

ENERGY SOURCE AND ACTION A
DEMONSTRATION: FLASHLIGHT

- What action did you observe?
- What kind of energy caused that action?
- What was the energy source?
- Where was the energy stored?
- What was the stored energy converted into?
- The energy in the _____ changed into _____ energy.

STATION 1: SOLAR CELL

- What action did you observe?
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- Where was the energy stored?
- What was the stored energy converted into?
- The energy in the _____ changed into _____ energy.

STATION 2: TONE GENERATOR

- What action did you observe?
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- The energy in the _____ changed into _____ energy.

ENERGY SOURCE AND ACTION B

STATION 3: MOTOR

- What action did you observe?
- What kind of energy caused that action?
- What was the energy source?
- Where was the energy stored?
- What was the stored energy converted into?
- The energy in the _____ changed into _____ energy.

STATION 4A: CANDLE

- What action did you observe?
- What kind of energy caused that action?
- What was the energy source?
- Where was the energy stored?
- What was the stored energy converted into?
- The energy in the _____ changed into _____ energy.

STATION 4B: RUBBING YOUR HANDS

- What action did you observe?
- What kind of energy caused that action?
- What was the energy source?
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- What was the stored energy converted into?
- The energy in the _____ changed into _____ energy.

ENERGY SOURCE AND ACTION B

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ENERGY SOURCES QUESTIONS

1. What is energy?
2. What are some of the different kinds of energy?
3. What are some of the sources of stored energy that people use?
4. How are food, fuel, and batteries alike?
5. What is the source of most of the energy used by people? Explain.

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ENERGY CONVERSION

Show the energy conversions. Use arrows to connect each Energy Action with the Stored-Energy Source that causes it. Each energy source may cause more than one action.

STORED-ENERGY SOURCE

ENERGY ACTION

Sun

Light

Candle

Muscle movement

Gasoline

Heat

Battery

Electricity

Apple

Chemicals

Wood

Machine motion

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ENERGY ACTION

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Machine motion

RESPONSE SHEET—ENERGY

Brad told his friend,

See that truck driving by? It is powered by sunlight.

Brad's friend said,

No it isn't, it's powered by gasoline.

Brad replied,

I know it burns gasoline but I still say it is powered by sunlight.

Explain why Brad said the truck was powered by sunlight.

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Brad replied,

I know it burns gasoline but I still say it is powered by sunlight.

Explain why Brad said the truck was powered by sunlight.

HOW DOES ENERGY TRAVEL? A

STATION 1: TONE GENERATOR

- What action did you observe?
- Where did the energy come from?
- Where did the energy go?
- What carried the energy?
- The energy in _____ moved through the _____ and ended up _____.

STATION 2: SPRING TOY

- What action did you observe?
- Where did the energy come from?
- Where did the energy go?
- What carried the energy?
- The energy in _____ moved through the _____ and ended up _____.

STATION 3: BOWLING

- What action did you observe?
- Where did the energy come from?
- Where did the energy go?
- What carried the energy?
- The energy in _____ moved through the _____ and ended up _____.

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Investigation 1: Energy
No. 6—Science Notebook

HOW DOES ENERGY TRAVEL? A

STATION 1: TONE GENERATOR

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Investigation 1: Energy
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HOW DOES ENERGY TRAVEL? B

STATION 4: BATTERY AND MOTOR

- What action did you observe?
- Where did the energy come from?
- Where did the energy go?
- What carried the energy?
- The energy in _____ moved through the _____ and ended up _____.

DEMONSTRATION: WATER WAVES

- What action did you observe?
- Where did the energy come from?
- Where did the energy go?
- What carried the energy?
- The energy in _____ moved through the _____ and ended up _____.

HOW DOES ENERGY TRAVEL? B

STATION 4: BATTERY AND MOTOR

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- The energy in _____ moved through the _____ and ended up _____.

DEMONSTRATION: WATER WAVES

- What action did you observe?
- Where did the energy come from?
- Where did the energy go?
- What carried the energy?
- The energy in _____ moved through the _____ and ended up _____.

ALL ABOUT THE TRANSFER OF ENERGY

1. Where do people get energy?
2. Why does a car need gasoline to run?
3. What kinds of things have moving energy?
4. What are some examples of stored energy?
5. How can stored energy change into active, moving energy?
6. What is fuel used for?
7. How does energy from the Sun get converted into energy that can be used by humans and other animals?

