

Bellringer:

1. How does heat transfer through conduction?

Learning Objectives:

- I can explain the process of conduction using a molecular explanation.

Conduction is the process by which heat energy is transmitted through contact with neighboring molecules.

Some solids, such as metals, are good conductors of heat while others, such as wood, are poor conductors. Air and water are relatively poor conductors.

Since air is a poor conductor, most energy transfer by conduction occurs right at the earth's surface. At night, the ground cools and the cold ground conducts heat away from the adjacent air. During the day, solar radiation heats the ground, which heats the air next to it by conduction.

Stay warm like the earth

To prepare for the cold temperatures outside, the most important thing to remember is to dress in layers. Wear three layers- a wicking layer, an insulating layer, and a protection layer.

The wicking layer is the layer closest to your skin. It usually consists of thermal underwear made of fabric that will move moisture away from your skin and pass it through the fabric to evaporate.

It will keep you warm and dry. It is usually a polyester, but silk will also work.

The insulating layer will keep the heat in and cold out and is usually made of fleece or wool. Think sweaters and sweatshirts.

The final layer is the protection layer, or the exterior layer. Like coats and jackets, it should protect you from the elements, including sleet, rain and block the wind.

Most are made waterproof and breathable. Coats or jackets made of goose down or wool are ideal for this layer. The higher the fill number for goose down, the better it insulates.

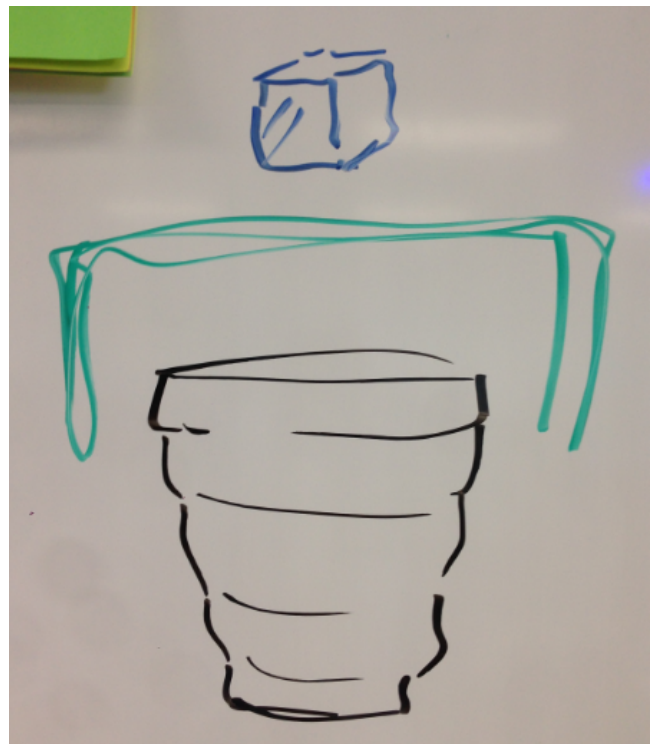
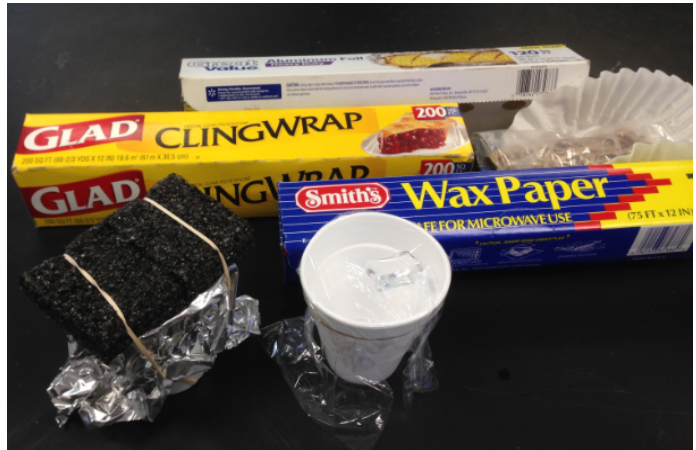
The best tip is to avoid clothes made of cotton.

Activity:

Write down the following in your notebooks.

1. What material will you cover your Styrofoam cup with?
2. What will you put inside your Styrofoam cup?
3. What is your prediction on how long it will take to melt the ice cube on top.

Set up your materials and then time it as soon as you set your ice cube on top.



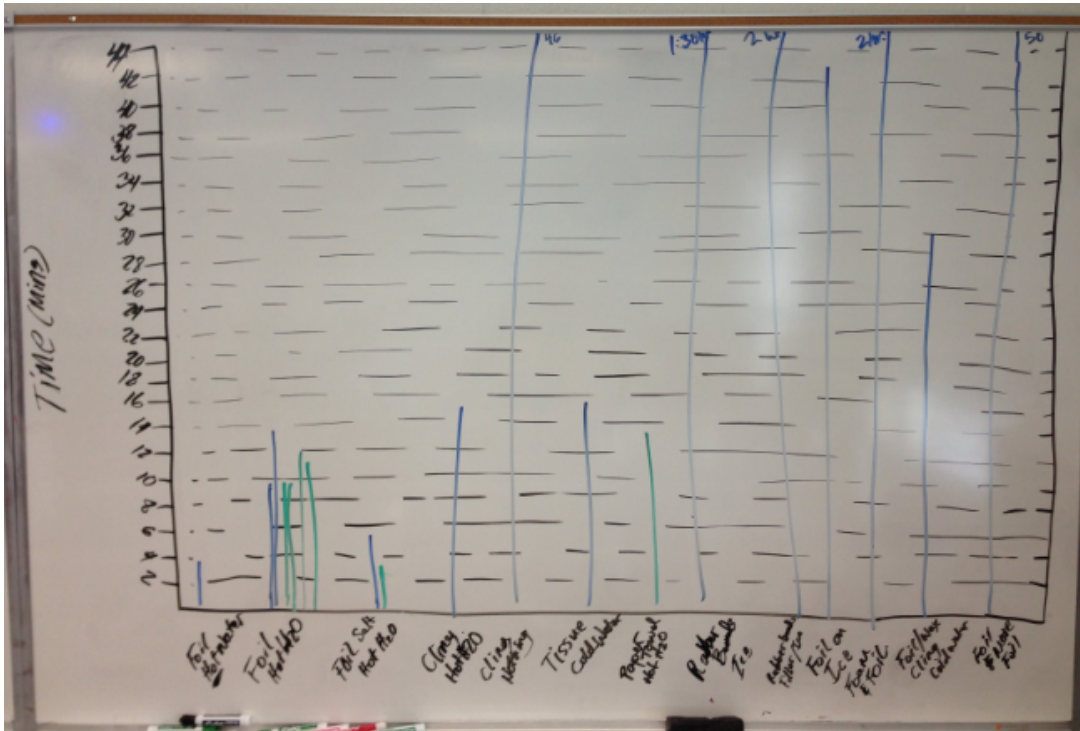
Evaluate

Compare with other groups' set ups.

Is their set up the same as yours?

Why are their melt times different?

If they were the same set up, did you still have the same melt time? If not, why?



Here's some of the data. Fastest to melt was 3:21 mins; Slowest was about 2 hours.

Cover	inside	Time
tin foil w/ salt	Hot water	3:32
tin	Hot water	9:25
Tin	Hot water	9:21
tin,	Hot water	12:06
Paper towel/salt	Hot water	13:00