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

**Background for Mentors**
- Acceleration of the device will be determined by force balance
- Mass of device x gravity + Thrust – drag = Mass of device x acceleration

**Summary Materials Table**

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount per Class</th>
<th>Expected $$</th>
<th>Vendor (or online link)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Quantity</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>----------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td>Tape</td>
<td>2</td>
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<tr>
<td>Index Cards</td>
<td>Half pack</td>
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<tr>
<td>Bike Pump</td>
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<tr>
<td>2L Soda Bottles</td>
<td>3-4</td>
<td>Need at least 1</td>
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<tr>
<td>Paper</td>
<td>20 sheets</td>
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<td></td>
</tr>
<tr>
<td>Stomp Base</td>
<td>1</td>
<td>In 120A</td>
<td></td>
</tr>
<tr>
<td>PVC Base</td>
<td>1</td>
<td>In 120A</td>
<td></td>
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</tbody>
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