Home Science Experiments and Observations

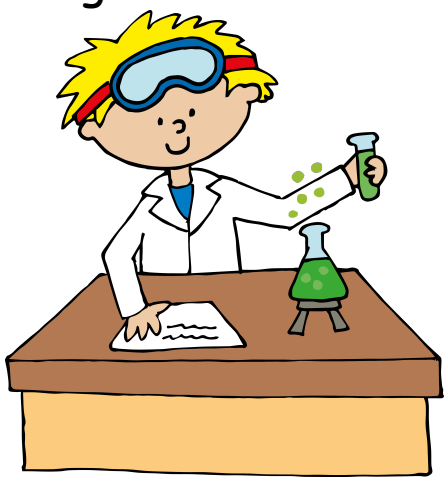
- With adult supervision, complete the following science activities.

- You are required to take notes and drawing conclusions. Most of the activities have question pages that follow the activity so look for the questions that follow.

- Please take the time to complete the questions. Without drawing formal conclusions, these become just a fun activity and you miss out on a valuable learning experience.

- Take a picture (or scan) your work, email them to me and you will get credit. Your sentence structure and complete thoughts will go toward improving writing grades.

- The activities have been sequenced to match what we learned in the classroom and as such they become more complex as you go and your learning builds.



Heart Rate and Air Exchange

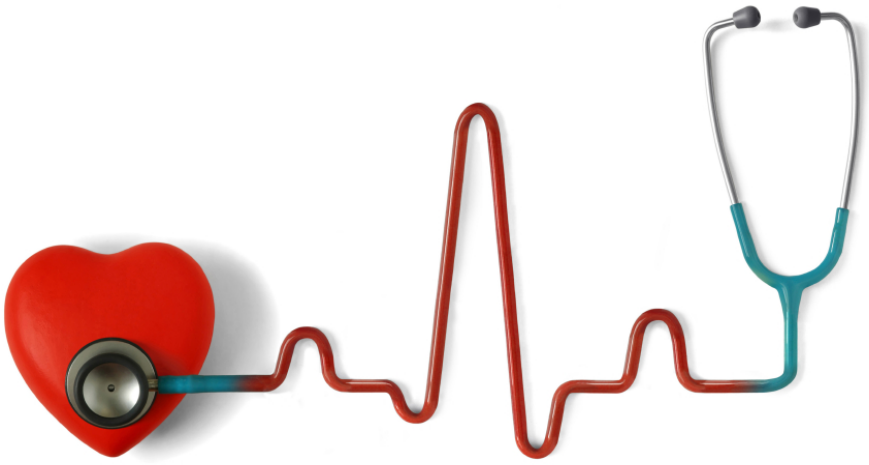
Directions:

1. Let's get up and move!

2. There are four pages in this unit.

3. The first one we did at school. Go ahead and do it again, it will count for a P.E. activity.

4. In the last activity, you might try Play-Doh in place of clay.



Name _____ Date _____

A.3.1
Directed Inquiry
Recording Sheet

How You Rate

Procedure

1. **Collaborate** Work in a group. Have one group member be the timekeeper.

2. **Measure** Have a group member take your pulse while you sit at rest. The group member will count beats for 15 seconds. You count the number of breaths you take during the same time.

3. **Record Data** Record your pulse and breathing rate below. Repeat steps 2 and 3 for each group member.

	Pulse		Breathing	
	Beats in 15 s	**Beats in 1 min**	**Beats in 15 s**	**Beats in 1 min**
At Rest				
After Exercise				

4. **Measure** Jump in place for 1 minute. Immediately have a group member take your pulse for 15 seconds. During the same time count your breaths. Record your new pulse and breathing rate. Repeat this step for each group member.

5. **Use Numbers** Find your pulse and breathing rate for 1 minute. Use this formula:

Number in 15 seconds	x 4 =	Number in 1 minute

Record the data in your chart.

Use with page 71

Name _____ Date _____

A.3.1
Directed Inquiry
Recording Sheet

Conclusion

1. **Analyze Data** How did your pulse and breathing rates change with exercise?

_____

_____

2. **Infer** Why do breathing and pulse rates increase with exercise?

_____

_____

_____

_____

_____

3. **Infer** Athletes often have much lower pulse rates and breathing rates after exercise compared with most people. Why do you think this is true?

_____

_____

_____

Ask Questions

Guided Inquiry

What other factors do you think affect pulse rate? Plan an **experiment** to test your ideas. Conduct the experiment with your teacher's permission.

Name _____ Date _____

Using Inquiry Skills

15. Compare How does your pulse rate differ when you are resting and when you are exercising? Explain what causes this difference.

_____

_____

_____

_____

Use the information in the table below to answer question 16.

	grams of fat	grams of protein	grams of carbohydrates	milligrams of cholesterol	grams of saturated fat
spaghetti	1	7	39	0	0.1
steak	15	23	0	77	6.4
brown rice	1	5	50	0	0.4
pecan pie	32	7	71	569	4.7
chocolate shake	9	9	60	30	4.8
tofu	5	9	3	0	0.7
celery	0	1	4	0	0
carrot	0	1	7	0	0

16. Analyze Data Would a marathon runner be wiser to eat steak or spaghetti before a long race? Explain your choice.

_____

_____

_____

Pulse Counter

What can your pulse rate tell you about yourself? If your pulse rate is slow, you are probably sitting. If it is fast, you probably just finished exercising. Besides exercising, what else can change your pulse rate? What can cause a family member's pulse rate to be different from yours? Do this activity with a family member and find out.

