

Some Like It Hot & Some Like It Cold

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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?

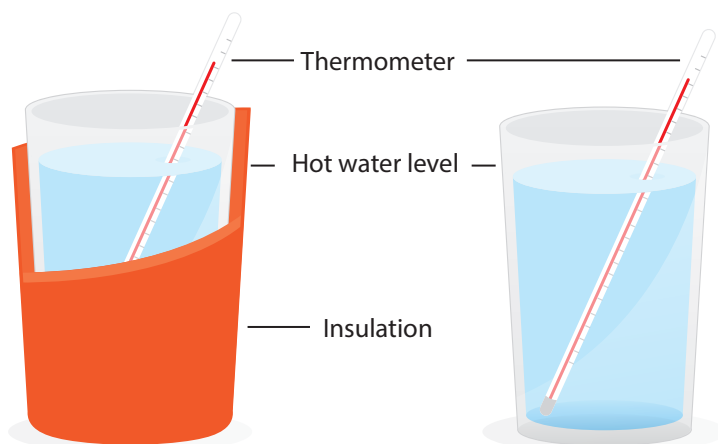
Which material is a good conductor of heat? What material is a good insulator?

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.



MOST*

VOCABULARY:

Absorption

Conductor

Energy

Insulation

Radiation

Reflection

Solar Energy

MATERIALS NEEDED:

Two coffee cups with lids per team

Thermos of hot water

Two thermometers per team

Materials to act as insulators, cotton cloth, fleece, bubble wrap, aluminum foil, newspaper, insulation

Masking tape

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Students should be able to:

Set up a successful experiment

Make accurate claims based on the data and classroom discussion.

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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.

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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

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.



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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:

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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