

# JUNK BOX WARS

## Bottle Blasters

Build a device that will launch a ball to knock over bottles and earn points!

### Competition Rules:

Each team will be provided with a junk box filled with materials to build your blaster. Each team will receive only one set of materials! Teams may use all or part of the materials provided and are not allowed to share materials with other teams. Scissors will be provided by the teacher.

Teams will be allowed time to build and test their devices. Competitors are allowed to bring diagrams to help them build their blasters. After the time is up, all devices will be impounded and no changes will be allowed!

### Structure Requirements:

Blasters may be any type of slinging device, such as catapults or sling shots, but must be powered by the energy in the elastic devices or structure. Projectiles cannot be aided by a helping hand or extra push.

Blasters must also be designed so that a single person can launch them. They cannot be held by other team members during a trial. Teams are allowed to secure the device to the floor with masking tape provided the surface is not damaged.

### Testing Procedure:

Each team will be allowed 5 minutes to prepare for each trial. Teams will be allowed to make repairs and modifications using the remaining materials in their junk box. Teams who go over the five minute time limit will forfeit the following round.

Teams will be allowed three two-minute trials to earn points. The device must remain behind the launch area boundary throughout the trial. Each team will receive 5 bouncy balls for each trial. Team members may retrieve the balls during the trial, but cannot enter the launch zone while balls are being launched.

Points will be awarded based on the point values of the bottles knocked off the testing platform. The team with the most points will be declared the winner. In the case of a tie, teams will be allowed an additional one-minute trial. The team with the most points in the tie-breaking round will be declared the winner.

#### Junk Box Possible Supplies

- Dowel Rod
- PVC Pipe
- Rubber bands
- Surgical supply tubing
- Mousetrap
- Spoons
- String
- Plastic Bottles
- Small Cups
- Masking tape
- Index cards
- Fabric scraps
- Pipe cleaners
- Hot glue
- Wooden craft sticks
- CDs

## Sample Score Sheet



### Bottle Blasters

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

Team Members : \_\_\_\_\_

Trial 1: \_\_\_\_\_ points

Trial 2: \_\_\_\_\_ points

Trial 3: \_\_\_\_\_ points

**Best Score =** \_\_\_\_\_

**Average =** \_\_\_\_\_



### Bottle Blasters

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

Team Members : \_\_\_\_\_

Trial 1: \_\_\_\_\_ points

Trial 2: \_\_\_\_\_ points

Trial 3: \_\_\_\_\_ points

**Best Score =** \_\_\_\_\_

**Average =** \_\_\_\_\_



### Bottle Blasters

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

Team Members : \_\_\_\_\_

Trial 1: \_\_\_\_\_ points

Trial 2: \_\_\_\_\_ points

Trial 3: \_\_\_\_\_ points

**Best Score =** \_\_\_\_\_

**Average =** \_\_\_\_\_



## Bottle Blasters Teacher Notes

### Recommended Supply List

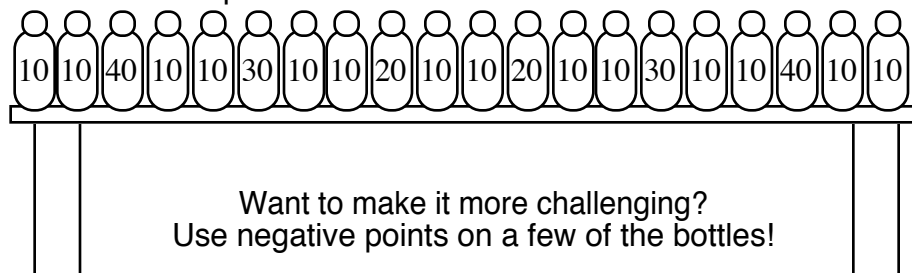
2' Dowel Rod (may be cut)	5 Plastic Bottles
2' PVC Pipe (may be cut)	5 Small cups (such as Dixie cups)
20 Rubber bands	5 CDs
4' Surgical supply tubing	1 roll of Masking tape (may limit to 400 cm)
2 Mousetraps	10 Index cards
10 Plastic spoons (or 2 metal spoons)	10" x 10" square of Fabric (such as denim)
100 cm of String	10 Hot glue sticks & a glue gun
20 Pipe cleaners	20 Wooden craft sticks

### Notes:

(1) Students may use all or part of the materials in the junk box. I allow the students to use any material inside the box. For example, if any of the materials come in wrappers or boxes, teams may use those for the device. The materials may be modified with the understanding that if a goof is made they will not receive new materials. Leftover materials may be used to make repairs if the device breaks during competition.

(2) Students may build a variety of "slinging" devices, such as catapults and sling shots. The key is to build a device that will launch the ball with enough force to knock over the bottles.

(3) You will need to obtain 20 plastic water or pop bottles. Label 14 empty bottles with a value of 10 points. Add a third of a cup of water to 2 bottles and label with a value of 20 points. Add a two-thirds of a cup of water to 2 bottles and label with a value of 30 points. Add a cup of water to 2 bottles and label with a value of 40 points. Arrange the bottles on the back edge of a table in a straight line. The bottles must be knocked off the table to score points. An alternative to using a table is to suspend a 2x4 piece of lumber between two platforms or tables.



(4) Establish a launch zone using string or other material. The launch area should be a minimum of 4 meters from front and sides of the testing platform. Team members may launch the ball from any location around the launch zone, but the devices must remain outside of the launch area during the trial. If the device crosses the line, no points should be awarded for the trial!

(5) Any bottle knocked off the testing platform during the trial whether by the launched ball itself or another bottle should be counted in the final score. You may also award points (full amount of half) for bottles that are knocked over, but did not fall off the testing platform. If team members knock over bottles while they retrieve the balls, no points should be awarded for that trial regardless of the bottles knocked over "legally".

(6) Teams are not allowed to give the ball an added push as it is launched. They are allowed to use a helping hand to prepare for the launch, i.e. pull it back to load it before the launch. Teams must also construct the device in such a manner that one person can launch it.

Safety Note: Be sure all participants are behind the launching area! Launching is not allowed while team members are retrieving the balls within the launch area. Team members must wear safety goggles during the launch!

Note: Check with a hospital supply store or pharmacy for surgical supply tubing or other elastic material that could be used for a blaster.