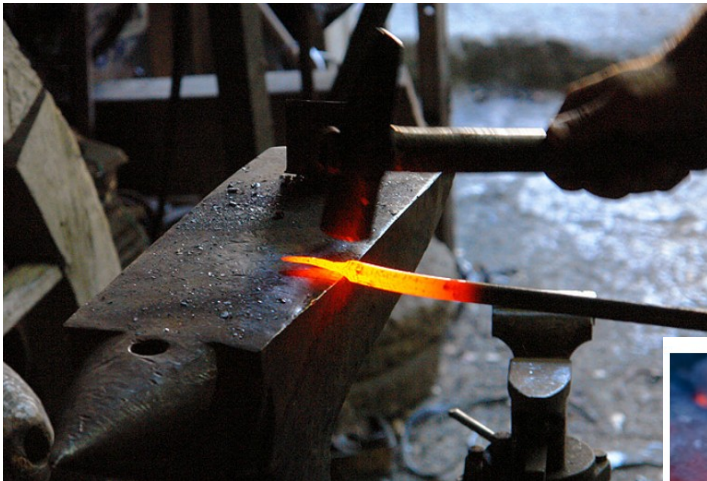


Name \_\_\_\_\_

Date: \_\_\_\_\_

# Focus on Energy

# Student Notebook



## Thermal Energy



Robert S. Donovan/flickr





# *The Energy Tracking Lens*

Part 1. Describe what you observe.

Part 2. Tell the energy story.

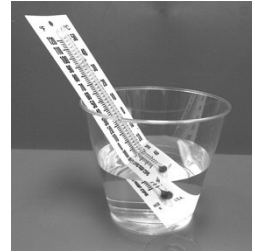
- System components?
- Form(s) of energy?
- Energy gains and losses?
- Energy transfers?
- Energy transformations?
- Where does the energy come from and where does the energy go?

Use observations to support your energy story.

# What can temperature tell us about thermal energy?

## 1. BEFORE you put the rock in the water:

- Measure the temperature of the water. Record the temperature on the data sheet page 3.
- Leave the thermometer in the cup.
- Feel each rock. Describe your observation of temperature on the Observation line of the data sheet.
- Fill in the BEFORE energy bars for the water and the rock on the data sheet.

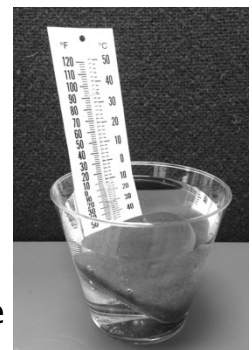


## 2. Carefully lower the rock into the hot water (use the fork). Leave the thermometer in the cup.

- Leave the rock in the water for 3 minutes. Watch the thermometer.

## 3. AFTER you take the rock out of the water:

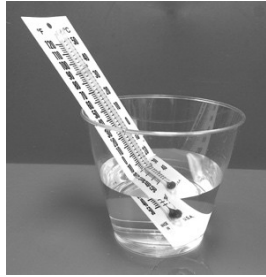
- Read the thermometer. Record the temperature in WATER AFTER section of the data sheet.
- Dry the rock and feel it. Compare it to the other rock. Did the rock that was in the water change temperature?
- Write your observation in the ROCK AFTER section of the data sheet.
- Fill in the AFTER energy bars for the water and the rock.



# Data Sheet

## WATER BEFORE

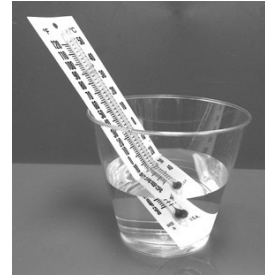
Observation: \_\_\_\_\_ °F



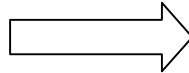
Energy

## WATER AFTER

Observation: \_\_\_\_\_ °F



Energy



## ROCK BEFORE

Observation: \_\_\_\_\_



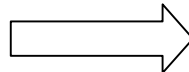
Energy

## ROCK AFTER

Observation: \_\_\_\_\_



Energy



Were there energy gains and losses?    \_\_\_ Yes    \_\_\_ No  
I think so because

