could test to determine their effects on the strength of an electromagnet?	