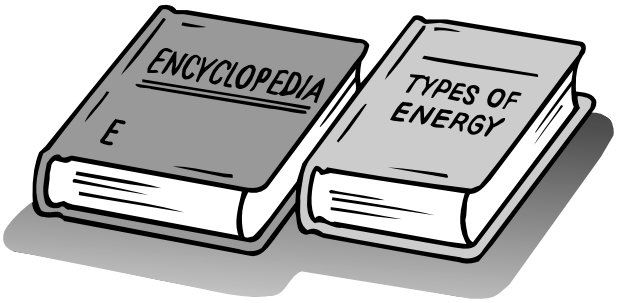
Chapter Science Investigation Name _____

Using Solar Energy

What You Need



reference and nonfiction books on energy

coloring pencils

gummed stars, preferably one color

metric ruler

Find Out

Do this activity to see how we identify forms of energy and transfer them to other forms of energy.

Process Skills

Classifying
Using Numbers
Interpreting Data

Time

- 30 minutes the first day
- 30 minutes each day for three weeks

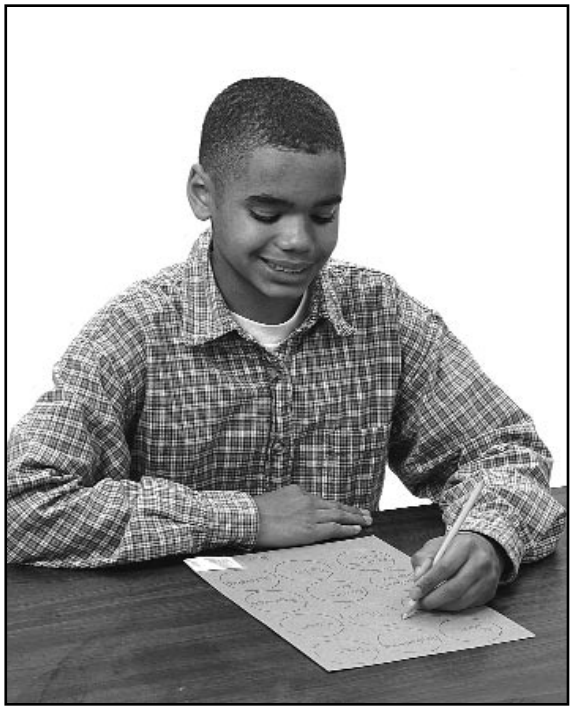
What to Do

1. Complete the Flow of Energy chart. Inside each circle label the following: “Sun,” “Moving Air,” “River,” “Tree,” “Plants for Food,” “Animals,” “Fossil Fuels,” “Hydroelectric,” “Water Heater,” “Furnace,” “Radio,” and “Automobile.”

2. Fill in the key in the lower right corner of the chart to include the following color code.

Heat Energy	red
Light Energy	yellow
Sound Energy	orange
Chemical Energy	green
Electrical Energy	blue
Mechanical Energy	brown

(You may instead choose to make the key on a computer, print it, cut it out, and paste it to the lower right corner of the chart.)

