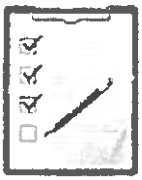
Name _____ Date _____

Scientific Method

Ask a Question 	**Purpose:** What theory are you testing, why are you doing this experiment (a reason)? Ask a question or outline the concept you are exploring.
Make a Prediction 	**Hypothesis**: before you perform or test theories predict what you think will happen or what the end result will be.
Make a Plan and Follow it 	**Materials**: in point form outline and organize what items you will need to perform the experiment. **Procedure:** write down each step in order of what you are to do (number each step in sequence) to perform the experiment. This is important so you may get the same results if you perform the same test again.
Observe 	Observations: write down what you observed, details of what happened and explain results in complete sentences.
Record the Results 	**Organize data** using pictures, charts, graphs and captions explaining the process and observations.
Draw a Conclusion 	**Conclusion**: end the lab by restating your prediction, confirming whether your original was correct (hypothesis) or incorrect and support why. Briefly end report by summarizing what happened to confirm or negate theory.

Weather Lab Report Assessment name:

Lab name & number Date:					
Lab Structure: lab components that are completed & in detail: purpose, hypothesis, materials, procedure, observations and conclusion					
Organization: communicates an appropriate title, lab partners, date, number of lab. Diagrams, charts, pictures are coloured and illustrated.					
Neatness & appearance: lab report is neat, legible, and easy to read/follow					
Mechanics: Lab is edited for punctuation, spelling, grammar, and uses point form (materials) and numbers (procedure)					
Experimental design: Has a complete conclusion that confirms whether the prediction was correct, supplies a summary of results.					

Lab Report Rubric outline

Report Skills	**Thorough understanding** **4**	**Good Understanding** **3**	**Is beginning to show understanding** **2**	**Needs more Work** **1**
Lab Structure	Has all components in detail: **Purpose, hypothesis, materials , procedure, observations and conclusion**	Most lab components done or have some detail: **Purpose, hypothesis, materials, procedure, observations & conclusion**	Some parts of the lab are completed or done partially: **Purpose, hypothesis, materials, procedure, observations & conclusion**	Many or all parts of the lab are incomplete: **Purpose, hypothesis, materials, procedure, observations & conclusion**
Organization **Diagrams/ Data**	The number of lab & appropriate related title, date, student name and partners in group -All diagrams, charts, illustrations are neatly organized to provide data (if applicable)	Most key information is there: the number of lab & appropriate related title, date, student name and partners in group -Diagrams, charts, or graphs are neatly illustrated	Parts of lab are missing: The number of lab & appropriate related title, date, student name and partners in group -diagrams or charts are partially done	No name, no number, partners in the lab group or date was written -no illustration, data, charts or graphs
Neatness & appearance	The lab is easy to read, legible printing and pride was taken in the appearance of work	Lab is readable and printed legibly	Printing is hard to understand, words are spaced too close together, there may be unnecessary doodles or rips	Lab report paper is ripped, coloured on, crumpled and impossible to decipher any written print
Spelling, Punctuation & Grammar	Lab report was edited for all errors in spelling, grammar, and has clear logical explanations	There are just 1-2 errors in spelling, grammar, or meaning in the lab	There are 3-4 errors that need to be edited	Lab is flawed with numerous errors in spelling, punctuation or makes no sense at all when read
Experimental Design: Conclusion	Conclusion relates back to the hypothesis and denies or confirms if it was correct. Lab ends with a summary of evidence of observations taken in the conclusion	Conclusion gives some answer to whether prediction was correct or not. Lab is appropriately ended with a sentence explaining results or restating observations.	Conclusion is partially done. It either states just that the prediction was correct or just writes an ending in a sentence what happened.	Conclusion is left blank altogether or has absolutely nothing to do with what is being tested.

