

Black Fabric Experiment

John Pickle, sciencepickle.com

Materials and Equipment

At least 3 black fabric samples, one should be silk, another should be felt or fleece, and the third something that interests you.

A lamp stand that can be a 100 to 150-watt incandescent light bulb safely. The stand should be at least 2 feet tall and allow for the light to be focused vertically downward.

One to three Non-contact thermal infrared (far infrared) thermometer

Timer/clock that shows seconds

Procedure

Set fabric samples flat on a table and directly underneath the lamp. You can work one fabric at a time if working alone, or all three if you have a team of people.

Point the thermometer toward the black fabric, roughly 6 inches away from the surface but out of the anticipated lamp's light. Measure the temperature of the fabric before turning on the lamp. Record in the table that follows.

For the rest of the temperature measurements, keep the thermometer in the same location and orientation. It helps to rest your hand holding the thermometer on the table.

Turn on the lamp and record the temperature every 30 seconds. If you have a timer, have them call out the time to measure. If you have a team using the thermometers, have them call out the temperature in the same order each time. One person should be recording the information for everyone to use.

After 3 minutes (minimum), turn the lamp off and record the temperatures for the next 3 minutes.

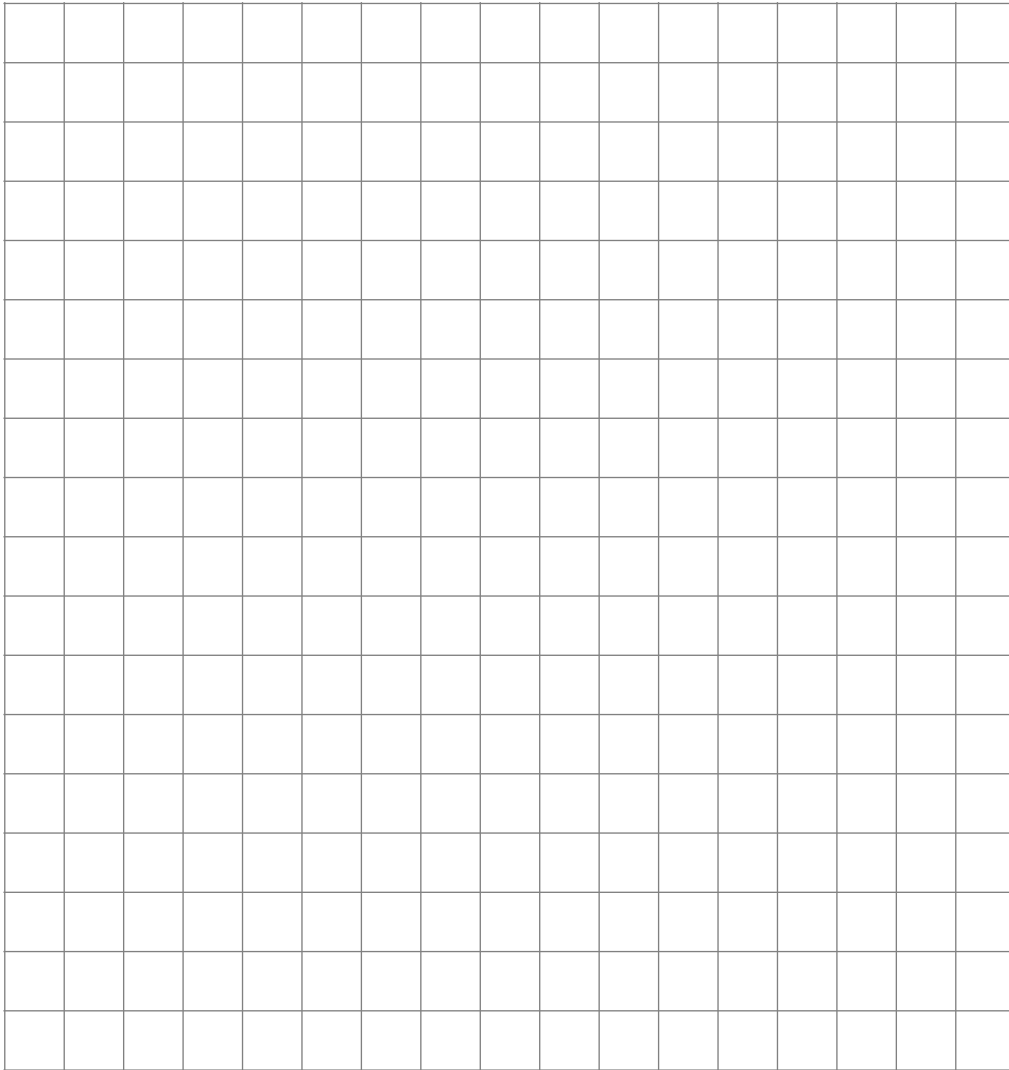
Once everyone has the data, each person should graph the results. Discuss your results and try to decide what is causing the differences and similarities between the fabrics.

Compare your results to those presented in the Blackbody Radiation software available at sciencepickle.com/energy.html.

Heating and Cooling Data of Black Fabrics

<i>Time [minutes]</i>	<i>Fabric 1</i>	<i>Fabric 2</i>	<i>Fabric 3</i>
0:00 <i>Light On</i>			
0:30			
1:00			
1:00			
2:00 <i>Light Off</i>			
2:00			
3:00			
3:00			
4:00			
4:00			

Temperature



Time [minutes]