

Cricket Wicket Knockdown Challenge

Instructions

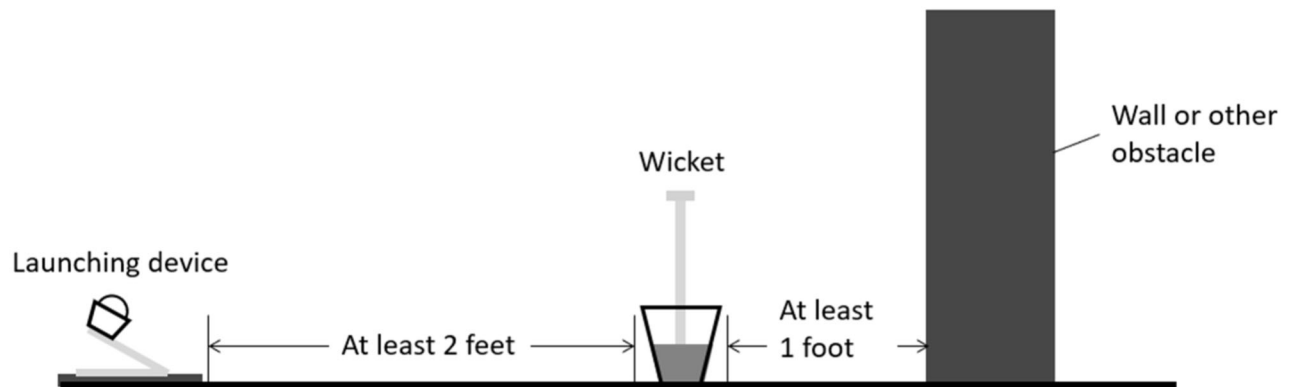
Name: _____

Date: _____

Overview: In this contest, you will build a machine to launch a ball. You will try to knock down a target with the ball as many times as you can in 3 minutes. Watch this video to learn about the project:

<https://sbgo.org/fluorchallenge2020>

Here is a drawing of the setup.



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Student worksheet

Materials

Your teacher will give you these materials to build with. Each material has a cost. Using less materials means you will have a higher score.

Item	Point cost (each)
Cardboard	10
Cup	3
Wooden craft stick	1
Pencil	1
Paper	1
Rubber band	2
Cardboard tube	9
Clear tape	10
Duct tape	20

Scoring

Calculate your score using this equation:

$$\text{Total Score} = (100 \times \# \text{ of times eraser is knocked down in 3 minutes}) - (\text{Materials cost})$$

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Student worksheet

Rules

1. Device can only be built with items on the official materials list.
2. Device must be free-standing and rest on the ground or a cardboard base. It cannot be taped to the ground or another object like furniture. It cannot be held up in the air or supported by a person (if you let go of it, it shouldn't fall over).
3. The device must launch the ping pong ball (e.g., using a rubber band or a lever). This launching action can be activated by a person, using one or two hands (e.g., stretching a rubber band, pushing on a lever). The device cannot just support the ball while a person throws the ball (e.g., like a golf tee—the device can't just hold the ball in place while you flick it forward with your finger).
4. Wicket must be built according to the diagram shown in Figure 1.

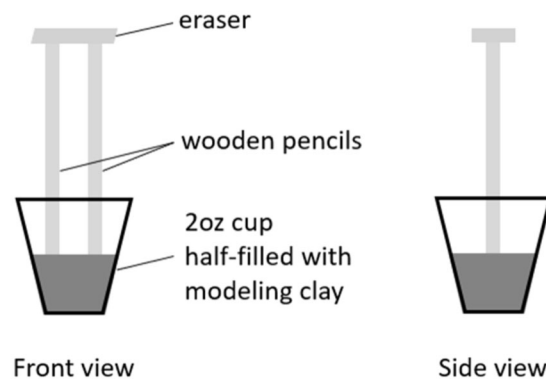


Figure 1.

