Title:	**Marshmallow Madness**
Performance Expectations:	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
Clarification Statement:	Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.
Time:	Two hours
Resources:	computers with Internet access , marshmallows, paper cups (one per student), balloons (one per student)
Gathering Information:	1. Introduce the vocabulary word *force* as *push or pull on an object*. 2. Place a chair in front of the students and ask the class, "Is there force acting on the chair?" (Kids will probably say no.) 3. Ask a student to push the chair about 4 feet to the right, then ask the class this question, "Is there a force acting on the chair?" 4. Show the video "Bill Nye The Science Guy on Balance" found at https://www.google.com/#q=Bill+Nye+The+Science+Guy+on+Balance. 5. Repeat the questions listed in Step 3. 6. Introduce the vocabulary words *balanced forces*, *unbalanced forces*, and *gravity*. 7. Ask students to list or demonstrate at least three examples of balanced forces acting on an object and at least three examples of unbalanced forces acting on an object. 8. Help students construct a marshmallow shooter out of the paper cup and balloon. Directions for this can be found at http://tekyteach.blogspot.com/search/label/science.
Reasoning:	1. Ask students to answer the following question in their science journals: *How far will the marshmallow go if I pull the balloon back farther?* 2. Ask the students to explain their prediction using the term "force". 3. Allow students to practice shooting the marshmallows a few times before they actually start collecting data.

	4. Put students into pairs to test their predictions. Each student should pull their balloon back different lengths (barely pull back, medium, and pull back a long way) and record how far the marshmallow traveled each time.
Communicating:	Students should compare their results with the results of their partner. Ask students to make bar graphs in their science journals showing the distance the marshmallows traveled for each of their attempts. Under the graph the students should answer the following questions: • Was your prediction right or wrong? Why was it right or wrong? • What types of forces were acting on the marshmallow before you let go of the balloon? (balanced or unbalanced) How did you know? • What types of forces were acting on the marshmallow as it was flying through the air? (balanced or unbalanced) How did you know? • What types of forces were acting on the marshmallow after it landed? (balanced or unbalanced) How did you know? As a class or in small groups, have students brainstorm other ways they could explore evidence of the effects of balanced and unbalanced forces on the motion of an object.
Science & Engineering Practices:	Asking Questions and Defining Problems Planning and Carrying Out Investigations
Disciplinary Core Ideas:	Forces and Motion
Cross Cutting Concepts:	Patterns Cause and Effect