

# **SODA BOTTLE ROCKETS**

## **OUTREACH PRE-VISIT PAGE (GRADES 3-8) 90 minutes**

Arizona Science Center will be arriving no later than 15 minutes before the start of your program(s). **Soda Bottle Rockets** is intended to be a hands-on introductory program that covers:

- Thrust is created when fuel is forced out of the bottle at high speeds
- Newton's 3<sup>rd</sup> Law of Motion will be used to explain the motion of the rocket
- Drag can be reduced by making the rocket more aerodynamic
- There is an optimum weight for rockets; light enough to be propelled by thrust but heavy enough to overcome drag

### **PROGRAM NEEDS**

- **The Arizona Science Center's instructor is a guest in your classroom. Class teacher/instructor must remain in room for duration of program for liability reasons. We cannot be responsible for your students.**
- One instructor table at front of room
- Water source readily available with the capacity to fill up 2 liter bottles (i.e. a deep sink)
- Limited to 30 participants who will be split into smaller groups of 3 or 4 students per group
- Outdoor location for launch must be unoccupied by other groups, free from overhanging trees, power lines, etc. and a minimum of 50 ft. x 100 ft.
- If multiple programs are scheduled at your location, it is ideal that the instructor be set up in one room and participants be brought in, otherwise allow 15 minutes between programs

### **SCIENCE STANDARDS**

#### **Grade 3:**

S1C1PO1: Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.

S1C1PO2: Predict the results of an investigation based on observed patterns, not random guessing.

S1C2PO1: Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

**Grade 4:**

S1C1PO2: Formulate a relevant question through observations that can be tested by an investigation.

S1C1PO3: Formulate predictions in the realm of science based on observed cause and effect relationships.

S1C2PO1: Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

**Grade 5:**

S1C1PO1: Formulate a relevant question through observations that can be tested by an investigation.

S1C1PO2: Formulate predictions in the realm of science based on observed cause and effect relationships.

S1C2PO1: Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

S5C1PO1: Describe the various effects forces can have on an object (e.g., cause motion, halt motion, change direction of motion, cause deformation).

S5C2PO1: Describe the following forces: gravity and friction.

S5C2PO4: Demonstrate effects of variables on an object's motion (e.g., incline angle, friction, applied forces).

**Grade 6:**

S1C2PO1: Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

**Grade 7:**

S1C2PO1: Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

**Grade 8:**

S1C2PO1: Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

S2C1PO2: Evaluate the effects of the following major scientific milestones on society: Newton's Laws.

S5C2PO2: Identify the conditions under which an object will continue in its state of motion (Newton's 1st Law of Motion).

S5C2PO3: Describe how the acceleration of a body is dependent on its mass and the net applied force (Newton's 2nd Law of Motion).

S5C2PO4: Describe forces as interactions between bodies (Newton's 3rd Law of Motion).

