RECORD SHEET

Activity 4: The Electric-Circuit Interaction

Name Date Class

Key Questions

1. _____

_____

2. _____

_____

Explore Your Ideas

Experiment 1: When does an electric-circuit interaction occur?

1. Draw a picture of the circuit when the bulb is lit.

2. Look carefully at how the wires are connected to each of the circuit elements — the cell (in its holder), the bulb (in its holder), and the switch. How many connections are there to each element in the circuit (*one connection*, *two connections*, *more than two*)?

_____

_____

3. When does an electric-circuit interaction occur?

Experiment 2: What types of materials are necessary for an electric-circuit interaction to occur?

Table 1: Materials that Allow the Bulb To Glow	
Material	**Does the Bulb Glow?** (Yes or No)
iron nail	
paper	

4. Examine your data table, and complete the following statement:

In order for an electric-circuit interaction to occur, the type(s) of material that must be included in the circuit is (are) _____ .

The evidence is _____

Experiment 3: How can you hook up more than one bulb to a cell?

5. Draw a picture of this circuit and label it *series circuit.*

6. Unscrew one of the two bulbs from its socket. Leave the other bulb alone. What happens to the other bulb—does it remain lit or does it go out?

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7. Draw a picture of this circuit and label it *parallel circuit.*

8. Unscrew one of the two bulbs from its socket. Leave the other bulb alone. What happens to the other bulb—does it remain lit or does it go out?

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9. Why do you think the result for Question 8 was different from the result for Question 6?

Experiment 4: If the number of cells in the circuit increases, what happens to the brightness of the bulb?

10. Is the bulb in this two-cell and one-bulb circuit *brighter than*, *dimmer than*, or *equally as bright* as the bulb in the one-cell, one-bulb circuit in Experiment 1?

11. What happens to the brightness of the bulb when an additional cell is added to the circuit?

12. Write your conclusion for this experiment by answering the following question in a complete sentence.

If the number of cells in the circuit increases, what happens to the brightness of the bulb?

Experiment 5: If the number of cells in the circuit increases, what happens to the amount of electric current in the circuit?

13. What is your hypothesis about the relationship between the number of cells and the amount of electric current? Choose one of the following responses.

a) The more cells, the *greater* the amount of electric current.

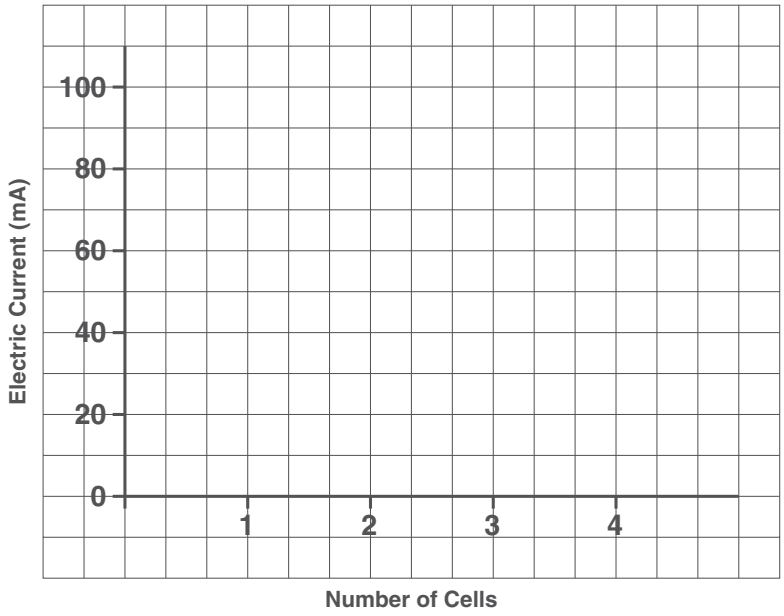
b) The more cells, the *smaller* the amount of the electric current.

c) There is *no relationship* between number of cells and the amount of electric current.

Discuss this question with your partner and record your answer, including your reason.

Table 2: Amount of Electric Current versus Number of Cells	
Number of Cells	Amount of Electric Current (mA)
1	
2	
3	
4	

14. Sometimes, people like to see data displayed on a graph. Your teacher will show you how to make a bar graph of your data.



15. Write your conclusion by completing the following statements:

If the number of cells in the circuit increases, the amount of electric current _____ (*increases*, *decreases*, *remains the same*).

The evidence is _____

_____

_____

_____

Make Sense of Your Ideas

1. What kind of objects are involved in an electric-circuit interaction?

_____

_____

_____

2. How are the objects connected together?

_____

_____

_____

3. What is the evidence that an electric-circuit interaction has occurred?

4. What happens to the electric-circuit interaction when there is a break in an electric-circuit loop?

5. What variable or variables can influence the electric-circuit interaction? What is your evidence?

6. You can buy two types of holiday lights.

In **type A**, when you plug in the lights and one bulb burns out, all the bulbs go out.

In **type B**, when you plug in the lights and one bulb burns out, the other bulbs stay on.

In one type, the bulbs are all connected together in a series circuit with the electrical source. In the other type, the bulbs are connected in a parallel circuit with the electrical source.

Which type, A or B, is connected in series?

Which type is connected in parallel?

7. Consider how your electrical devices are connected together at home. Suppose you have a room with two different lamps. Do you think the lamps are connected together in series or in parallel? How do you know?

Our Consensus Ideas

The key questions for this activity are:

1. What are the defining characteristics of an electric-circuit interaction?
2. What are some variables that influence the electric-circuit interaction?

1. Think about your answers to the questions in Make Sense of Your Ideas. Write your best answers to the key questions.

1.

2.

2. Indicate the experiments in this activity that provide the evidence to support the scientists' ideas. Record this on the *Scientists' Consensus Ideas: The Electric-Circuit Interaction* form.