5. Wicket must be placed upright, at least 1 foot from the nearest wall or obstacle (Figure 2).

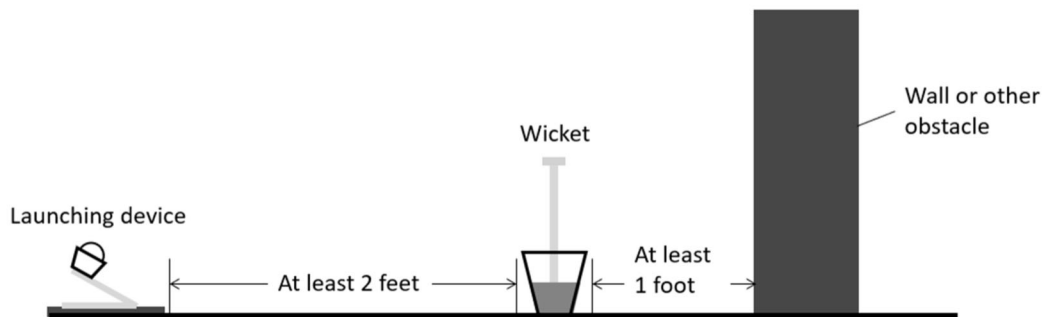


Figure 2.

6. Your launching device must be a minimum of 2 feet away from the wicket (Figure 2).

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7. Testing may be done by a team of up to four students (e.g., one student to launch the ball, one student to retrieve the ball, one student to reset the eraser or wicket, and one student to record the number of times the eraser is knocked over).
8. The ball is allowed to bounce or roll on the ground before hitting the wicket. If a ball bounces off the wall or any object (including a student) and then knocks the eraser over, that does not count (Figure 3). It does not matter if the ball hits anything *after* hitting the wicket.

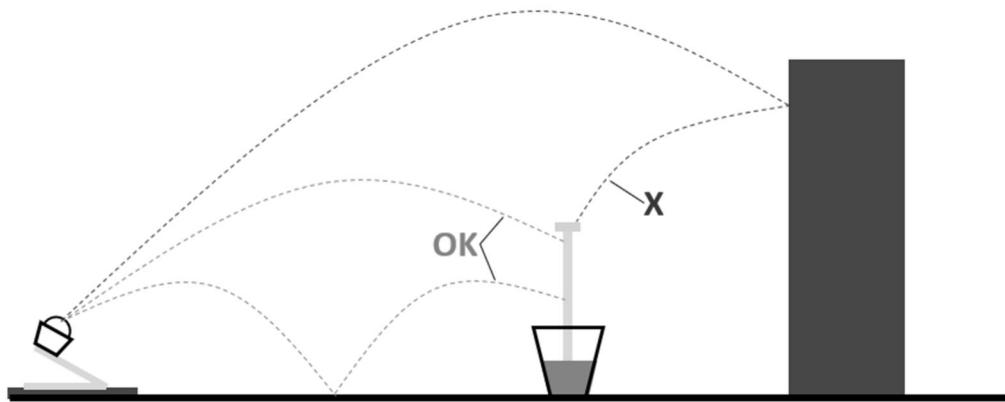


Figure 3.

9. The ball does not need to hit the eraser directly in order to knock it down. It still counts if the ball hits the cup or the pencils and makes the eraser fall.
10. For the official test to calculate your score, there is a time limit of three minutes to see how many times you can knock the eraser off the wicket.
11. You can do as many official tests as you want to try and get a higher score, but you can only submit one high score per team.

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Student worksheet

Directions: Fill out this worksheet as you work on your project.

1. **Design.** Draw design ideas for three different machines.
2. **Build.** Share your ideas with other people in your group. Decide which machine you will build. They do not have to be the same! You can combine ideas from different people.
3. **Test.** Test your machine, following the rules on page 3. Write your answers to these questions after your test.
 - a. Did the machine work like you thought it would?
 - b. Did anything break? If so, what broke?
 - c. How many times did you knock down the eraser in three minutes?
 - d. Did you observe (notice) anything else?

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Student worksheet

4. **Try again.** Your machine probably did not work perfectly on the first try. That's OK! You might need to try again. What are two things you are going to make better about your machine?

5. Final Design.

a. What are you most proud of about your machine?

b. What could be improved (made better) if you had more time to work on it?

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Student worksheet

6. Find your score.

- Use the scoring worksheet from your teacher to find your score.
- If you improve your design and test again, use the table below to record your score for each test.

Test Number	Score
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	