Weather Lab # 1 Properties of Air

names:

Purpose: to test the theory that warm and cold air masses have different effects on the weather

Hypothesis:

Work On It

Pair

Warm Air Rises, Cool Air Sinks

Materials for each pair

- 2 medium-sized bowls
- hot water (not boiling)
- ice water
- small balloon
- plastic 2 L bottle without a lid

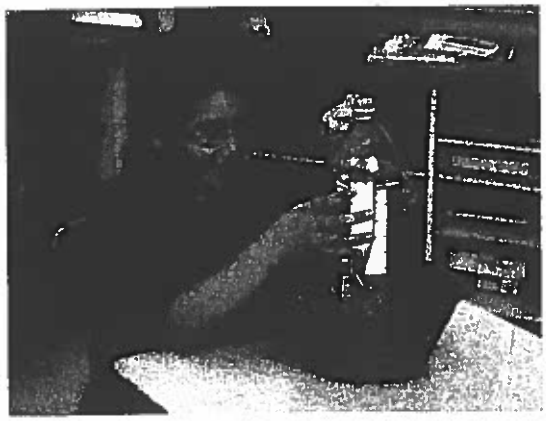
Procedure

1. Fill one bowl halfway with hot water and the other bowl halfway with ice water.

SAFETY CAUTION!
Be careful not to splash the hot water on yourself or anyone near you.

2. Stretch the balloon over the opening of the bottle.

3. Predict what will happen when you stand the bottle in the bowl of hot water. Then, stand the bottle in the hot water to test your prediction.



4. Predict what will happen if you move the bottle to the bowl of ice water. Then, stand the bottle in the ice water to test your prediction.

5. Record your observations in your notebook. Be sure to include a drawing of the bottle and balloon before and after being placed in each bowl of water.

Conclusion: My prediction was

Name: _____

Properties of Air

Bottle in Hot Water

Predictions	Observations

Bottle in Cold Water

Predictions	Observations

Weather Lab #2 What Material Warms Up the Fastest?

Names:_____

Purpose: To test to see if the sun's energy heats up all materials at the same rate

Hypothesis:

Work On It

Pair

Does the Sun's energy heat up all materials at the same rate? Complete the following activities to find out. First you will test water, sand, and soil. Then you will design an experiment using ice cubes to test wood, grass, concrete, and asphalt.

Which Material Warms Up Fastest?

Part 1

Materials for each pair

- 3 identical plastic cups
- water
- dry sand
- soil
- 3 thermometers
- sunlight

Procedure

1. Fill each cup to the same level, one with water, one with sand, and one with soil.
2. Put a thermometer in each cup. Leave the thermometers in for about 5 minutes. Record the temperature for each cup.
3. Predict which material will warm the fastest. Place the cups in direct sunlight to test your prediction.
4. After 15 minutes, read and record the temperature again. Calculate the change in temperature for the water, sand, and soil. Which material warmed up the fastest?

Part 2

Materials for each pair

- wood
- grass
- concrete
- asphalt
- ice cubes
- any other materials you need

Procedure

1. Before you can design your experiment, you need to answer the following questions.
   - Think about the surfaces you will investigate. Where will you find them?
   - Think about the ice cubes. What will the ice cubes need to do for you to compare how hot the surfaces are?
   - What will you need to measure? How will you do that?
   - What information and measurements will you record?
   - What other materials will you need to complete your investigation?
   - Which surface do you think will heat up fastest? Record your prediction.
2. Design your experiment. Share your plan with other students and with your teacher.
3. Carry out your experiment.

Communicate

1. **What happened to the air inside the bottle once the bottle was places in each bowl?**
   Ice water bowl:
   Hot water bowl:

2. **Explain what you think would happen if you put the bottle in the cold water first, and then in the hot water.**

3. **What would you say to someone who thinks an inflated balloon is empty? Explain your answer using the properties of air.**

4. **Think about how warm and cold air move. Where in a two-storey home would you expect to find the colder rooms? Explain your answer and include a drawing to show how air moves indoors.**

Samples/material	Degrees at Room temperature	Degrees In direct sunlight
water		
dry sand		
soil		

	Rate of Melting
wood	
grass	
concrete	
asphalt	
ice cubes	

Communicate:

1. Organize the results from each experiment into a table or graph. Present your results to your classmates.

2. Which material in Part 1 had the greatest change in temperature? _____
Which material had the smallest change in temperature? _____
What did you notice about the material that heated the most? _____
_____
What did you notice about the material that heated the least? _____
_____

3. On a hot summer day, where would you choose to sit for the afternoon: on a grass lawn, in a sandbox, on a co sidewalk, in a dirt, on a wood deck, or on an asphalt basketball court? Explain your choice. Which location do y think would be the worst? Why?