---

---

Was there a transfer of energy?    \_\_\_ Yes    \_\_\_ No

I think so because

---

---

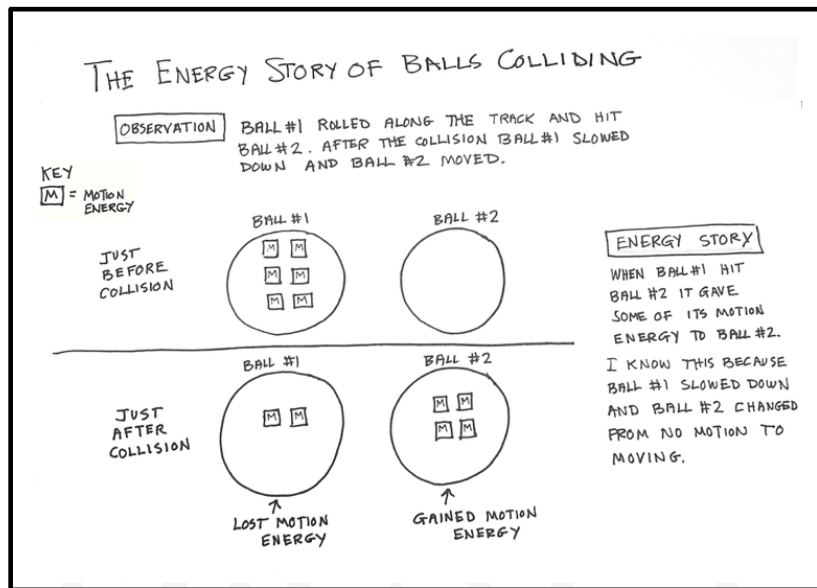
# Energy Story Poster

A complete Energy Story poster has:

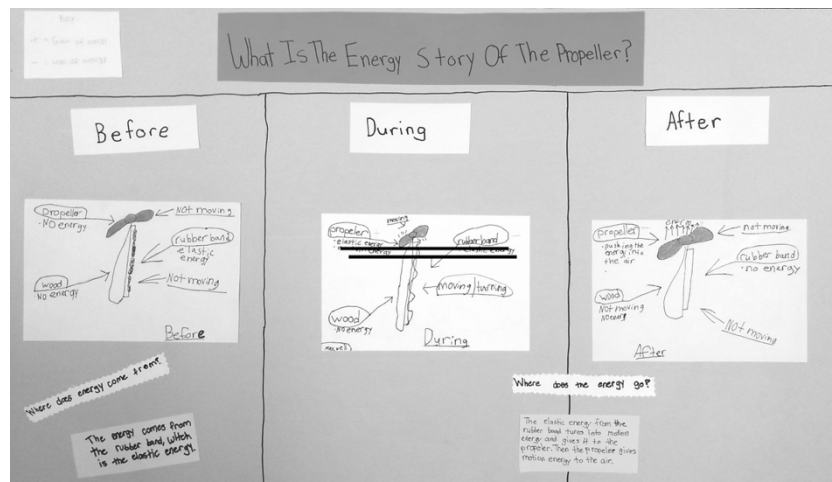
- \* A title
- \* A key
- \* An observation
- \* Answers to the Energy Tracking Lens questions
- \* Drawings with notes

Posters can have many different designs. For example:

A poster can include Energy Cubes or Energy Bars.

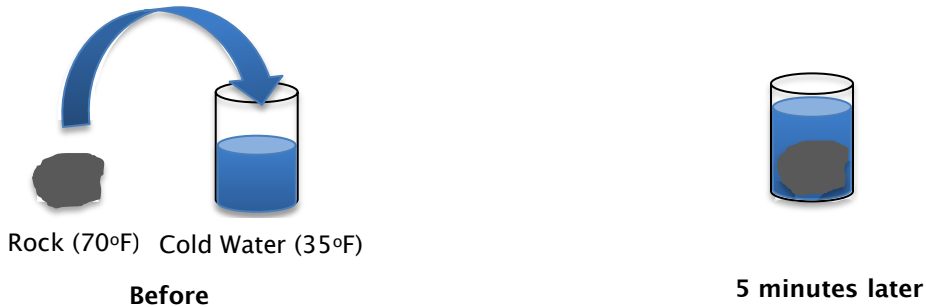


A poster can show different moments or snapshots in time.



## Quick Check: Rock in Cold Water

A rock has been sitting on the table for a while and is at room temperature. Luisa has just taken a cup of cold water out of the refrigerator. She puts the rock in the cup of cold water. She then waits for 5 minutes to see what will happen.