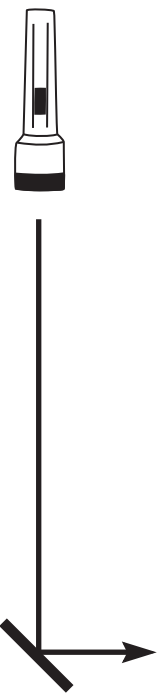
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7. How does energy from the Sun get converted into energy that can be used by humans and other animals?

MIRROR CHALLENGES A

Draw the position of mirrors under each challenge. Draw lines to show how light reflects off the mirrors to solve the challenge.

Example: Place mirrors to make light shine to the left.



1. Place mirrors to make light shine on the side of the flashlight.



2. Place mirrors to make light shine in two different directions.



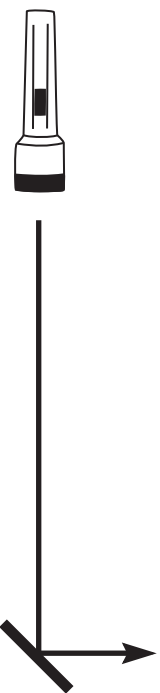
3. Place mirrors to make light shine on an object behind the flashlight.



MIRROR CHALLENGES A

Draw the position of mirrors under each challenge. Draw lines to show how light reflects off the mirrors to solve the challenge.

Example: Place mirrors to make light shine to the left.



1. Place mirrors to make light shine on the side of the flashlight.



2. Place mirrors to make light shine in two different directions.



3. Place mirrors to make light shine on an object behind the flashlight.



MIRROR CHALLENGES B

4. Place mirrors to shine light on the back of the first reflecting mirror.



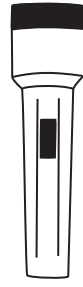
5. Stand a book in front of the flashlight. Place mirrors to shine light "through" the book.



6. Make up your own challenge and show how to solve it.

MIRROR CHALLENGES B

4. Place mirrors to shine light on the back of the first reflecting mirror.



shine light "through" the book.

6. Make up your own challenge and show how to solve it.

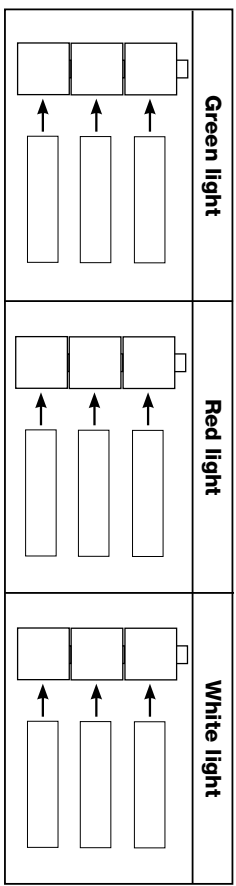


UNKNOWN COLORS

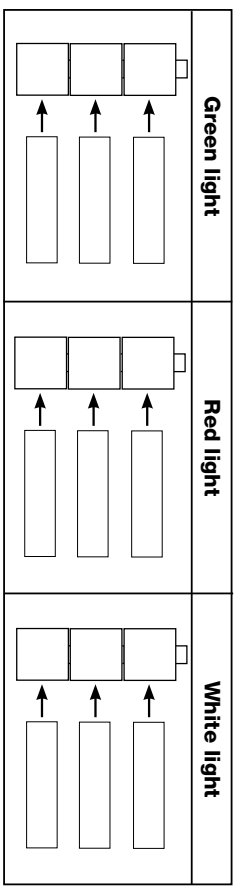
Observe the three cubes in the **green** tube. Record the colors you see in green light.

Observe the three cubes in the **red** tube. Record the colors you see in red light.

When everyone has recorded, remove the cubes from the tube. Record the colors you see in white light.



Unknown Colors 1. I observed these colors in



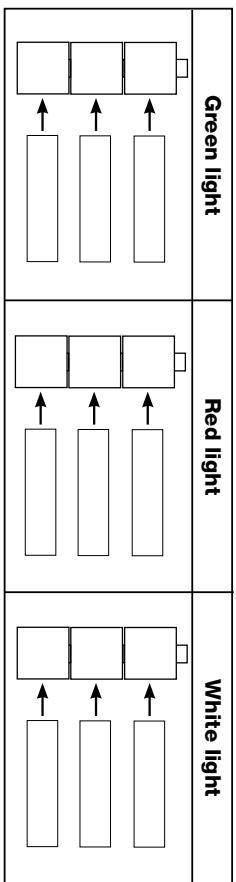
1. Look at a dark green cube in white light. What color is it? Explain why.
2. Look at a dark green cube in red light. What color is it? Explain why.