Materials

- small piece of clay
- toothpick
- clock or watch with a second hand

Procedure

Ask an adult to help you make a pulse counter. Roll clay into a ball. Flatten the ball and carefully stick a toothpick upright in the center of the clay. Balance the counter on your wrist behind your thumb as shown. Observe the toothpick move each time your pulse beats. Count the number of beats in a minute. Have a family member keep track of the time for you. Ask a friend or family member who is around your age, but a different gender, to take his or her pulse rate. Ask an adult family member to do the same thing. Try taking your pulse rate in the morning and in the afternoon. Record all your data.

Results

Does gender affect pulse rate? Does age affect pulse rate? Does the time of day affect pulse rate? What do you think can make pulse rate go up quickly?

Diffusion and Capillary Action

Directions:

1. There are six pages in this unit. To best benefit from the lesson you should complete all six pages.

2. You may not have all of the items in your home right now, so just do the activities that you are able to do.

3. Some of your conclusions and notes will have to be written on a separate sheet of paper. Anything you do should be emailed to me.

4. Please write neatly and thoughtfully so I am able to understand your thinking.

Name _____ Date _____

Do Diffusion!

When you smell dinner from across the room, it is because diffusion happened. Diffusion is the movement of particles from an area of higher concentration to an area of lower concentration. In this activity, you and a family member will see how diffusion happens.

Materials

- plastic container
- food coloring
- water
- clock or stopwatch
- notebook
- pencil

Procedure

Ask an adult to help you fill the plastic container with room-temperature water. Set the container of water on a flat, stable surface. Wait until the water stops moving. Be careful not to jiggle the container. Without touching the water or container, squeeze a drop of food coloring into the center of the water. In your notebook, draw a picture of what you see. Make note of the time. Observe what happens to the drop of food coloring for 5–10 minutes.

Results

What happened to the drop of food coloring as time passed? How long did it take for the water to become completely colored? Explain to your family member what happened.

Name _____ Date _____

Pulling Up Water

Plants use their roots to absorb water and minerals. They move water and materials up into their stems and leaves against the force of gravity. In this activity, you and your family members can observe the movement of water through a flower stem.

Materials

- white carnation
- large plastic cup
- water
- red food coloring
- stirring spoon
- stem cutter

Procedure

Add water to the cup so it is about three-fourths full. Add 4 to 5 drops of food coloring to the water and stir. Add more drops, if needed, to color the water brightly. Ask an adult family member to cut off about an inch of the carnation stem. Immediately place the stem into the water. Set the cup on a table. After an hour, observe the carnation.

Results

What did you observe? What did your observation tell you about how water moves in a stem?

Name _____ Date _____

A.2.2
Directed Inquiry
Recording Sheet

Moving Water in Celery

Procedure

1. **Collaborate** Work with a partner. Add water to the cup until it is about three-fourths full.

2. **Measure** Add 4 to 5 drops of food coloring to the water, then stir. Add additional drops if necessary to color the water brightly.

3. **Collaborate** Your teacher will give you a stalk of celery that has just had about 3 cm cut from its bottom. Immediately place the cut end of the celery in the cup of colored water.

4. **Predict** What do you think will happen to the celery? Record your prediction.

   _____

   _____

   _____

5. **Observe** After one hour, observe the celery. Have your teacher cut off about 3 cm from the bottom of your celery and then cut off a thin cross-section. Prepare a slide and observe the cross-section with a microscope. Draw your observations.

Name _____ Date _____

A.2.2
Directed Inquiry
Recording Sheet

Conclusion

1. **Infer** What did you observe in the cross-section of the celery? Infer the cause.

_____

_____

_____

2. **Predict** What do you think would happen to the celery if you left it in the colored water overnight?

_____

_____

3. **Hypothesize** What if the bottom of a celery stalk was split lengthwise, and only one half was placed in colored water? Form a hypothesis. Test it with your teacher's help.

_____

_____

_____

_____

Ask Questions

Guided Inquiry

Collect leaf samples from trees, grasses, and other plants. **Classify** the leaves according to the patterns of their veins. What questions do you have about these patterns?

_____

_____

_____

Name _____ Date _____

Using Inquiry Skills

15. Draw Conclusions Dylan stood two stalks of celery in two cups of blue water. He placed one cup in a sunny spot and one in a dark corner. The top of the stalk in the sun turned blue before the top of the other stalk. What conclusions can you draw from this result?

_____

_____

_____

_____

Use the table to answer questions 16 and 17.

Tree Rings

Year	Width of Ring (cm)
1982	1.42
1983	1.36
1984	2.19
1985	3.27
1986	3.02
1987	2.45
1988	2.31
1989	2.81
1990	2.67
1991	3.99
1992	3.75
1993	4.05
1994	3.51

16. Interpret Data In what year did the tree grow the least? In what year did it grow the most?

_____

17. Infer What might cause the differences in the widths of the tree rings?

_____

_____

Name _____ Date _____

A.2.1
Directed Inquiry
Recording Sheet

Keeping Green

Procedure

1. **Hypothesize** Work in a small group. Using what you already know about plants, form a hypothesis about the way leaves would change without sunlight.

