



The Try-Physics Tournament

Physics Camp at Home Activity

In *Harry Potter and the Goblet of Fire*, Harry participates in the Triwizard Tournament, a test of skill and bravery. You're going to test your own skills in the Try-Physics tournament!

Just like the Triwizard, this tournament has three tasks. We have provided recommended materials and instructions, but ask your parents on how to adjust the tasks to make them perfect for your own home. Then, use the scoring system we provided to compare your Tournament scores to your friends' scores at their own homes, or try the task a second time and see if you can set a new high score!

Good luck, and let the Try-Physics Tournament begin!

During the Physics of Quidditch Camp, campers participate in the three tasks on different days throughout the week as they continue to learn more about physics. This pdf contains instructions and educational materials for the First Task. Information on the Second and Third Tasks will be posted later this summer, so be sure to check back later!





The Try-Physics Tournament

First Task: Dragon Egg Drop

Harry rescued the egg from the Hungarian Horntail; now you need to protect it!

You must use a set of household materials to design three different structures that will prevent your “dragon egg” from breaking when it is dropped from a height.

Use creativity and the principles of physics that you know (especially drag and air resistance—see more on the next page) to be successful. Good luck!

Suggested materials*:

- 15 plastic drinking straws
- 2 disposable cups
- 1 wooden pencil
- 1 ziploc bag
- 2 paper plates
- 10 cotton balls
- 20 popsicle sticks
- One 3-foot piece of twine
- 5 sheets of computer paper
- 10 pipe cleaners
- 1 pair of scissors
- 1 roll of Scotch tape or masking tape

Also: At least one raw egg, a yardstick/ruler, and a splat-mat (e.g. large trash bag cut into a flat sheet) to drop the egg on... just in case!

*Parents, feel free to use different numbers of supplies or to substitute other fun building and construction materials that you have around the house!





Physics principles:

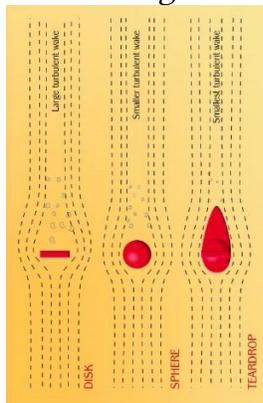
Here are some important physics concepts to keep in mind while you're building your device.

Drag is a force that an object feels when it moves through a gas or liquid, which makes it harder to move. We most commonly think of drag as affecting objects moving through the air, like airplanes, but drag also affects things moving through the water, like swimmers. An object that has more drag as it falls will fall more slowly. *If you are trying to keep your egg from breaking, do you want more drag or less drag?*

Two parts of an object's shape affect how much drag it feels: its surface area, and how aerodynamic it is.

Surface area is how much space an object seems to take up while you're looking at it straight-on. The larger an object's surface area is, the more drag affects it and the slower it moves. *Try dropping a normal sheet of paper, and then crumple it up and drop it again. Which one has more drag? Why?*

Aerodynamics refers to how easily an object moves through the air. If air gets trapped in front of an object and has trouble flowing around the object, then the object tends to have more drag and move more slowly. *How can you use this principle and the idea of surface area to design a device that will protect your egg?*



Which of these shapes has the most drag? Which has the least? Which one do you want your device to look like the most?





Recommended rules:

In order to test your device, you must be able to take the egg completely out of the device in between drops. That means no wrapping it up so tightly that you can't see what happened to the egg!

Once you've built the device and put the egg in, try dropping it onto the splat mat from these heights, starting with the lowest—if the egg breaks, your score is equal to the highest successful height.

Be sure to listen to your parents when you're building your device and especially when it is time to test it! Let them help you put the egg in the device and drop it.

50 pts: Completing the egg device. *Way to use your physics knowledge! Can you learn from what you did and try again?*

100 pts: One yard (3 ft) *Like Fleur, a good start!*

150 pts: Two yards (6 ft) *Cedric would be proud!*

200 pts: Dropping off a ladder or another tall object. *Wow, you were even more prepared than Harry!*