UNKNOWN COLORS

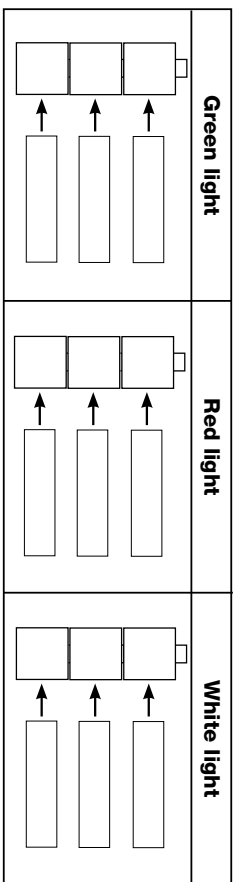
Observe the three cubes in the **green** tube. Record the colors you see in green light.

Observe the three cubes in the **red** tube. Record the colors you see in red light.

When everyone has recorded, remove the cubes from the tube. Record the colors you see in white light.



Unknown Colors 2. I observed these colors in



1. Look at a dark green cube in white light. What color is it? Explain why.
2. Look at a dark green cube in red light. What color is it? Explain why.

ALL ABOUT LIGHT QUESTIONS

ALL ABOUT LIGHT QUESTIONS

1. What is light?
 2. What is the most important source of light for Earth?
 3. How can light energy change into heat energy?
 4. How is reflection different from absorption?
 5. Describe an object that can block sunlight to create shadows.
 6. Describe how light travels.
1. What is light?
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 3. How can light energy change into heat energy?
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THROW A LITTLE LIGHT ON SIGHT QUESTIONS . . .

THROW A LITTLE LIGHT ON SIGHT QUESTIONS . . .

1. Why couldn't Sara see anything when she first went into the exhibit at the Lawrence Hall of Science?
 2. Why did Sara's orange appear black in blue light?
 3. Why did Sara's lime appear green in white light?
 4. How will Sara's lime look in red light? Explain why.
1. Why couldn't Sara see anything when she first went into the exhibit at the Lawrence Hall of Science?
 2. Why did Sara's orange appear black in blue light?
 3. Why did Sara's lime appear green in white light?
 4. How will Sara's lime look in red light? Explain why.

SOLID, LIQUID, OR GAS?

After you sort all the samples of matter, write their names in the spaces below.

Solid	Liquid
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Gas	Unsure
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

SOLID, LIQUID, OR GAS?

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_____	_____
_____	_____
_____	_____
_____	_____

Gas	Unsure
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

PROPERTIES OF SOLID, LIQUID, AND GAS

PROPERTIES OF SOLID, LIQUID, AND GAS

1. **Solid.** How can you tell if a sample of matter is solid?
2. **Liquid.** How can you tell if a sample of matter is liquid?
3. **Gas.** How can you tell if a sample of matter is gas?

1. **Solid.** How can you tell if a sample of matter is solid?
2. **Liquid.** How can you tell if a sample of matter is liquid?
3. **Gas.** How can you tell if a sample of matter is gas?

MEASURING MASS

Determine the mass of the metal disk, wood square, and plastic chip. Start with the metal disk. Take turns measuring the mass.

- Student 1 measures the mass of the metal disk in grams.
- Everyone records the mass on their own notebook sheet.
- Repeat the measuring and recording for students 2, 3, and 4.
- Repeat the process for the wood square.
- Repeat the process for the plastic chip.

Object	Student 1	Student 2	Student 3	Student 4
Metal disk				
Wood square				
Plastic chip				

QUESTIONS

- Did everyone get the same result for the mass of the metal disk?
- Were the differences large or small?
- What could have caused the differences?

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Investigation 3: Matter
No. 16—Science Notebook

MEASURING MASS

Determine the mass of the metal disk, wood square, and plastic chip. Start with the metal disk. Take turns measuring the mass.

- Student 1 measures the mass of the metal disk in grams.
- Everyone records the mass on their own notebook sheet.
- Repeat the measuring and recording for students 2, 3, and 4.
- Repeat the process for the wood square.
- Repeat the process for the plastic chip.

Object	Student 1	Student 2	Student 3	Student 4
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Investigation 3: Matter
No. 16—Science Notebook

THE SPONGE QUESTION

Investigation 1. How many grams of water can a dry sponge soak up?

