Keep It Hot

Problem:
Keep your cup of water as hot as possible for as long as possible.
Discuss the following questions to help you prepare for the next two activities.
What color material absorbs the sun’s radiation the best? Which color the least?
What type of materials reflect the sun’s energy away from the substance?
Which material is a good conductor of heat? What material is a good insulator?

Prediction:
Looking at the materials and supplies provided, choose the material to insulate the cup
that you believe will work the best. Explain your reason.

Experiment:
1. Set up two cups for this experiment. The first cup will be the control cup.
   a. Simply prepare a lid to secure a thermometer in it and place it on the cup.
   b. Wrap the second cup with your selected material for insulation and secure.
      Save room at the top for the hot water to be poured into the cup.
   c. Secure the lid so that a thermometer can register the temperature of the water.
2. Pour hot water into both cups. Put the lids on and make sure you can read the
   temperatures on the thermometers.
3. Take the initial temperature readings of the hot water in both cups. When the
   temperatures has stopped rising and stabilized—this will be the initial
   temperature reading.
4. Take the temperature readings of both cups every two minutes for at least
   sixteen minutes.
5. Design a data chart in your science notebook.
Some Like It Hot & Some Like It Cold

Name: _________________________________________________________   Date: __________

1. Add this page to your notebook. Data table below:

2. Graph: Include on graph paper and attach.

3. Compare your data with other students’ data. Make several other observations about the experiment from data charts.

4. Whose set up lost the least amount of heat? Whose lost the most amount of heat?

5. State the results of your experiment.

______________________________________________________________________________________________________
______________________________________________________________________________________________________
______________________________________________________________________________________________________

6. What conclusion can you make from this experiment?

______________________________________________________________________________________________________
______________________________________________________________________________________________________
______________________________________________________________________________________________________

7. List the evidence that supports your conclusion.

______________________________________________________________________________________________________
______________________________________________________________________________________________________
______________________________________________________________________________________________________
Some Like It Hot & Some Like It Cold

Frosty the Snowman Science Lab

Great for a lab day after a fresh snowfall.

Your job is to create a covering so that your snowman melts as little as possible. You will create an insulating cover so that when you take Frosty back into the classroom and leave him there until ___________, he melts as little as possible (write in time).

Take a look at the supply table. These are the materials available for you to use to create your protective covering. In your science notebook, create your plan with details of the materials you will use. Once your plan is approved and stamped by the instructor begin creating your design. This should be nearly finished before you build your snowman.

Building the snowman:

Take a scoop of snow and fill up the gallon container. This will be the volume of snow you have to work with to build a snowman. Empty the content of the snow into the dish pan and create a snowman. Use the items provided for a face and clothing or decorations for your snowman.

Go ahead and put on your protective covering before bringing the snowman into the classroom. Place your snowman in the locations mentioned by your instructor. You will return to check on your snowman at ______________. Record the amount of melted water obtained from your snowman ______________

Clean up your area disposing of the snow as instructed.

MATERIALS NEEDED

PER TEAM:
Gallon plastic jug
Buttons
Carrot
Pieces of cloth
Newspaper
Old towels
Aluminum foil
Scissors
Masking tape
Packaging materials
Cardboard
Plastic grocery bags
Other insulating materials safe for students use
Plastic dish pan
Graduated measuring cups or graduated cylinder

Students will be able to:
Set up a successful experiment
Make accurate claims based on the data and classroom discussion.
Frosty the Snowman Science Lab

Write this information into your science notebook or on this worksheet according to your teacher’s instructions.

Problem:
Your job is to create a covering so that your snowman melts as little as possible.

Prediction:
Design for Insulating cover draw and label this below:

Explain how you think the insulating cover will work to reduce melting?

Data:
The amount of water obtained from the melting snowman: ______________________
Time of start of lab: ______________________
Time of checking water volume: ______________________
Other observations or points of data:

Sharing of class data and observations:

Conclusion:

Evidence that supports the conclusion:
**Some Like It Hot & Some Like It Cold**

**Teacher Information:**

**Keep It Hot**
Prepare the hot water so that it is warm to the touch but will not leave a burn if spilled. Place the hot water into a thermos for this experiment.

Review concepts through the lab such as what color is a good absorber of energy, what is a good reflector, what is a good conductor of heat and what is a good insulator of heat. These concepts will assist in understanding both labs.

Using the information you learned from the prior lab apply this to the Frosty the Snowman Lab.

**Frosty the Snowman Lab**
It works best to allow the snowmen to sit inside the classroom for at least several hours prior to determining how much snow melted.

**New York State Standards**

Physical Setting Earth Science:

- **Standard 1**: Math key idea 2
- **Standard 1**: Science Key idea 2
- **Standard 1**: Engineering design key idea 1
- **Standard 4**: key idea:2
- **Standard 6**: Key Idea 6