

# JUNK BOX WARS

## Zoom Machines

Create a "zoom machine" that will travel a distance of 4 meters in the shortest amount of time.

### Competition Rules:

Each team will be provided with a junk box filled with materials that could be used to create a vehicle. Each team will receive only one set of materials. Teams may use all or part of the materials in their junk box and are not allowed to share materials with other teams. All unused materials should be saved in case repairs are needed during competition.

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

### Machine Requirements:

Your vehicle must be powered by the energy stored in the rubber band(s) and may not be aided by a helping hand or other energy source.

### Testing Procedure:

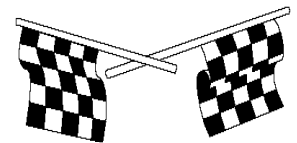
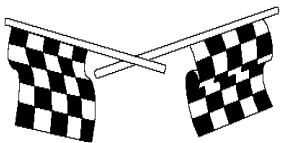
Each team will be allowed 5 minutes to "power up" their vehicles. No electric winders are allowed. Teams are not allowed to rewind the rubber band during testing.

Each team will be allowed two trials with 10 minutes allowed between trials to "power up" the vehicle and to make repairs or adjustments using materials left over from construction. No new construction or major design changes are allowed.

The best time out of the two trials will be considered for final results. If the car fails to make it to the finish line or goes out of the track area, no points will be awarded for that trial. The lightest vehicle will be declared the winner in case of a tie.

### Junk Box Possible Supplies

- CDs
- Dowel rods
- Pencils
- Straws
- Spools
- Film canisters
- Rubber bands
- Plastic containers
- Milk cartons
- Masking tape
- Glue
- Index cards
- Paper
- Pipe cleaners



## Event Score Sheets



### Zoom Machines

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

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

Mass of vehicle = \_\_\_\_\_ g

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

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



### Zoom Machines

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

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

Mass of vehicle = \_\_\_\_\_ g

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

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



### Zoom Machines

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

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

Mass of vehicle = \_\_\_\_\_ g

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

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



## Zoom Machines Teacher Notes

### Recommended Supply List:

- 6 CDs
- 2' Dowel rod (may be cut into smaller sections)
- 4 Pencils
- 10 Straws
- 6 Spools
- 6 Film canisters
- 10 Rubber bands (at least one must be saved for the testing process)
- 4 Small plastic containers (butter dishes) with lids
- 2 Small milk cartons
- 1 Roll of masking tape
- 10 Index cards
- 5 Pieces of paper
- 10 Pipe cleaners
- Hot glue gun with 5 sticks of glue

### 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. No major design changes are allowed!

(2) You will need to set up a race track that is 4 meters long and 1 meter wide. I suggest using string or other material to set up the boundary lines. If a car fails to make it to the finish line or goes out of the track during the race, the team will not receive any points for that trial.

NOTE: If your students have difficulty keeping the vehicles on the race track or they fail to make it to the finish line, you may want to determine the scores based on the distance the vehicle travels. The one that travels the greatest distance would be the winner.

(3) Students must use care when working with the hot glue guns. Remind students of safety procedures before construction time begins.

Visit <http://www.pbs.org/saf/1103/teaching/teaching3.htm>  
for details on simple rubber band vehicles.