

Phase I – Research and Planning –

1. Identify the “Big” concept to be covered by the engineering design challenge.

The students will design and build a water-powered rocket that can hit a distant target.

2. Research appropriate learning standards associated with the topic.

MS-ETS1-2

MS-ETS1-4

MS-PS2-2

3. Identify and discuss the different types of problem solving and declarative/procedure knowledge needed.

Students will need a basic understanding of the following:

- energy and energy transfer
- forces, mass and Newton’s laws of motion
- velocity and acceleration
- drag (air resistance)

4. Explore objectives and ancillary concepts/content covered by the project.

Students will be able to design and build a water bottle rocket that flies straight and in the desired direction.

Students will need to understand the concepts of center of drag, center of mass to make relationships for a straight flying rocket.

Students will need to be able to explain why water is more effective than air for propelling a bottle rocket.

5. Identify possible activities.

Students can design a rocket and understand drag and resistance.

Students will compete for height and accuracy.

Students can design a parachute system for their bottle rocket.

6. Select the best activity for your classroom.

Students can build a soda bottle water rocket to launch.