Natural Timekeeping: Fruit Clock

Background: Most clocks or watches today are powered by batteries. You can create your own battery-powered clock with food from your kitchen and a couple of items from your local hardware store. The science behind the fruit-powered clock is simple. There is a chemical reaction between the steel in the paper clip and the juice (acid) in the fruit. There is also a chemical reaction between the copper in the penny and the juice (acid) in the fruit. These two chemical reactions push electrons through the wires. Because the two metals are different, the electrons get pushed harder in one direction than the other. If the metals were the same, the push would be equal and no electrons would move. The electrons flow in one direction around in a circle and then come back to the fruit battery. While they flow through the clock, they make it work. This flow is electrical current, which a normal battery you buy at the store would help produce.

Materials:
2 lemons or your fruit of choice
3 copper wires
2 large paper clips
2 pennies
A digital clock
Knife (with adult assistance)
Fruit clock

Instructions for Activity:

1. Use the demonstration fruit clock to show how fruit can be used to keep time (instructions enclosed with model).
2. Invite participants to make a homemade fruit clock. Make sure that an adult is assisting with this activity.
3. Attach one of the paper clips to a wire.
4. Attach a penny to a second wire
5. Attach another penny to one end of the third wire and a paper clip to the other end.
6. Squeeze and roll two lemons to loosen the pulp inside.
7. Make two small cuts in the skins of both lemons about an inch apart.
8. Put the paper clip that is attached to the wire and the penny into one of the cuts until you get to the juicy part of the lemon.
9. Put the penny into a hole in the other lemon.
10. Put the other paper clip into the second hole of the lemon with the penny.
11. Put the last penny into the last open hole.
12. Connect the free ends of the wires to the contact pads on the battery holder of the digital clock.
13. If the clock doesn't illuminate, try switching the wires to the opposite contacts on the clock's battery holder.

Additional Activity Ideas:

Cut the lemons in half or squeeze them and put the wires in the lemon juice. Does the battery still work?

Experiment with different fruits, vegetables, or beverages such as soda or orange juice. What food or drink makes the best battery to keep your clock going?