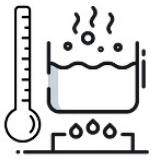
4-page lab sheet

THERMAL ENERGY VIRTUAL LAB INVESTIGATION

Name: Date:

LEARNING TARGET

Explain how thermal energy is transferred between two objects.



PRE-LAB

Define temperature:

Define heat:

SET-UP

1. Visit the following website:
   https://phet.colorado.edu/en/simulations/energy-forms-and-
2. Click the play button.
3. Select the "intro" option.
4. Select the "energy symbols" and "link heaters" boxe
   corner of the screen.

Note: The box with the red "E" inside represents heat

OBSERVING THE RELATIONSHIP BETWEEN HEAT AND TEMPERATURE

5. Drag the thermometer
   containers

Fill in the blanks:

Comparing the liquid materials: At the same temperature, _____ contains more heat energy than _____.

Comparing the solid materials: At the same temperature, _____ contains more heat energy than _____.

6. Next, place the container of water (and the thermometer) on top of the stove. Pull the toggle down to make the water cold.

What happens to the heat energy inside the water?

7. Now, push the toggle upward to make the water hot.

What do you notice about the amount of heat energy of the water during this process?

What do you notice about the temperature of the water during this process?

y increases, the _____ of a material will also

HANGES
BJECTS

t the bottom right of the screen. Select "energy

n containers for 25-30 seconds. Observe the temperatures of each
uring this time.

al/container increases its temperature at a faster rate?

loses heat energy (to vaporization) at a faster rate?

ge "reset" circle at the bottom right of the screen. Select "energy
k heaters."

meter in each of the 4 containers.

about the temperature of all four containers (comparatively)?

nd olive oil (and the thermometers) on the stove and push the
ntainers for about 30 seconds.

rom the stove and place the water on the iron cube.

out the heat energy?

t do you notice about the temperature?

ges between the water and the iron after they reach the

olive oil for about 30 seconds. Remove the olive oil from
il on the brick.

heat energy?

u notice about the temperature?

ween the olive oil and brick after they reach the

ws from higher-temperature object to the
ct until they reach the _____
uilibrium, where there's no net energy exchange.

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EXPLORING HEAT EXCHANGES

15. Design your own experiment to test the following claim:

**Claim: Thermal energy ALWAYS flows from the higher temperature obje
temperature object.**

Evidence:

Material (heated for 30 seconds)	Material (initial starting temperature for simulation)	Observati What happens to energy when the touc
Brick	Water	
Iron	Water	
Brick	Oil	
Iron	Oil	

Does your data support the claim?

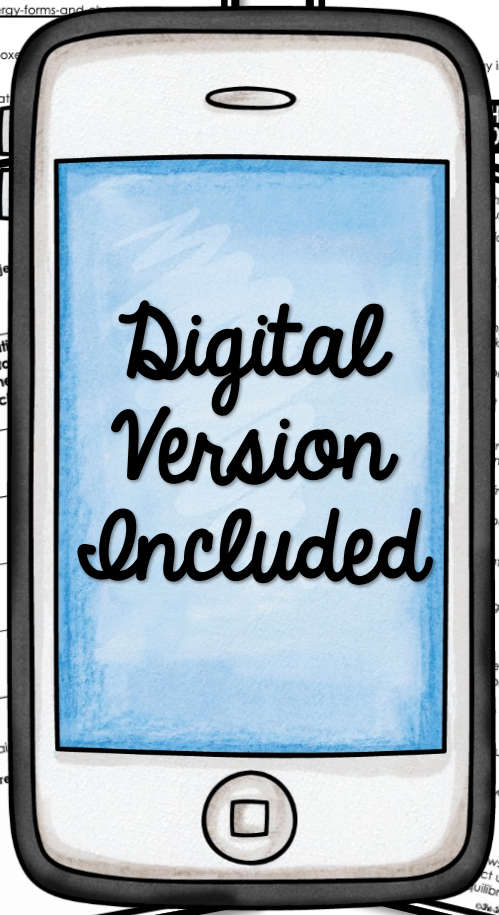
16. Design your own experiment to test the following clai

**Claim: If two objects are at the same temperature, there
between the two objects.**

Describe your experiment for testing this claim:

Does your data support the claim?

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This resource takes students through a virtual thermal energy (heat and temperature) simulation. Students will complete the student worksheet as they move through the virtual simulation.

This resource is great for:

- INTRODUCING THERMAL ENERGY AND HEAT TRANSFER
- REINFORCING CONCEPTS DURING YOUR THERMAL ENERGY UNIT
- INDEPENDENT STUDENT PRACTICE
- TECHNOLOGY INTEGRATION
- FLIPPED CLASSROOMS
- DISTANCE LEARNING AND ONLINE COURSES
- SUBSTITUTE TEACHER ASSIGNMENTS
- REVIEW AND REINFORCEMENT

No Prep! Just print and go!

Concepts Covered:

- HEAT AND THERMAL ENERGY
- TEMPERATURE AND ITS RELATIONSHIP TO THERMAL ENERGY
- HEAT TRANSFER BETWEEN OBJECTS
- COMPARING THERMAL ENERGY IN DIFFERENT MATERIALS
- THERMAL EQUILIBRIUM
- ENERGY TRANSFER FROM HIGHER-TEMPERATURE OBJECTS TO LOWER-TEMPERATURE OBJECTS