   _____

   _____

2. **Experiment** Place your plant in a sunny window or other sheltered spot. Use the cloth squares to cover at least three leaves. Keep at least one leaf uncovered to serve as a control. Aside from the cloth covers, keep all conditions the same for the leaves.

3. **Predict** How do you think the different leaves will change over time? Record your prediction.

   _____

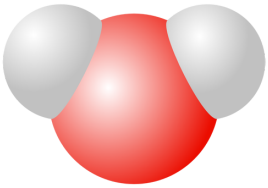
   _____

4. **Record Data** Check the plant every day and give it water if the soil is dry. Every two days, remove the cover from one or more leaves. Record your observations, then cover the leaves again.

Time	Uncovered Leaves	Covered Leaves
2 days		
4 days		
6 days		

5. **Analyze Data** Discuss the differences that you observed and recorded. Compare the effects of blocking sunlight for two days, four days, and six days.

Water and Weather



Directions:

1. There are eleven pages in this unit.

2. You may not have all of the items in your home right now, so just do the activities that you are able to do.

3. Some of your conclusions and notes will have to be written on a separate sheet of paper. Anything you do should be emailed to me.

4. Remember, write neatly and thoughtfully so I am able to understand your thinking.

Name _____ Date _____

A.3.3
Pressed for
Time Record

Is Water Important?

Materials

- paper towel
- funnel
- spoon
- sugar
- water
- plastic bowl

Procedure

1. Place a paper towel in a funnel. Put 4 spoonfuls of sugar on top of the paper towel. Hold the funnel over an empty bowl.

2. **Record Data** Slowly pour 10 mL of water into the funnel. Observe the amount of sugar remaining. Estimate how many spoonfuls remain.

_____

3. **Record Data** Add another 20 mL of water. Observe the amount of sugar remaining. Estimate how many spoonfuls remain.

_____

4. **Record Data** Repeat step 3.

Conclusion

1. **Analyze Data** How does the amount of water added affect the amount of sugar remaining in the funnel?

_____

_____

Name _____ Date _____

Experiment with Surface Tension

Materials

- water
- penny
- eyedropper

Procedure

1. **Predict** Predict how many drops of water you can put onto a penny before the water overflows.

_____

2. **Experiment** Test your prediction. Use an eyedropper to put drops of water onto a penny.

3. **Record Data** Record the number of drops you put onto the penny before the water overflowed.

_____

Conclusion

1. **Analyze Data** How did your prediction compare with the results of your experiment?

_____

_____

2. **Infer** What held the water on the penny?

_____

_____

3. **Draw Conclusions** Water has higher surface tension than rubbing alcohol. Could you place more drops of water or rubbing alcohol on a penny before the liquid overflowed?

Name _____ Date _____

Conserving at Home

The amount of fresh water on Earth is limited. Fresh water lasts longer when people recycle it and decrease how much they use. With a family member, make a list of ways that you and your family can conserve water.

Materials

- paper
- pencil

Use	How to Conserve

Procedure

Make a two-column chart on a sheet of paper. Label the columns "Use" and "How to Save." With a family member, list as many ways as you can think of that you and your family use water every day. Go from room to room in your home to help you think of different ways you use water, such as brushing your teeth in the bathroom and washing dishes in the kitchen. Also list ways that you and your family use water regularly, but not daily, such as washing a car or bathing a pet once a week. Then, for each water use you listed, write down a way that you can conserve water by recycling or using less of it during that activity. For example, if you listed "brushing teeth" as one use, you might note that you can conserve water by turning off the tap while you brush.

Results

How can you and your family help to conserve water by recycling or using less of it? Have a family discussion about conserving water in your home.

Name _____ Date _____

B.4.2
Pressed for
Time Record

Dig for Water

Materials

- small pan
- sand
- water
- small spoons

Procedure

1. Fill a pan with sand. Dig a small hole in the sand at one end of the pan. Fill the hole with water until it stays full.

2. Predict how far you will have to dig at the other end of the pan to reach water.

_____

_____

3. **Experiment** Use a small spoon to "dig for water" on the side of the pan without the hole.

4. **Record Data** Record what happened.

_____

_____

_____

Conclusion

1. **Predict** How did your prediction compare to what happened?

_____

_____

2. **Draw Conclusions** How did the water get from one end of the pan to the other end?

_____

_____

_____

Name _____ Date _____

B.5.2
Directed Inquiry
Recording Sheet

Water Cycle Model

Procedure

1. **Collaborate** Work with a partner.

2. **Measure** Use a metric ruler to measure 1 cm of water in a plastic container. Place the lid on the container.

3. **Experiment** Place four or five ice cubes in a plastic bag. Seal the bag and place it on the lid of the container.

4. **Use Models** Put the container near a lamp so that the lamp shines on one side of the container. **Safety:** Do not touch the light bulb. Do not look directly into the light.

5. **Observe** After 15 minutes, carefully observe the container. Look for any changes on the inside and outside of the container. Record your observations in your chart. Make observations every 15 minutes for 1 hour.

