Name_____ Period _____ Date _____

Water Rockets

STEM Sims

Lesson 6: How Fast Was the Water Rocket Moving?

A water rocket follows a parabolic path when no air is present. At each point along the water rocket's path, horizontal and vertical vectors describe the rocket's motion. Can you determine the water rocket's initial launch velocity?

Doing the Science

1. You must have a stop watch (that displays time in hundredths of a second) available to do this activity.
2. Start the Water Rockets Simulation by clicking on the "Sim" tab.
3. Make the following selections:
    - Angle: 30°
    - Fluid Volume: 200 mL
    - Pumps: 6
    - Fluid Type: Methanol
    - Air: Off
    - Wind: Off
4. At the same time you start your stopwatch, click on the Launch button.
5. The instant the water rocket lands, click stop on your stopwatch.
6. Record the flight time in seconds and flight distance in meters in Table 1.

Table 1.

Flight Time (sec.)	Flight Distance (m)

7. Calculate the initial horizontal velocity of the water rocket. Make sure to show your calculation below.

8. Calculate the initial vertical velocity of the water rocket. Make sure to show your calculation below.

9. Select an appropriate measurement scale, draw the initial horizontal and vertical velocity vectors, and use the tail-to-tip method or another suitable method to find the initial velocity of the water rocket (resultant).

Do You Understand?

1. What was the rocket's vertical velocity at the half-point of its flight? Please explain your response.

2. What was the maximum vertical height achieved by the water rocket in its flight? Make sure to show your calculation to support your answer.