

## Stomp Rockets/Water Rockets

**Lesson Type:** Project/Demo

**Target Grade:** Elementary/High School

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### **Brief Overview/Challenge**

The goal of this lesson is to teach students about gravity and the principles behind rockets. Also the students will work through the engineering design process.

### **Teaching Goals**

- Learn about gravity
- Learn about some of forces
- Work through the engineering design process

### **Agenda**

- **Introduction of rockets** (5 min)
  - Introduce the design challenge. Build a device that unrolls as slowly as possible.
  - Show them a basic design with a skewer and two small cardboard sides.
- **Build paper rockets** (10 min)
  - Distribute materials after introduction.
  - Every group gets two sheets of paper and tape.
- **Test paper rockets** (5 min)
  - Test the students' designs
  - Review what went well
- **Build Water Rockets**(10 min)
  - Have the students use what they learned from paper rockets
- **Final Test** (20 min)
  - Test the students' designs
- **Recap** (5 min)
  - Go over what went well and what didn't go well for the building

### **Materials**

- Half a pack of Index Cards

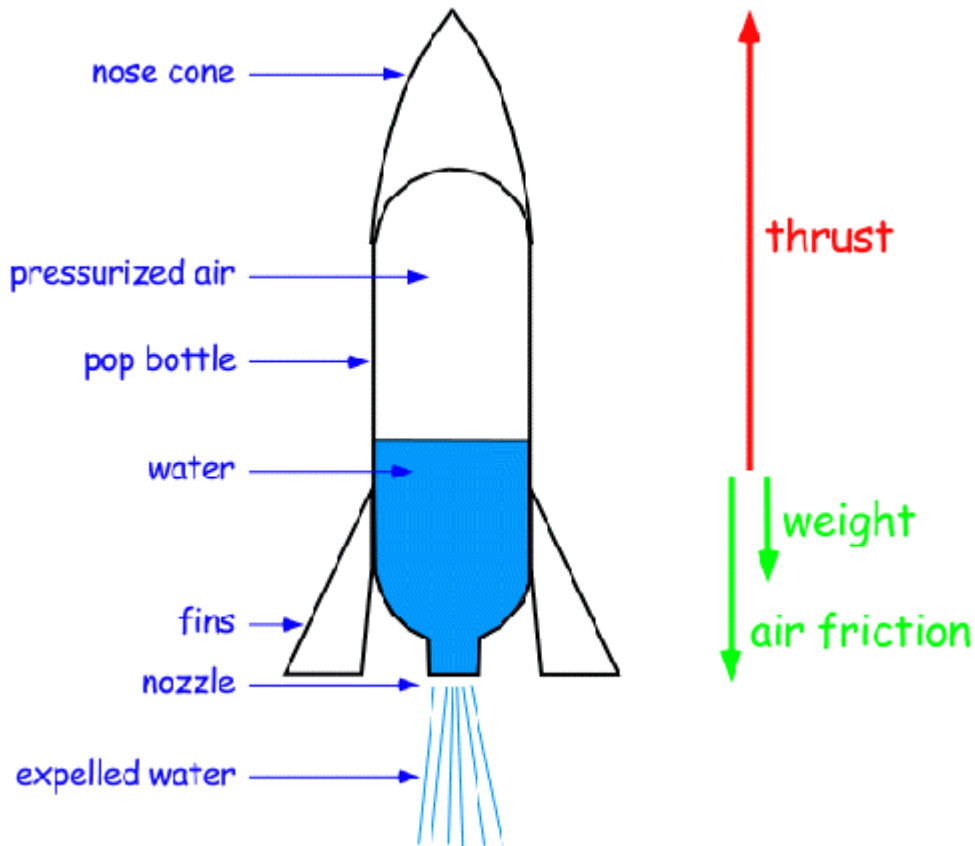
- No more than 10-15 sheets of paper (may be supplied by schools)
- 3-4 empty large soda bottles, depending on size of group
- tape, scissors, markers (most likely supplied by schools)
- Pre-fabricated PVC launch stand
- Stomp rocket base

### **Procedure/Tips for building**

- Build the base of the paper rockets by wrapping a tube of paper around the launch tube.

### **Material to Teach**

- Force of gravity = mass x gravity



- Force balance on the rocket

### **Background for Mentors**

- Acceleration of the device will be determined by force balance
- $-\text{Mass of device} \times \text{gravity} + \text{Thrust} - \text{drag} = \text{Mass of device} \times \text{acceleration}$

### **Summary Materials Table**

Material	Amount per Class	Expected \$\$	Vendor (or online link)

Tape	2		
Index Cards	Half pack		
Bike Pump	1		
2L Soda Bottles	3-4		Need at least 1
Paper	20 sheets		
Stomp Base	1		In 120A
PVC Base	1		In 120A