Time	Observations	
	Inside of Container	Outside of Container
Start		
15 minutes		
30 minutes		
45 minutes		
1 hour		

Name _____ Date _____

B.5.2
Directed Inquiry
Recording Sheet

Conclusion

1. **Infer** What changes occurred on the inside of the container? Infer what caused the changes.

_____

_____

_____

_____

_____

2. **Use Models** You made a model of Earth's water cycle using a lamp as a source of heat. What source of heat warms the water in lakes, rivers, and oceans on Earth?

_____

Experiment

Guided Inquiry

Repeat the experiment, adding food coloring to the water. **Compare** what you see with what you saw in the first experiment. Write a hypothesis to explain the difference.

_____

_____

_____

_____

_____

Use with page 153

Name _____ Date _____

B.5.3
Directed Inquiry
Recording Sheet

The Ocean and Weather

Procedure

1. **Collaborate** Work with a partner. Fill one plastic foam cup with water and fill the other cup with sand. Use the charts to record the temperatures.

Under a Lamp

Time	Sand	Water
5 min.		
10 min.		
15 min.		
20 min.		
25 min.		
30 min.		

In the Shade

Time	Sand	Water
5 min.		
10 min.		
15 min.		
20 min.		
25 min.		
30 min.		

2. **Experiment** Push one thermometer into the sand 2.5 cm (1 in.) deep. Place a second thermometer 2.5 cm into the water, using tape to attach it to the side of the cup. Record the temperature of the sand and water.

3. **Measure** Place each cup under a hot lamp or in direct sunlight. Measure and record the temperature of each sample every 5 minutes for 30 minutes.

4. **Measure** Move the two cups to a cool, shady place. Measure and record the temperature every 5 minutes for 30 minutes.

5. **Record Data** Make a line graph to show your data. Note when you moved the samples from a warm place to a cooler one.

Name _____ Date _____

B.5.3
Directed Inquiry
Recording Sheet

Conclusion

1. **Analyze Data** What does your data indicate about the heating and cooling of water and sand?

_____

_____

_____

2. **Infer** Based on your observations, how do you think the presence of a large body of water might affect the weather on land nearby?

_____

_____

_____

_____

Design an Experiment

Guided Inquiry

How might you test the inference you made in the Directed Inquiry? What further information is needed? Carry out your experiment. **Communicate** the results to the class.

_____

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_____

_____

Name _____ Date _____

Weather Tracking

Where does weather in your area come from? Weather is different from one day to the next. Storms can be tracked. In this activity, you and a family member can observe how weather is predicted by watching a television weather forecast.

Materials

- pen or pencil

Procedure

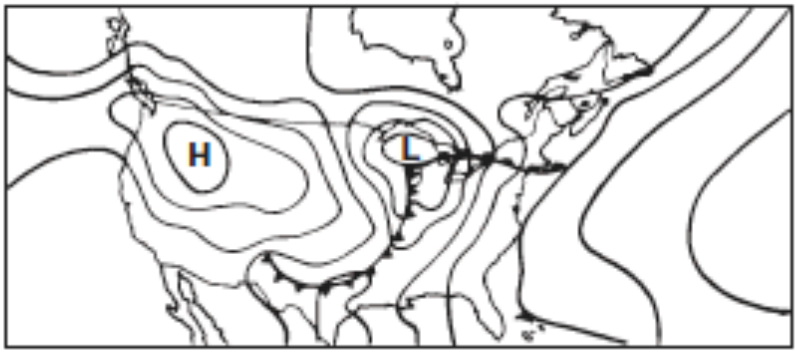
Watch a television weather forecast for your area. Notice where any storms are shown on maps or with radar. In which direction are the storms predicted to move? Notice if any fronts are shown on the weather map. In which direction are the fronts predicted to move? Record your weather forecast for tomorrow.

_____

_____

Results

Look at the weather map. Think about what you know about how fronts move and the kinds of weather they bring.



Based on the weather map, what do you think weather in your area will be like the next day? Explain to your family member why you think so.

_____

_____

Name _____ Date _____

Thinking Critically

18. Evaluate Your family lives in a California town at the base of the western edge of a coastal mountain range. Your best friend lives a few kilometers away on the other side of the mountain range. How do the climates of your two towns differ?

_____

_____

_____

_____

19. Synthesize Your class sets up a weather station in your school yard. After a few days, someone observes that the temperature readings at your station are quite a bit higher than those reported by the local weather station. What might cause this difference and what changes might you make to correct the situation?

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_____

_____

20. Analyze On a warm, sunny, breezy day, you and a friend go to the shore to fly kites. Your friend is afraid that the kites might get tangled in some wires near the parking lot. You say the kites will fly safely over the water. Who is right? Explain.

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_____

_____

Name _____ Date _____

D.10
Take-Home Activity

A Salty Solution

Do you know why people put salt on roads and sidewalks during icy weather? Does the salt provide traction for cars and for people? Or is there another reason? In this activity you and a family member can learn what happens when salt mixes with ice.

Materials

- two identical freezer-safe containers
- water
- measuring cup
- salt
- masking tape
- teaspoon
- thermometer (if one is available)

Procedure

Use masking tape to label the two freezer-safe containers. Label one container "Water Only" and label the other container "Water and Salt." Pour 1 cup of water into each container. For the container labeled "Water and Salt," dissolve 2 teaspoons of salt in the water. Ask an adult to put both containers in the freezer. Check the containers every 15 minutes. Make a note of which container freezes first. If a thermometer is available, take the temperature of the "Water and Salt" solution as it begins to freeze.

