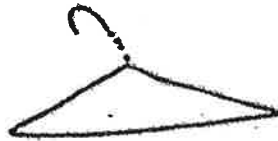


## Catapult Launch

An acrobat for a world-famous traveling circus has asked you to design a catapult that will launch her through the air to land safely into a net (paper plate). Even though you may be tempted to aim for a large target (hula hoop) from a short distance, remember that the act is much more exciting if you are farther away and the target is small. You might even call that death defying! As an incentive, the circus has offered to pay you a bonus of \$1,000 for every inch beyond 12" the net is placed beyond the catapult. Good luck with your design.

### Basic Catapult Design

1. Lay the coat hanger on the table in front of you, hook side away from you.



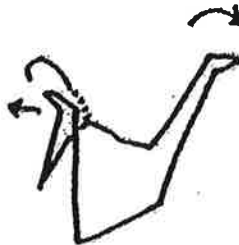
2. Bend the two sides of the hanger up vertically, so that when you let go the hook and middle part of the hanger lie flat on the table and the sides are standing straight up.



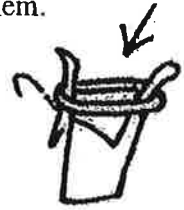
3. Use pliers to squeeze each side so it is skinnier.



4. Use pliers to bend the tip of each side slightly, away from the middle of the hanger. This keeps the rubber band from slipping off so easily.



5. Slide a rubber band down over the two bent sides so that it is stretched between them.



6. Slip the handle of a plastic spoon between the two sides of the rubber band, and start winding the spoon to twist up the rubber band.



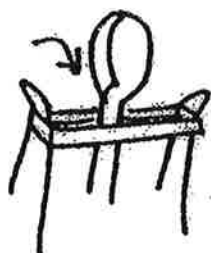
7. When you have wound up the rubber band enough, the spoon will try to spin if you release it. Next, slide another rubber band over the tips of the coat hanger, but don't slide it down as far as the first one. This rubber band will keep the spoon from unwinding when you let go of it.



8. Adjust the spoon and the two bands until the lower, twisted band is approximately  $\frac{1}{2}$  inch from the end of the spoon handle, and the upper untwisted band is hitting the spoon right about where the bowl joins the handle.



9. Option: Instead of just letting the spoon strike the upper rubber band, slide the bowl of the spoon between the upper band. When you pull it back, the stretched upper band gives it some extra force.



## Wire Hanger Catapult

	<b>One Inch Distance</b>	<b>Two Inch Distance</b>	<b>Three Inch Distance</b>
<b>Marshmallow</b>			
<b>Cotton Ball</b>			
<b>Eraser</b>			
<b>Crumpled Paper</b>			
<b>Paperclip</b>			

## Rubric for Catapult Launch

Name: \_\_\_\_\_

<b>Students...</b>	<b>Always</b>	<b>Often</b>	<b>Sometimes</b>	<b>Never</b>
<b>Pts. Available</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
...created a catapult.				
...adjusted the catapult to make it work more reliably.				
...adjusted the catapult to make it more accurate.				
...recorded their findings.				
...reflected on their findings in writing.				
...communicated their findings to the class.				
...acted responsibly & stayed on task.				
<b>Total Score</b>				