

Which has More Heat Energy: Vegetable Oil or Petroleum Oil?

Concept: Students will learn that different types of fuel produce different amounts of heat energy.

Goal: Students will measure the amount of heat (calories) generated by a nonrenewable fuel (motor oil) and a renewable fuel (vegetable oil).

Materials: Vegetable oil, automobile oil, 2 pieces of cotton clothesline (3 cm each), glass eyedropper, thermometer, chart, matches, tin can, paper clips, metric measuring cup, water, styrofoam cup, wire coat hanger or ring stand for supporting can of water

Procedure:

1. Bend the paper clip so it stands with the end of the clip pointing upwards.
2. Stab the cotton clothesline piece on the paper clip end so it does not touch the table.
3. Bend the coathanger so that it will support the tin can higher than the height of the clothesline holder.
4. Place about 20 drops of oil on the clothesline to saturate it.
5. Add about 100 mL of water to the can.
6. Place it on the coathanger cup holder and place the styrofoam cup over the can as a lid.
7. Poke a hole in the styrofoam cup and place the thermometer into the can of water.
8. Record the temperature of the water and its volume in the chart.
9. Place the saturated clothesline under the can and light it on fire with a match.
10. Record the highest temperature the water achieved as the fire went out.
11. Record the temperature in the chart.
12. Repeat steps 4-11 using fresh clothesline and the other type of oil.
13. Calculate the change in temperature of the water for both trials.
14. Calculate the amount of heat given off by the burning oil for both trials. (multiply the volume times the temperature change to get heat given off in calories)

Data Chart:

	Temperature Of cold Water (°C)	Volume of water used (mL)	Temperature after burning (°C)	Heat given off by oil (cal)
Vegetable Oil				
Automobile Oil				

Which type of oil gave off the most heat?

Is there a large difference in the amount of heat the oils gave off?

How do your results compare with the results of the others in your class?

Would vegetable oil be a good substitute for petroleum oil as a fuel? Why?

Extensions:

Try different types of oils (peanut, olive, safflower, etc.) to see if they have different heat contents.

Is there a difference in the heat content of solid animal fats (such as lard or Crisco) and vegetable oil?

Where does the energy stored in the oils originally come from?