Results

Talk with your family member about what happened. Did both containers of water freeze at the same rate? Which container was the first to freeze? What did the addition of salt do to the freezing point of water? Fresh water freezes at 32°F (0°C). What was the temperature of the salt water when it began to freeze? Do your results explain why people put salt on icy roads?

The Solar System

Directions:

1. There are nine pages in this unit. To best benefit from the lesson you should complete all nine pages.

2. Some of your conclusions and notes will have to be written on a separate sheet of paper. Anything you do should be emailed to me.

3. Please write neatly and thoughtfully so I am able to understand your thinking.

4. Have Fun!

Name _____ Date _____

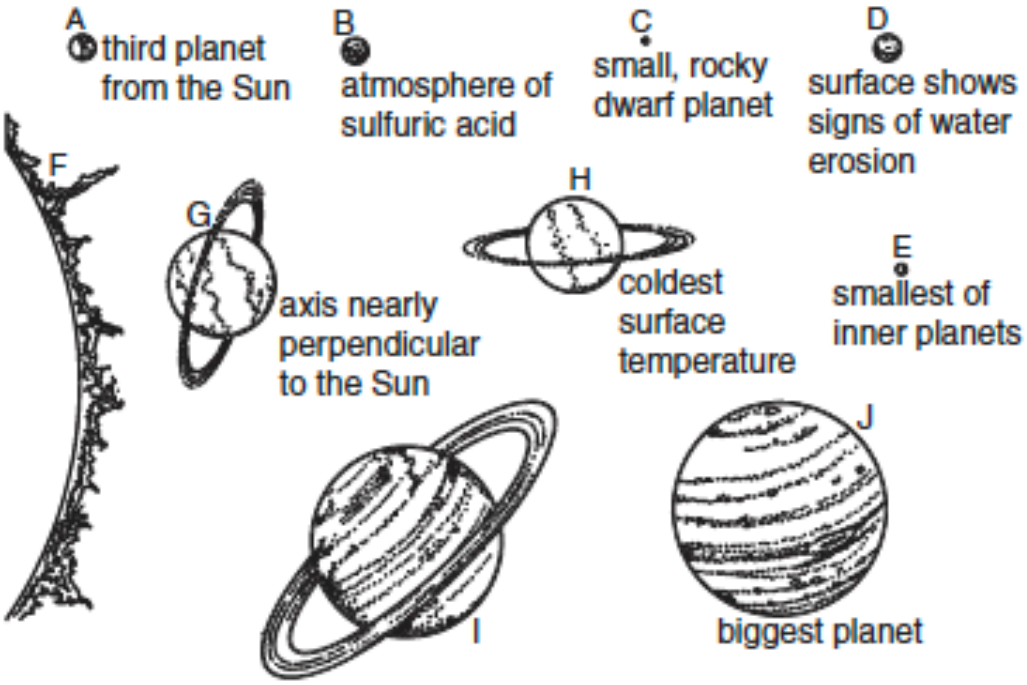
C
Performance
Assessment

Mapping the Solar System

There are eight planets, as well as the Sun, in the solar system. All of the planets differ from each other in many ways. The climate of each planet depends, in part, on its position relative to the Sun. In this activity you will show your understanding of the solar system by mapping its planets!

Procedure

1. In the picture below, you can see the Sun and all of the planets in the solar system. Use what you have learned in this unit to write their names in the spaces below the pictures.



A: _____ B: _____ C: _____

D: _____ E: _____ F: _____

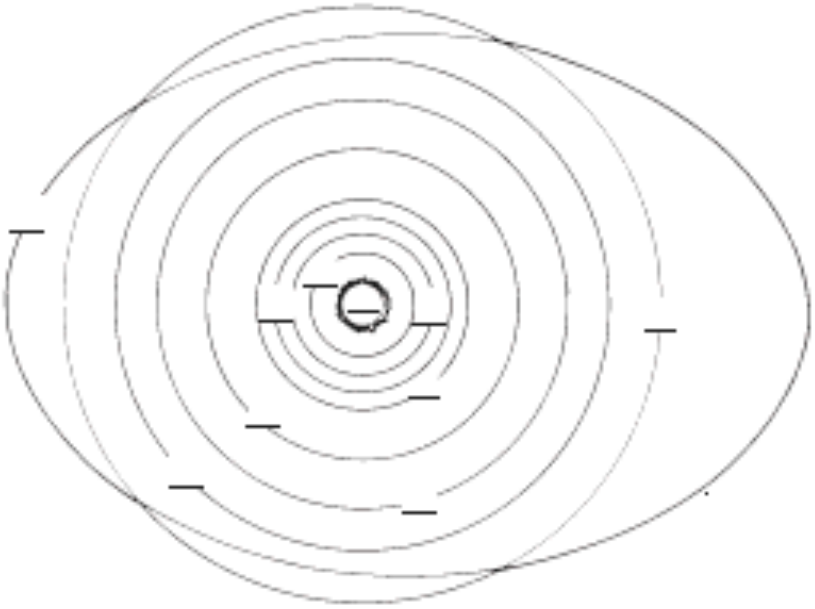
G: _____ H: _____ I: _____

J: _____

Name _____ Date _____

C
Performance
Assessment

2. Look at the diagram of the solar system below. Use what you know about the different bodies in the solar system to write the letter representing each body on page 137 in the spaces provided below. Which planet is farthest from the Sun? Which is closest? Where is Earth located?



