



Unit: Attack of the Fluffy Bunnies
Lesson: Catapult STEAM Challenge



<p>Content Area: Standard(s) Addressed:</p>	<p>ELA - RL 3.2, RI 3.3, RI 3.7, SL 3.1, SL 3.2 Science – 3-PS2-1, 3-PS2-2, 3-5-ETS-1, 3-5-ETS-2, 3-5-ETS-3 Math – 3.MD.4, 3.G.2 Art - VA:Cr 1.2.3, VA:Cr 2.1.3</p>
<p>SEL Standard(s) integrated/Addressed:</p>	<p>SEL - 2A.1b, 2C.1a, 2C.1b, 2D.1b, 3B.1b</p>
<p>Learning Target(s): (What will student(s) know and be able to do because of lesson?)</p>	<p>Identify and Explore the variables that affect the path of a projectile. Students will manipulate these variables to send the projectile to their target.</p> <p>Measure and collect data reflecting the distance of a projectile on many trials up to fourths of an inch segments.</p> <p>Partition the projectile target into equal sections to create fractions of a whole box</p> <p>Work collaboratively to create and test all teammates theories. Resolve conflicts constructively by making positive choices and accepting other points of view.</p> <p>Build on the message of the myth from Attack of the Fluffy Bunnies to demonstrate the cause and effect of a projectile flight and landing.</p> <p>Practice collaborative discussions building on other’s ideas to develop an answer to the challenge.</p> <p>Gain information from compare/contrast tables of data</p> <p>Create personal satisfying artwork utilizing the “catapult” tool that was built in the challenge</p>
<p>Materials/Texts Needed:</p>	<p>10 craft sticks/popsicle sticks, 4 rubber bands, bottle cap, marshmallows or pompoms, craft paint, foam paintbrush, and hot glue gun (double-sided tape can be substituted for younger grades). (per group)</p> <p>-Shoe boxes (1 per group), small pieces of cardboard (Cereal boxes, cut up shoe boxes...etc.)</p>
<p>Technology/website used:</p>	<p>https://phet.colorado.edu/sims/html/projectile-motion/latest/projectile-motion_en.html</p>
<p>Instructional Outline:</p>	<p>Randomly divide students into groups 3-4 students in each group. Each student can build their own catapult but need to discuss how they can make different models within the group.</p>

SAMPLE STEAM LESSON

Can the fluffy bunnies find a landing spot on planet earth? (Launching the pompoms at a student created target.)

Distance trials- Record the distance from catapult that each item travels for 10 tests. (Variables – shapes and sizes of the items launched are recorded separately.)

Activities/Tasks: Students will create catapults using the items available.

Students will create the “TARGET PLANET” using a shoe box. (equally dividing up the box using cardboard spacers.)

Each location within the box can be labeled with community locations- school, library, theater, candy shop, police station. Student can give each location a point value. (According to the story the bunnies want to go anywhere there is candy....so candy shop, theater would have more points than the police station or library.)

Galaxy activity- On a large piece of paper students can create a solar system of planets for the bunnies to target. Concentric circles can be measured outward to help measure distance of the launches. (Students record the distance for items launched. 10 launches for each item.)

ART activity- Place a large piece of paper taped to the wall or easel. Students determine the distance needed to send the pompom to hit the paper. (Do this after the previous experiments so students have an understanding of the flight/energy needed to reach the paper.) Dip the pompom into a small amount of paint and launch towards the paper. (Different launchers for different colors work best to keep the “mixing” of colors to appear only on the paper.)

Guiding questions:

How did the size of the bunnies change the outcome of the launch?

Can the catapult be modified to launch larger bunnies?

How can the height of the launched bunny be increased?

How can the distance of the launch be increased?

Is there a connection between the height and the distance of the launch?

Access for All: Check to see if students might require the larger popsicle sticks or larger pompoms (marshmallows) for fine motor difficulties.

Modifications/Accommodations: Should the targets be on a table verses on the floor?

Closure— Compare tables where the groups findings on the measurement of distance for each item launched and discuss the variables. Chart the points earned on the “target planet” box and compare the accuracy ability for each variable item launched.

SAMPLE STEAM LESSON

Reflection	<ol style="list-style-type: none"> 1. How did this lesson support 21st Century Skills? 2. How did this lesson reflect academic rigor? 3. How did this lesson cognitively engage students? 4. How did this lesson engage students in collaborative learning and enhance their collaborative learning skills?
-------------------	--

Standards:

ELA –

RL.3.2 Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

Science –

3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all. Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.

3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency. Assessment Boundary: Assessment does not include technical terms such as period and frequency.

3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

SAMPLE STEAM LESSON

3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts
<p>Planning and Carrying out Investigations</p> <ul style="list-style-type: none"> Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. 	<p>PS2.A: Forces and Motion</p> <ul style="list-style-type: none"> Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) <p>PS2.B: Types of Interactions</p> <ul style="list-style-type: none"> Objects in contact exert forces on each other. 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified. <p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions.

Math –

3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

Art –

VA:Cr1.2.3 a. Apply knowledge of available resources, tools, and technologies to investigate personal ideas through the artmaking process.

VA:Cr2.1.3 a. Create personally satisfying artwork using a variety of artistic processes and materials.

SEL –

2A.1a Recognize that others may experience situations differently from oneself.

2C.1a Identify ways to work and play well with others.

2C.1b Demonstrate appropriate social and classroom behavior.

2D.1b Identify approaches to resolving conflicts constructively.

3B.1b Make positive choices when interacting with classmates.