_____
_____
_____

4. Name two or three locations on Earth that would heat more quickly than others. Give reasons for your choices. _____
_____
_____

5. Give at least two reasons why the average temperature in a desert near the equator would be higher than the average temperature on a mountain in Canada.

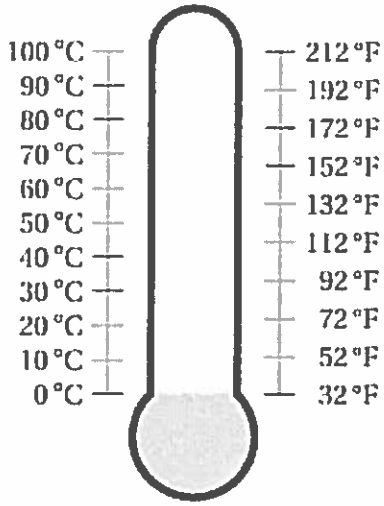
_____
_____
_____

Conclusion: My hypothesis was

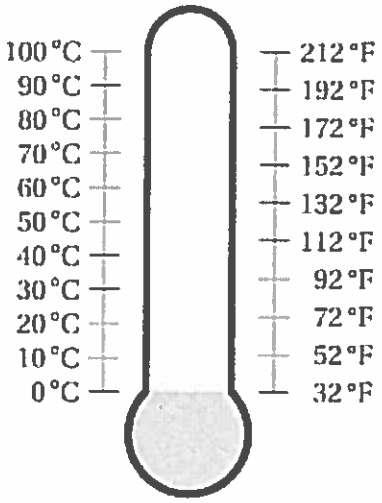
Energy from the Sun: Rate of Melting

Document the temperature on each of these samples.

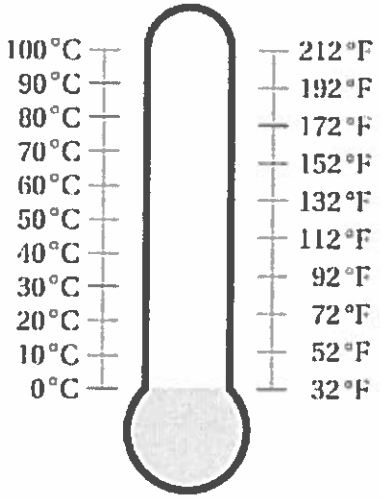
sand



soil

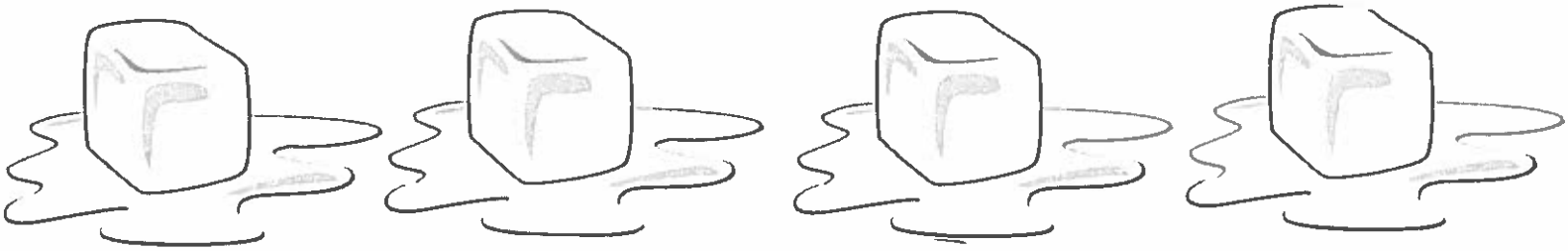


water



Observations:

Observations: which surface had the most rapid rate of melting the ice cube:



wood grass asphalt concrete