3. What type of body is our Sun? What is the Sun made of?

_____

_____

_____

_____

4. What are some differences between the inner and outer planets? Name two main differences between them.

_____

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_____

_____

_____

Name _____ Date _____

C.7.1
Directed Inquiry
Recording Sheet

Conclusion

1. **Analyze Data** In your model, how does sunlight compare on Mercury, Earth, and Jupiter?

_____

_____

_____

_____

_____

2. **Infer** How would Earth change if its orbit moved closer to the Sun? How would it change if it moved farther away?

_____

_____

_____

_____

_____

Ask Questions

Guided Inquiry

What questions do you have about stars and planets? Which of these questions do you think scientists can investigate? **Research** the answers and report back to the class.

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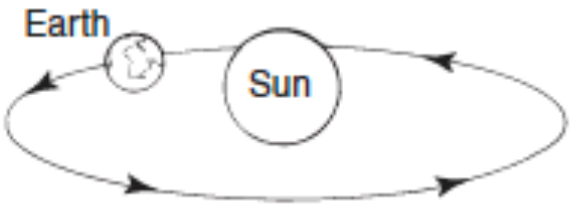
Name _____ Date _____

Your Age on Other Planets

You have learned that the farther a planet is from the Sun, the longer it takes to complete its revolution. Every time Earth makes a trip around the Sun, you become one year older. How old would you be now if you lived on the other planets? Try this activity with a family member to find out!

Materials

- pen or pencil
- calculator



Procedure

Here's how to find your age on the other planets:

1. Calculate your age in Earth days. (your age in years × 365 days)
2. Divide your age in Earth days by the number of days in that planet's revolution period, or "year."
3. The answer is your "new" age!

Planet	Number of Days in Year	Age
Mercury	88 days	
Venus	225 days	
Earth	365 days	
Mars	687 days	
Jupiter	4,329 days	
Saturn	10,752 days	
Uranus	30,660 days	
Neptune	60,152 days	
Pluto (dwarf planet)	90,410 days	

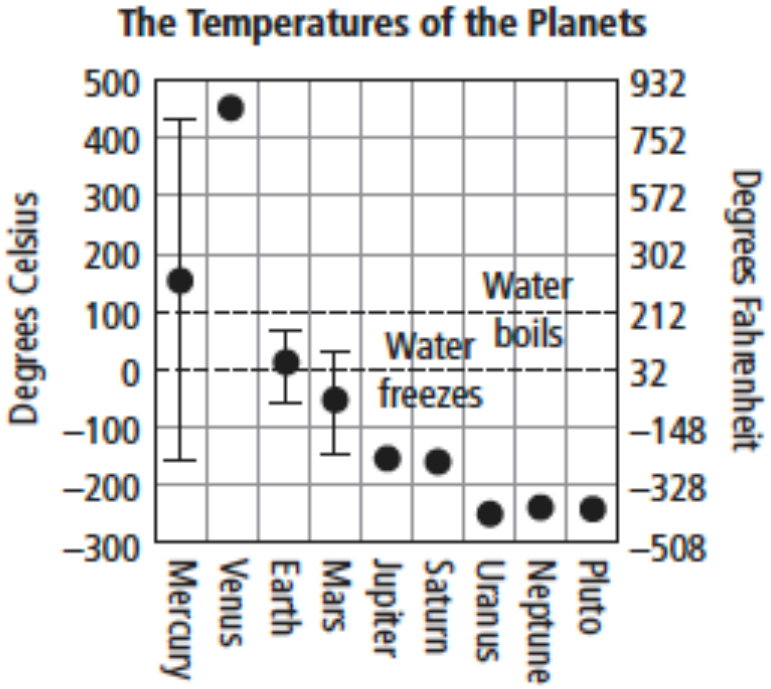
Results

Talk about your results with your family member. On which planet would you be oldest? Why? Do you notice any patterns in the numbers on your chart? What is the pattern? What do you think is the reason for the pattern?

Name _____ Date _____

Using Inquiry Skills

Use the graph to answer questions 15 and 16.



15. Compare Which planet has a surface temperature that is most similar to that on Earth?

_____

16. Infer What are the chances of finding liquid water on the surface of Venus? Explain your answer.

_____

_____

_____

_____

Name _____ Date _____

Using Inquiry Skills

Use the chart to answer questions 15 and 16.

Gravitational Pull and Revolutional Period (compared to Earth)

Planet	Gravitational Pull	Approximate Length of Time to Revolve Around the Sun
A	0.38	88 Earth days
B	0.04	248 Earth years
C	0.91	225 Earth days
D	1.20	165 Earth years
E	0.38	687 Earth days
F	0.80	84 Earth years
G	2.54	12 Earth years
H	0.93	29 Earth years
I	1.00	365 Earth days

15. Analyze Data Which planet could be Pluto? Explain.

_____

_____

_____

_____

16. Compare Compare the strength of the strongest gravitational pull with that of the weakest.

_____

_____

Name _____ Date _____

Thinking Critically

17. **Apply** What will happen when the Sun's supply of hydrogen is used up?

