

MATERIALS LIST FOR PHYSICS: HEAT

The materials needed are listed here in the sequence used, by experiment. A “shopping list” at the end gives them all together without duplicates.

A.8 Practical Application: Measure temperature change.

a hot plate

one or two 12-ounce (pop can-size) cans

tap water

a scale to measure the weight of the can and water

a thermometer, or if available, a more sophisticated method of measuring and recording temperature

salt, enough to make a saturated solution (it will take about 4 ounces of salt for 12 ounces of water)

a timer (clock or more sophisticated time-keeper)

A.9 Practical Application: Melt ice and boil the water.

a pan

ice

water

a scale to weigh the pan, ice, and water

a hot plate

a thermometer, or if available, a more sophisticated method of measuring and recording temperature

a timer (clock or more sophisticated time-keeper)

A.18 Practical Application: Gas law.

a bicycle pump

a pressure gauge (some pumps have one built in)

(if using a pump with a built-in gauge) a plugged-up valve stem from an old bicycle tube to stopper the end of the hose to get pressure readings

a basketball

a pump with a needle for inflating the basketball

a more or less spherical balloon

access to a microwave oven

access to a freezer

B.5 Demonstrate: A peculiar aspect of radiation.

three Polaroid lenses (polarized plastic)

light-sensing equipment (if available)

B.10 Practical Application: Calculate and measure final temperature.

an aluminum soda can.

a glass or plastic jar with a lid that the can will fit into with some room to spare.

Make sure this jar will hold at least a pound (2 cups) of water.

a larger jar or container with a lid that the smaller jar will fit inside
thermometers (or temperature probes)
hot plate
insulating pad

B.13 Practical Application: Calculate rate of cooling.

about one cup of water
a pan to hold the water
a scale to measure the weight
a hot plate
a thermometer (or temperature probe)
a timer (clock or more sophisticated time-keeper)

B.16 Practical Application: Control heat.

two shiny metal cans
a black painted can of the same shape and size
water
a thermometer (or temperature probe)
a 100-watt bulb to place next to the cans
a “sleeve” of insulation (fiberglass or insulating foam) to put around a can

B.19 Practical Application: Calculate heat transfer.

a metal coffee can or similar container with a lid
pan to heat water
a 2" thick layer of fiberglass batting or insulating foam (taped onto the sides and bottom of the can, and over the top)
enough water to nearly fill the can
a scale to weigh the water
a hot plate
a thermometer (or temperature probe)
gloves

SHOPPING LIST

100-watt bulb and lamp
balloon, more or less spherical
basketball
bicycle pump
can, black painted, same shape and size as shiny ones
can, metal coffee can or similar container with a lid
cans, 12-ounce (aluminum soda can)
cans, shiny metal (two)
data about five ways in which energy is converted to heat in the local environment.
One of them should be the heating system of your school.
data on the heat released in burning different fuels
freezer
gloves
hot plate
ice
insulating pad
insulation (fiberglass or insulating foam)
jar or container with a lid that the smaller jar will fit inside
jar, glass or plastic, with a lid that a soda can will fit into with some room to spare
Make sure this jar will hold at least a pound (2 cups) of water
light-sensing equipment (if available)
microwave oven
pan
plugged-up valve stem from an old bicycle tube (to stopper the end of the pump hose
to get pressure readings)
pressure gauge (some pumps have one built in)
pump with a needle for inflating a basketball
salt (about 4 ounces)
scale to measure weight
thermometers (or temperature probes)
three Polaroid lenses (polarized plastic)
timer (clock or more sophisticated time-keeper)
water