Name:_____

Crazy Catapults

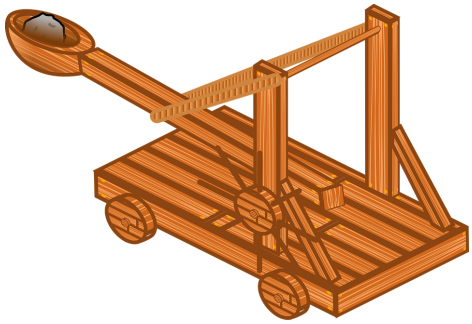
Catapults were used during the Middle Ages to launch objects over high walls of castles and fortified cities. A catapult is a machine, usually on wheels, that had a basket or container on one the end of a long wooden arm. The container holds an object that can be hurled across distances using different types of forces.

There were many different types of catapults created, each using different methods of force and had different ways of getting the object to fly across the walls. Some were designed for accuracy to hit a specific target. Others were made for projecting objects across far distances, or some required using as much force as possible to knock down obstacles.

In this task, you will be designing and creating your own catapult. Then you will use your catapult to complete three different tasks that will test accuracy, distance, and force.

The materials that you will be able to use are listed below:

Construction paper	Popsicle sticks	Tape and Scissors
Plastic Cups	Pop Cans	Straws
Rubber bands	Soup cans	Plastic Spoons
Bottle caps	Pipe cleaners	Toothpicks



You can work with some of the supplies to get ideas and see how the materials might work together to help you. Be sure to include everything in your sketch below!

Information taken from: Aimiliona Tevnane CW, Baintighearn. "Catapult History and Modern Day Construction." *Catapult History and Modern Day Construction*. N.p., n.d. Web. 17 Jan. 2017.

Name:_____

Draw your individual sketch of your catapult design below, making sure to ***label*** the parts. You should also draw your design from different perspectives and angles.

Lesson adapted from “Trebuchet Toss” at tryengineering.org and “Catapult Challenge” at http://www.vivifystem.com/blog/2014/12/23/catapult-challenge

Name:_____

Draw your team design below, making sure to label the parts. You should also draw your design from different perspectives and angles.

ALSO, identify the different simple machines that you have used in your design. Label these on your sketch.

Before starting the stations, find the mechanical advantage of your catapult. Use your notes to find the correct formula based on the simple machines that you are using to launch objects (most likely a lever!). Show your work below.

Lesson adapted from “Trebuchet Toss” at tryengineering.org and “Catapult Challenge” at http://www.vivifystem.com/blog/2014/12/23/catapult-challenge

Name:_____

All the teams will test their catapult at three different stations. Each station tests a different part of your catapult. For all stations, you may make minor changes to your catapult between launches if necessary

Make sure to read all directions carefully, and answer the questions as you complete each station.

DISTANCE STATION

1. The goal at this station is to launch a marshmallow the longest distance possible.
2. Place your catapult behind the tape mark to start.
3. You may take two test launches, then the next three launches should be recorded below.

	Projectile Distance
Test 1	
Test 2	
Test 3	
Average	

1. 1. What factors of your catapult most affected how far the marshmallow traveled?

_____
_____
_____
_____

2. What changes might you make to your catapult to make it launch something even farther?

_____
_____
_____
_____

Lesson adapted from “Trebuchet Toss” at tryengineering.org and “Catapult Challenge” at http://www.vivifystem.com/blog/2014/12/23/catapult-challenge

Name:_____

ACCURACY STATION

The goal of this station is to launch the most cotton balls into the container you will have 5 attempts.

1. Place your catapult behind the tape line.
2. You may take two test launches, then the next 5 launches will count.You may make minor changes to your catapult between launches if necessary.
3. Record your results below.

Attempt	1	2	3	4	5
Place a ✔if successful and an **X** if not					

1. Calculate your accuracy using a percent (amount successful / total tries)

2. What factors of your catapult most affected the accuracy of the marshmallow?

_____
_____
_____
_____

3. What changes might you make to your catapult to make it more accurate?

_____
_____
_____
_____

Lesson adapted from “Trebuchet Toss” at tryengineering.org and “Catapult Challenge” at http://www.vivifystem.com/blog/2014/12/23/catapult-challenge

Name:_____

FORCE STATION

The goal of this station is to launch the bean or pebble so it knocks down as many cups as possible in one shot. You will have 3 attempts.

1. Place your catapult behind the tape line (you may go farther back from the line, but no closer).
2. Set up the cups to make a tower (3 on the bottom, then 2, then 1 cup on top)
3. You may take two test launches, then the next three launches should be recorded below.

Attempt	Cups knocked down
1	
2	
3	
Average	

1. What factors of your catapult most affected how many cups were knocked down?
   _____
   _____
   _____
   _____

2. What changes might you make to your catapult to make the force even higher?
   _____
   _____
   _____
   _____

Lesson adapted from “Trebuchet Toss” at tryengineering.org and “Catapult Challenge” at http://www.vivifystem.com/blog/2014/12/23/catapult-challenge

Name:_____

Answer the following questions:

1. In what test did your catapult perform the strongest and why do you think that might be?

_____

_____

_____

_____

_____

_____

2. If you could have had access to other materials, what would you have requested to use and why?

_____

_____

_____

_____

3. Name one design or method that you saw another team using that you thought worked well. Describe why this worked well.

_____

_____

_____

_____

4. Name two possible drawbacks and two advantages of using a catapult in battle.

_____

_____

_____

_____

Lesson adapted from “Trebuchet Toss” at tryengineering.org and “Catapult Challenge” at http://www.vivifystem.com/blog/2014/12/23/catapult-challenge