_____

_____

_____

_____

18. **Analyze** Suppose you are playing a guessing game with a friend. She says that she is thinking of a planet that takes 84 Earth years to complete one revolution of the Sun. You know that Mars orbits the Sun in 687 days. Is your friend thinking of an inner planet or an outer planet? How do you know?

_____

_____

_____

_____

_____

19. **Evaluate** What are some advantages of using space probes rather than space craft carrying people to explore outer space?

_____

_____

_____

20. **Synthesize** Some scientists have suggested that Pluto is not a planet. What evidence supports such an idea?

_____

_____

_____

Name _____ Date _____

C.7.4
Directed Inquiry
Recording Sheet

Planets in a Bowl

Procedure

1. **Collaborate** Work with a partner. Cut out a small paper circle, and label it "Sun." Tape the circle to the inside bottom of the bowl.

2. **Use Models** The marbles represent planets. Drop one marble along the side of the bowl. Record the results.

_____

_____

3. Seal the bowl tightly with the lid. Then move the bowl over and over in a circular path, keeping it flat against the table. Observe the motion of the marble inside. Record the results.

_____

_____

4. **Use Variables** Change the way you move the bowl, always keeping it flat against the table. Try moving it slower or faster, or in a wider or narrower circle. Observe the marble's motion.

5. **Compare** Open the bowl and add the second marble. Repeat step 3, making sure the lid is sealed tightly. Compare the motions of the two marbles. Observe what happens when the marbles hit each other.

_____

_____

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_____

Name _____ Date _____

C.7.4
Directed Inquiry
Recording Sheet

Conclusion

1. **Use Models** Compare the moving bowl and marbles to the planets of the solar system.

_____

_____

_____

_____

2. **Analyze Data** What would happen if two planets hit each other, or if an asteroid struck a planet? Does evidence from the activity support your answer?

_____

_____

_____

_____

3. **Infer** Why do you think that planets do not crash into the Sun?

_____

_____

_____

_____

Ask Questions

Guided Inquiry

If you throw a baseball into the air, it will fall to the ground. How fast would you have to throw a baseball for it to escape Earth's gravity and fly into space? **Research** the answer. Report it to the class.

Physical and Chemical Reactions

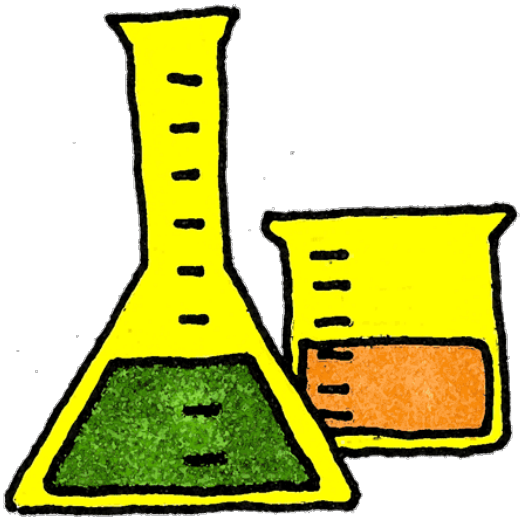
Directions:

1. There are ten pages in this unit.

2. These activities require supervision.

3. This unit takes into account all learning up to this point so be thoughtful and careful.

4. Have Fun!



Name _____ Date _____

Mixing In

Procedure

Safety: Wear goggles as you perform this procedure.

1. **Collaborate** Work with a partner. Fill two beakers with water.

2. **Observe** Add two teaspoons of sand to one beaker and two teaspoons of salt to the other beaker. Observe what happens in each beaker. Record your observations.

   _____

   _____

3. **Compare** Stir the contents of each beaker. Stop stirring, and do not touch or move the beakers for several minutes. Compare the contents of the two beakers. Record your observations.

   _____

   _____

4. **Predict** What do you think would happen if you added water to a mixture of sand and salt? Record your prediction.

   _____

   _____

5. **Experiment** Add one teaspoon of sand and one teaspoon of salt to the third beaker, and mix them thoroughly. Fill the beaker with water, and stir. Record your observations.

   _____

Name _____ Date _____

D.10.3
Pressed fo
Time Reco

Experiment with Changes

Materials

- plastic bottle
- water
- freezer

Procedure

1. **Measure** Add water to a plastic bottle until it is filled half-way to the rim. Measure the height of the water in the bottle. Record your measurement.

_____

2. **Experiment** Place the bottle in a freezer and leave it there for a few hours.

3. **Measure** Remove the bottle from the freezer. Measure the height of the water in the bottle again. Record your measurement.

_____

Conclusion

1. **Analyze Data** How does the height of the water compare to the height of the ice?

_____

_____

2. **Infer** Why did the water expand when it froze?

_____

_____

Name _____ Date _____

Balloon Blow-Up

Chemical changes take place all around us. In a chemical reaction, one or more substances are changed into one or more new and different substances. In this activity, you and a family member can observe a simple chemical reaction.