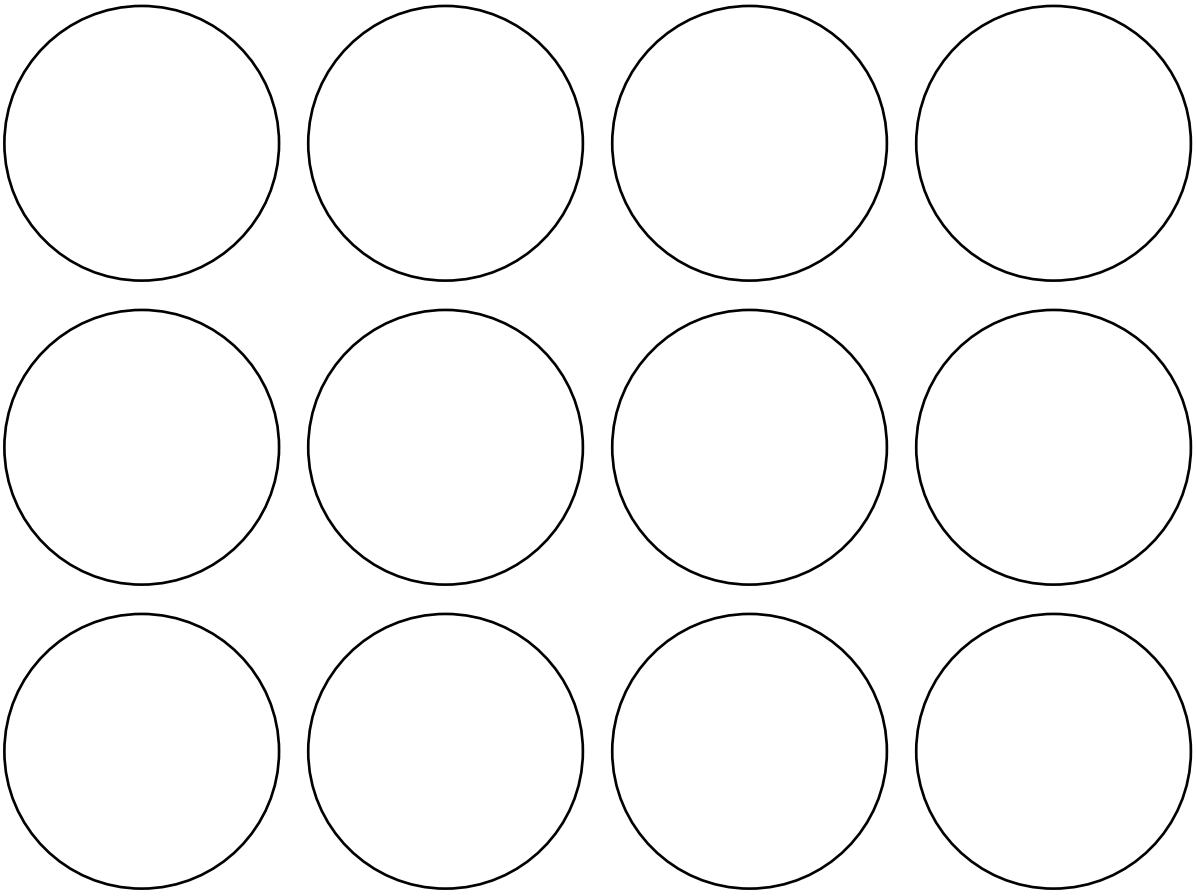


3. **Investigate** and **chart** the flow of energy from the sun to the various ways that we use energy every day. Draw a line from circle to circle, using your color key to identify the various energy forms.

4. Place a star wherever energy is converted into another form. Example sequence: sun (light energy—yellow) to tree (chemical energy—green) to fossil fuels (chemical energy—green) to furnace (heat energy—red) to moving air.

5. If you need to, you may add circles to your chart and label them.

Flow of Energy



Key

Conclusions

1. How do we rely on the flow of energy from the sun?

2. Give another example of how energy is used over and over again.

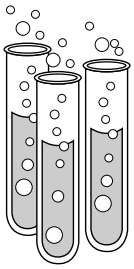
3. Name places in your classroom where energy is converted from one form to another.

New Questions

1. What are some disadvantages of using conventional energy sources?

2. What are some advantages of using solar cells?

3. How can you conserve energy?



Name _____

ACTIVITY

Flowing Heat

What do you **predict** will happen to the temperature of water if you fill one bag with hot water and the second bag with cold water?

Bag 1 (Hot Water)

Time	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**	**6.0**	**6.5**	**7.0**	**7.5**
Temp.															
Time	**8.0**	**8.5**	**9.0**	**9.5**	**10.0**	**10.5**	**11.0**	**11.5**	**12.0**	**12.5**	**13.0**	**13.5**	**14.0**	**14.5**	**15.0**
Temp.															

Bag 2 (Cold Water)

Time	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**	**6.0**	**6.5**	**7.0**	**7.5**
Temp.															
Time	**8.0**	**8.5**	**9.0**	**9.5**	**10.0**	**10.5**	**11.0**	**11.5**	**12.0**	**12.5**	**13.0**	**13.5**	**14.0**	**14.5**	**15.0**
Temp.															

Graph your data on a sheet of graph paper. Use a red line for your hot-water data and a blue line for your cold-water data.

Name _____

Conclusions

1. What happened to the temperature in the bag of hot water? In the bag of cold water?

2. Which bag of water gained thermal energy? What evidence do you have that this bag of water gained thermal energy?

3. Which bag of water lost thermal energy? What evidence do you have that this bag lost thermal energy?

4. How would you **explain** the temperature changes?

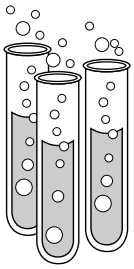
5. **Infer** which way the thermal energy flowed. Explain how you know this.

6. How do your results **compare** with your prediction from Step 1?

Asking New Questions

1. What would happen if you had two bags of hot water and a bag of cold water in the cup?

2. What would happen if you used twice as much cold water?



Name _____

ACTIVITY

Insulating for Energy Conservation

Record your data below.

Uninsulated House

Time	Temperature
after 5 min	
after 10 min	
after 15 min	

Insulated House

Time	Temperature
after 5 min	
after 10 min	
after 15 min	

Name _____

Conclusions

1. How much longer than the house *without* insulation did the house *with* insulation stay above 20 °C?

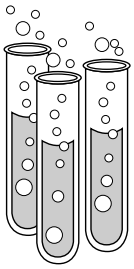
2. How did your results **compare** to those of others in your class?

3. **Explain** what the crumpled newspaper does.

Asking New Questions

1. Make an **inference** about which house would need the least energy to keep it comfortable on a cold day.

2. How could you **test** materials for use in insulating buildings?



Name _____

ACTIVITY

Transferring Energy

Record your data for the solar collector below.

Trial	Beginning Temperature	Ending Temperature	Time Taken
1			
2			
3			

Total time that water spent running through solar energy collector: _____

Record your data for the hot plate below.

Time (min)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Temperature									

Name _____

Conclusions

1. What was the final water temperature using the solar collector?

2. How long did it take the hot plate to heat the water to that temperature?

Asking New Questions

1. What are some of the benefits of using solar heating?

2. What are some of the drawbacks of using solar heating?