

Sec.: _____ Name: _____

Experiment: Solar Energy Collector
(E. Science 9-5-2b)

Purpose: To build a simple solar energy collector to learn how sun energy can be trapped as a source of energy instead of using electricity.

Materials: coffee cans with lids: 1 large, 1 small
cover materials: plastic wrap, waxed paper, polyethylene pane of glass
hammer nail (diameter of thermometer)
newspapers paint (flat black spray)
pencils (colored) clock

Methods:

1. Paint the inside of the small can black. Let it dry.
2. Punch a hole in one side of the can so the thermometer can pass through easily. (see first figure).

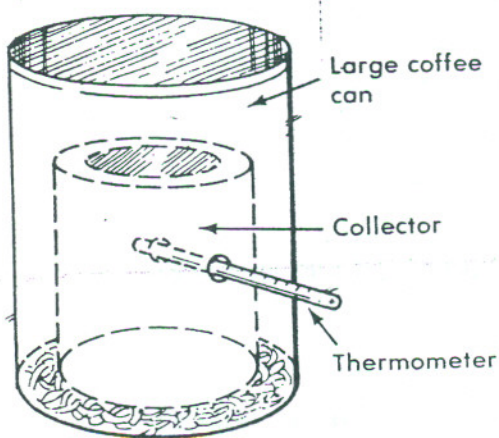
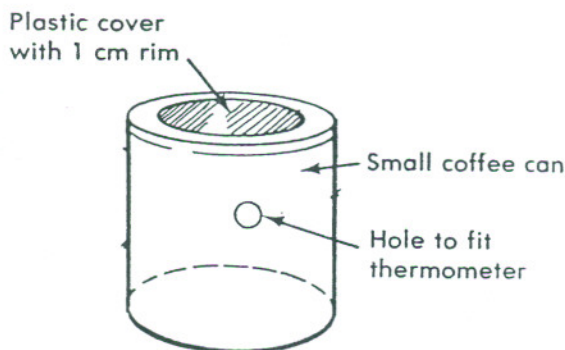
3. Cut the center out of the plastic lid for the small can. leave a 1 cm rim around the lid.
4. Stretch a piece of plastic wrap across the top of the small can and put on the lid.
5. Punch a hole in the large can so a thermometer can pass through it easily into the small can.
6. Shred some newspaper and put it in the bottom of the large can.
7. Set the small can on top of the newspaper. Be sure the holes in the cans align. If they do not align, add or take out newspaper until they do align.

8. Insert the thermometer as shown in the second figure and measure the air temperature in the small can. Record this in results table under plastic wrap.

9. Place the solar collector in the sun and measure the temperature each minute for 10 minutes. Record the temperature in results table starting with time zero (beginning).

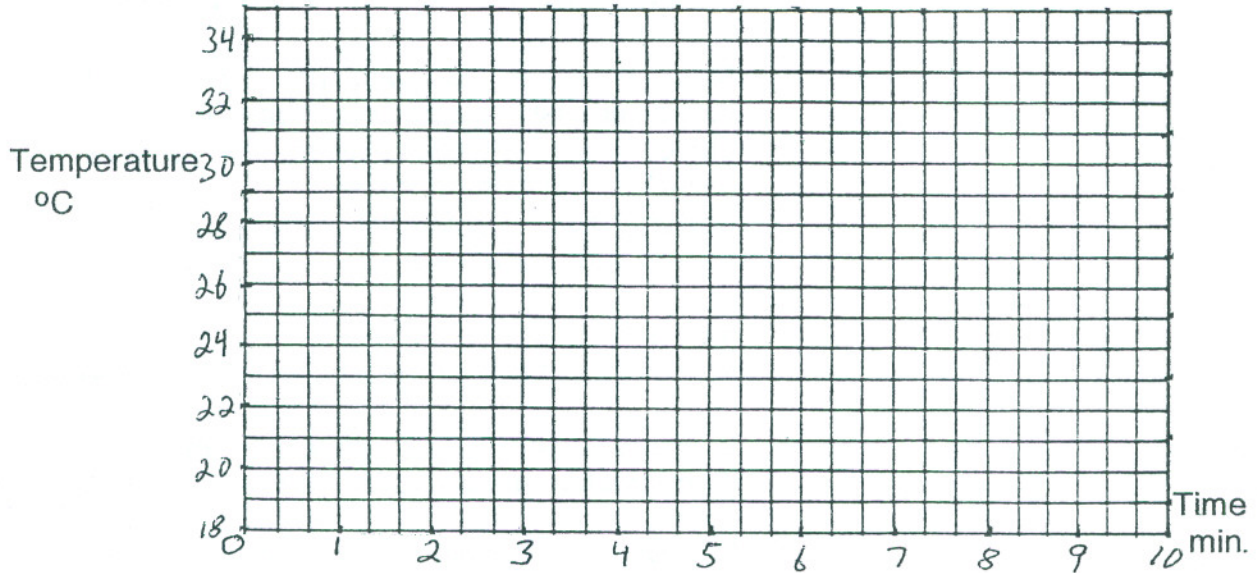
10. Repeat steps 8 and 9 using waxed paper, polyethylene, and glass covers for the small can. NOTE: Do not try to put the coffee can lid over the glass pane.

11. Use a different color pencil for each materials and graph your data. Use the vertical axis (Y axis) for Temperature and horizontal axis for Time.



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Results:	temperature in °C										
time	0	1	2	3	4	5	6	7	8	9	10
plastic wrap											
waxed paper											
polyethylene											
glass											



Conclusions:

1. Which material is the most effective cover material?
2. Which material is the least effective cover material?
3. Why did you insulate the collector?
4. What other types of insulation could be used?
5. Why did you paint the inside of the can black?
6. Why is most winter clothing a darker color than summer clothing?

Discussion:

1. Solar collectors have five basic parts: 1) the covering material or glazing, 2) the collector plate which is usually coated with a dark material, 3) The collector box or housing, 4) the insulation, and 5) air or liquid to transfer the solar energy. Name the parts of your solar collector that correspond to each of the five basic parts.

1. _____
2. _____
3. _____
4. _____
5. _____

2. What else is needed so that the heat energy collected can be effectively used?

3a. What covenant is referred to in Gen. 9: 8 - 16?

3b. List all who are listed in this covenant?

3c. What does this indicate about God's commitment to caring for Earth's animals?