Linking Activity 1 "Feel the Heat" Conduction

"Feel the Heat" is an activity that addresses the nature of heat transfer through conduction. The purpose of the game is for students to experience the direction of heat transfer and the correlation between the temperature of molecules and the movement of molecules.

> [*Note for the Teacher:*
> This activity can take place either in the classroom or outside. You may need to create sufficient space in the classroom by moving desks around, or if there's not enough classroom space, you may wish to go into a hallway or outdoors. This activity may take about 15–20 minutes.]

You will need

- enough small objects—e.g., counters, marbles, coins, wrapped candies—for each student to have three of them

Procedure

1. Divide students into two equal groups. The students in Group 1 represent cold water molecules, and the students Group 2 represent hot water molecules.
2. Give each student in Group 1 one counter (or whatever object you are using) and each student in Group 2 five counters.
3. Have the students form two lines (Group 1 and Group 2) facing each other.
4. Remind students that hot molecules move a lot, while cold molecules do not move very much, and that heat flows from warmer (faster) to cooler (slower) molecules until they are all have the same amount of energy. Explain that the number of objects they are holding represents the amount of energy they have.
5. Tell the students in Group 1—cold water—that they must move slowly, by placing one foot in front of the other, heel to toe.
6. Tell the students in Group 2—warm water—to move at regular speed by taking normal steps.
7. Have the students move about randomly; when they bump into each other, they transfer energy: The student with the larger number of counters has to give one to the student with fewer counters. If their energy is the same—if they have the same number of counters—there is no transfer of energy.
8. Students should adjust the speed of their movements based on the number of counters they have, representing the amount of energy transferred through conduction.
9. The activity ends when all students have the same amount of energy—i.e., three counters each—and are moving at the same speed.

Sense-Making Discussion: Conduction

Conduct a discussion about the similarities and differences between what students did in this activity and their experience with the *Galactic Gloop Zoo* game.

- What do the objects in the activity represent?
- What is the relationship between the number of objects each of you had, at the beginning and at the end of the activity, to the speed of your movement?
- Describe the process of conduction you experienced in the activity.

Game Connection—Level 6 in *Galactic Gloop Zoo* explores conduction. In this level, the egg, which is very hot, has to be cooled in order for it to hatch. To achieve this goal, Walker Gloops, along with Stan the Zookeeper, transfer heat through conduction. Stan, whose temperature is zero degrees, must come into contact with the Walker Gloop, whose temperature is minus one hundred degrees. Stan's movement initiates heat transfer by conduction. Stan gives heat to the Walker Gloop and the Walker Gloop touches the egg. The close up shows how conduction works. Heat transfers from warmer objects to cooler objects.

Now is a good time to project **Level 61** on a screen or SmartBoard. Enter the password "teacher feature" to access the Level. This level is equivalent to Level 6 in the game, and illustrates conduction. Play the level and ask students if they have something new to add to their ideas about the similarities and differences between the activity and the game experience. Use the following questions to guide the conversation.

- Describe how conduction takes place in level 6 of the *Galactic Gloop Zoo* game.
- Did you notice anything new?

Following the discussion, use the question below as a Quick Write. Give students 10–15 minutes to answer the question.

- Write a rule to explain how "heat energy" is transferred in the Feel the Heat activity and the *Galactic Gloop Zoo* game.

Collect students' responses and conduct a class discussion about their answers.