1. During the 5 minutes the rock is in the cold water, the water will:
  - Gain energy
  - Lose energy
  - Neither gain or lose energy

How could you *collect evidence* to test your answer:

---

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2. During the 5 minutes after the rock is placed in the cold water the rock will:
  - Gain energy
  - Lose energy
  - Neither gain nor lose energy

The statement I chose makes sense to me because:

---

---



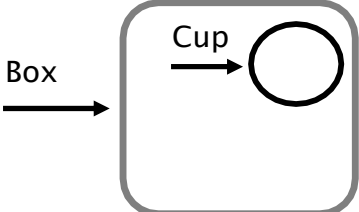
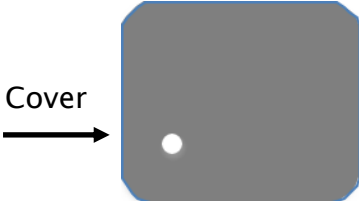
3. Which of these statements about energy transfer do you agree with?
  - There was a transfer of energy from the water to the rock.
  - There was a transfer of energy from the rock to the water.
  - There wasn't a transfer of energy, just temperature changes.
  - There would not be a transfer of energy or temperature changes.

The statement I chose makes sense to me because:

---

---

## Where did the thermal energy go?

	Set up the investigation and record temperature data	Temperature at Start	Temperature after 4 min.	Change (+,-,none)
1	 <p>Measure temperature of the water in the cup. Cover the cup.</p>			
2	 <p>Measure temperature of air inside the box.</p>			
3	<p>Put the cup of water inside the box in a corner.</p> 			
4	<p>Cover the box so the hole is in the corner opposite the cup of water.</p> 			
5	Place the digital thermometer in the hole.			
6	Keep the box covered for 4 minutes. Watch the dial thermometer to see if the air temperature inside the closed box is changing.			
7	After 4 minutes, record the air temperature. Open the box. Feel the air. Open the cup. Use the strip thermometer to measure the water temperature.			



# Track the energy flow inside the box

**Part 1. What change did you observe** after you put the cover on the box?

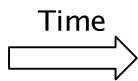
## Part 2. The energy story inside the box.

a. What form(s) (kinds) of energy are involved?

b. Use energy bars to show any energy gains and losses.

Water (Inside box)

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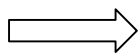


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- Gain
- Loss
- No change

Air (Inside the box)

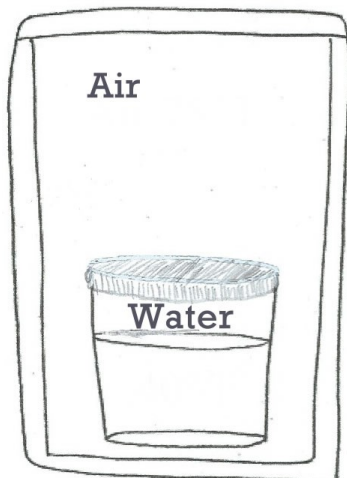
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- Gain
- Loss
- No change

c. Draw arrows and use words to show the flow of energy inside the box.



# Thermal Energy Flow in Everyday Life

1. Do you think thermal energy is present? Yes, No, Not Sure?



1.

\_\_\_\_\_



5.

\_\_\_\_\_



9.

\_\_\_\_\_



2.

\_\_\_\_\_



6.

\_\_\_\_\_



10.

\_\_\_\_\_



3.

\_\_\_\_\_



7.

\_\_\_\_\_



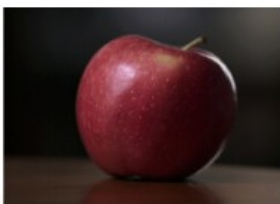
11.

\_\_\_\_\_



4.

\_\_\_\_\_



8.

\_\_\_\_\_



12.

\_\_\_\_\_

2. What made you think thermal energy was present?

## Cookie Energy



Darwin, the dog, is watching your cousin bake cookies. Your cousin takes some hot cookies out of the oven and puts them on a rack to cool down. He tells you that you can eat one in 15 minutes. Your friends Katya, Sal, Roger and Luis are discussing what will happen to the thermal energy in the cookies while they cool off.



Katya says – “Energy from the hot cookies will transfer to the air in the room.”

Sal says – “Energy from the hot cookies evaporates into the room.”

Roger says – “Energy leaves the hot cookies but it does not go anywhere.”

Luis says – “There is no energy transfer, the hot cookies just cool off.”

**Circle** the idea that makes the most sense to you and explain why.

Darwin notices that while the cookies are cooling down the temperature of the kitchen does not change much at all. He wonders how it is possible for the temperature of the cookies to change so much while the temperature of the kitchen does not change.

Explain how this is possible. (Use diagrams, bars, words and/or the Energy Tracking Lens to tell the energy story).