Materials

- balloon
- empty plastic water bottle with cap
- baking soda
- vinegar
- measuring cup
- funnel or baster

Procedure

First, have an adult family member stretch the balloon a few times to make it easier to blow up. Pour 1/4 cup of water into the empty water bottle. Add 1 teaspoon of baking soda to the water. Put the cap on the bottle and shake it a few times. Remove the bottle cap. Pour about 1/2 cup of vinegar into the balloon. Have an adult family member stretch the open end of the balloon over the mouth of the bottle, being careful not to let the vinegar spill out. Once the balloon is tightly in place, hold it upright so the vinegar goes into the bottle. Watch what happens.

Results

Talk with your family member about what happens inside the bottle and what happens to the balloon. How do you know that a chemical reaction happened? How do the properties of the vinegar and baking soda (reactants) compare to the new substance that was produced (products)?

Name _____ Date _____

A.1.2
Directed Inquiry
Recording Sheet

Watch Yeast Feast!

Procedure

1. **Collaborate** Work in a small group.

2. **Experiment** Pour 100 mL of warm water (not hot) into a cup or bowl. Stir in 15 g of sugar and 5 g of yeast. Pour the mixture into a sealable plastic bag. Squeeze out as much air as you can. Seal the bag completely.

3. **Use Variables** Repeat step 2 using a second bag, but this time do not include sugar.

4. Place both sealed bags on a tray lined with a paper towel. Set the tray on a shelf or tabletop under a lit lamp.

5. **Record Data** Check the bags throughout the next 24 hours. Record what you observe. Use either words or pictures to describe what you see below.

Time	Yeast + Water + Sugar	Yeast + Water
1 hour		
2 hours		
4 hours		
8 hours		
24 hours		

Name _____ Date _____

A.1.2
Directed Inquiry
Recording Sheet

Conclusion

1. **Compare** Describe how the content of the two bags changed over time. Note important differences in the bags.

_____

_____

2. **Hypothesize** What do you think might have caused the effects you observed? Propose a hypothesis. Describe how you could test this hypothesis.

_____

_____

_____

_____

_____

_____

3. **Use Variables** In this experiment, what were the independent and dependent variables? Which variables did you control?

_____

_____

4. **Communicate** Write a report describing your investigation.

Experiment

Guided Inquiry

Do yeasts grow better in warm or cold temperatures? Do they need light to grow? **Ask questions** about yeast growth. Plan and carry out an experiment to test one of these questions.

Name _____ Date _____

The Pressure's On!

Procedure

Safety: Be careful when using scissors.

1. **Collaborate** Work with a partner. Cut off the top of two balloons. Then, cut one of the balloons a third of the way down.

2. **Use Models** Stretch the smaller balloon over the mouth of the smaller jar until it is tight. Secure it with a rubber band. Tape a toothpick on the balloon over the center of the mouth of the jar. Leave the toothpick hanging over the lip of the jar.

3. **Use Models** Carefully place the small jar inside the larger jar. Stretch the larger balloon tightly over the mouth of the large jar. Secure it with a rubber band.

4. **Experiment** While one partner holds the large jar, the other partner should push down on the balloon to increase the air pressure inside the jar.

5. **Observe** Record what happens to the toothpick when the balloon is stretched downward.

_____

_____

_____

6. **Experiment** Repeat step 4, this time pulling up on the balloon. Record what happens to the toothpick.

_____

_____

_____

Name _____ Date _____

C.6.1
Directed Inquiry
Recording Sheet

Conclusion

1. **Infer** How does pulling up on the balloon affect the air pressure inside the jar?

_____

_____

_____

2. **Use Models** What does your model show about how changes in air pressure can be observed?

_____

_____

_____

_____

Experiment

Guided Inquiry

How could you modify this experiment to detect actual changes in air pressure? **Compare** your observations with air pressure readings listed in the newspaper.

_____

_____

_____

_____

_____

Name _____ Date _____

D.10.3
Directed Inquiry
Recording Sheet

Balloon Bath

Procedure

1. **Collaborate** Work with a partner.

2. **Measure** Draw a circle around the widest part of each balloon. Label one balloon *A* and the other *B*. Measure around each balloon on the lines you made. You can use a string to measure if you need to. Record the measurements.

Balloon	Measurement
A original measurement	
A after cooling	
B original measurement	
B after cooling	

3. **Experiment** Half fill a dishpan with water and add ice cubes. Place balloon *A* in the ice water. Gently push the balloon into the water with a ruler.

4. **Record Data** Hold the balloon under the ice water for 3 minutes. Then remove it and quickly measure the distance around the balloon as you did in step 2. Record your measurement.

5. **Use Variables** Dump out the ice water and warm the dishpan with warm tap water. Half fill the dishpan with warm tap water.

6. **Compare** Repeat step 4 using warm water and balloon *B*.

Name _____ Date _____

D.10.3
Directed Inquiry
Recording Sheet

Conclusion

1. **Analyze Data** How did the balloon change when it was cold? When it was heated?

_____

_____

_____

_____

2. **Infer** Propose a reason why the balloons changed size.

_____

_____

_____

_____

_____

Ask Questions

Guided Inquiry

What would happen if you put balloon *A* in a freezer? What would happen if balloon *B* was put in very hot water? With your teacher's permission, ask questions like these and test them. **Analyze data** from your results.

_____

_____

_____

_____

_____