Investigation Plan

I predict the dry sponge will soak up _____ of water.

The dry sponge soaked up _____ of water.

Investigation 2. How many grams of water can a wet sponge soak up?

Investigation Plan

I predict the wet sponge will soak up _____ of water.

The wet sponge soaked up _____ of water.

- Weigh the soaked sponge.
- Weigh the dry sponge.
- Soak the sponge in water.
- Weigh the sponge after it is squeezed dry.
- Squeeze all the water out of the sponge.
- Weigh the water left in the cup.

THE SPONGE QUESTION

Investigation 1. How many grams of water can a dry sponge soak up?

Investigation Plan

I predict the dry sponge will soak up _____ of water.

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I predict the wet sponge will soak up _____ of water.

The wet sponge soaked up _____ of water.

- Weigh the soaked sponge.
- Weigh the dry sponge.
- Soak the sponge in water.
- Weigh the sponge after it is squeezed dry.
- Squeeze all the water out of the sponge.
- Weigh the water left in the cup.

OPINION AND EVIDENCE QUESTIONS

1. Teasha claimed that natural sponges were better. What did she base that claim on?
2. Why did Teasha and Kim repeat their experiments?
3. Was Teasha's claim that natural sponges last longer based on opinion or evidence?
4. What is the difference between opinion and evidence?

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1. Teasha claimed that natural sponges were better. What did she base that claim on?
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MEASURING VOLUME

Object	Predicted volume or capacity	Measured volume or capacity	Difference
Cup, mark A			
Cup, mark B			
Cup, mark C			
Cup, mark D			

MEASURING VOLUME

Object	Predicted volume or capacity	Measured volume or capacity	Difference
Cup, mark A			
Cup, mark B			
Cup, mark C			
Cup, mark D			

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Investigation 3: Matter
 No. 19—Science Notebook

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Investigation 3: Matter
 No. 19—Science Notebook

MEASURING TEMPERATURE

On this side of the number line,

- Write "A" by the temperature of the water in cup A.
- Write "B" by the temperature of the water in cup B.
- Write "C" by the temperature of the water in cup C.



On this side of the number line,

- Write "Hot" by the temperature of the hot water.
- Write "Cold" by the temperature of the cold water.
- Write "P" by the temperature you predict for the mixture of hot and cold water.
- Write "Mixture" by the temperature of the mixture of hot and cold water.

MEASURING TEMPERATURE

On this side of the number line,

- Write "A" by the temperature of the water in cup A.
- Write "B" by the temperature of the water in cup B.
- Write "C" by the temperature of the water in cup C.



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- Write "Cold" by the temperature of the cold water.
- Write "P" by the temperature you predict for the mixture of hot and cold water.
- Write "Mixture" by the temperature of the mixture of hot and cold water.

MELTING

Predict if each sample will melt. Record your predictions in the table below.

Put one sample of each of these materials in a plastic cup.

chocolate wax margarine pebble

Float the cup in the hot-water container.

Measure the temperature of the hot water: _____

Record your observations in the table below.

Material	Will it melt? (yes or no)	Observations (what happened)
Chocolate		
Margarine		
Pebble		
Wax		

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QUESTIONS

1. Which materials melted completely?
2. How do you know?
3. Which materials did not melt completely?
4. How could you melt them?

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1. Which materials melted completely?
2. How do you know?
3. Which materials did not melt completely?
4. How could you melt them?

BAKING SODA AND VINEGAR

BAKING SODA AND VINEGAR

I predict that the mass of the baking soda and vinegar will be **greater / the same / less** after mixing.

I predict that the mass of the baking soda and vinegar will be **greater / the same / less** after mixing.

Record the mass of the baking soda and vinegar before mixing.

Record the mass of the baking soda and vinegar before mixing.

Record your observations after you add vinegar to the baking soda.

Record your observations after you add vinegar to the baking soda.

Record the mass of the baking soda and vinegar after mixing.

Record the mass of the baking soda and vinegar after mixing.

Explain where you think the bubbles came from.

Explain where you think the bubbles came from.

Compare the masses before and after mixing. Explain what you think happened.

Compare the masses before and after mixing. Explain what you think happened.

ALL ABOUT SOLIDS, LIQUIDS, AND GASES

1. What is all matter made of?
2. How are particles organized in solids and liquids?
3. If you transfer heat energy to a solid, what happens to the particles?
4. If you transfer heat energy to a liquid, what happens to the particles?
5. Do all solids have the same melting point? Explain.

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