

Professional Development Situation: Activity Guide**Skill Focus: Managing Groups During STEM, Facilitating Inclusive Learning Experiences****Time Required: 60 minutes**

RADIOACTIVE GOLF BALLS

In this activity, youth will use their creativity to develop a new device to transport “radioactive” golf balls safely over a distance of 8 feet.

Learning Objectives

- Youth will be able to work as a team to solve a problem.
- Youth will be able to use the engineering design process to develop a solution to a problem.

Materials

- For each pair
 - 1 brown paper lunch bag
 - 1 golf ball
 - 4 pieces of 4” string
 - 4 drinking straws
 - 2 skewers
 - 4 paper clips
 - 4 rubber bands
 - 5 post-it notes
 - 3 push pins
 - 1 pencil
 - 1 foot piece of tape
 - 1 piece of paper
 - 1 pencil
- For the entire group
 - 1 meter stick
 - 1 stopwatch
 - 5 golf balls

- An additional paper lunch bag

NOTE: It may be easier to pack all the materials each pair will be using in a brown paper bag.

Advanced Preparation

- Review the activity and practice it on your own, if possible.
 - *Italics words are what you can say to youth.*

Activity Instructions

Introduction (5 minutes)

- Break the entire group of youth into teams of two and hand them their materials.
- Tell the group that the golf balls are radioactive and they need to be transferred from one container to the other due to the container not being strong enough to contain the radioactivity. Because the golf balls are highly radioactive, they cannot touch the golf balls while they move them from one paper bag to another paper bag. They also cannot tilt the bag, as that will cause more radioactivity to escape.
- Introduce the [engineering design process](#). Youth will use this to develop their devices.

Brainstorm (10 minutes)

- Each team will brainstorm ideas, evaluate each possibility, and then choose the solution that they would like to test. They can draw their designs on paper or just discuss their ideas as a team.

Build (15 minutes)

- Each group has 15 minutes to construct the device that can transport 1 golf ball at a time using only the supplies provided. The teams may alter supplies in anyway necessary.

Test (5 minutes)

- When the designs are complete place two bags on the floor approximately 8 feet apart. The bags are to sit on the ground with the opening toward the ceiling. To ensure that the bags do not move tape both bags to the floor.
- Success is defined as getting all 5 golf balls from one bag to the other bag. No part of a person's body or clothing may touch the golf balls. No hands can go into the bag at any time. Likewise, no one can touch the bag in any way during their test.

Adapt and Retest (15 minutes)

- After the initial test, advise youth that they will get 10 minutes to adapt their designs by adding something or making any changes that they would like.
- Then, retest each device using the same metrics for success during the test part of the activity.

Communicate Results (10 minutes)

- *Which devices were successful? Which devices were not successful?*
- *Why do you think the successful designs worked?*
- *Why do you think the devices that were not successful didn't work?*
- *How did having a time limit affect your end product?*
- *What steps in the engineering design process did you use today?*
- *What will you do differently if we do this challenge again?*