

## Student Resource 3.2

### Design Brief: Radioactive Extraction Activity

**Background:** A container holding radioactive rocks is deteriorating. The rocks must be moved to another container to prevent radioactive leakage.

**Challenge:**

Construct a device that will move “radioactive” rocks from one bag to another without human contact, within 20 minutes.

**Criteria and Constraints:**

- Students will work in teams of two or three.
- Materials may be altered in any way.
- The rocks must be moved one at a time.
- The rocks must stay at least 3 inches away from any body part; no person’s body part or clothing may touch the rocks at any time.
- If a rock is touched or falls, the rock must be returned to container #1.
- Speed is critical. The team that is successful in the shortest amount of time wins.

**Materials per team:**

- 2 brown paper lunch bags
- 5 rocks or large gravel, Styrofoam balls, etc., spray painted green to look like radiation, placed inside one of the paper bags
- 4 four-inch pieces of string
- 4 drinking straws
- 2 skewers
- 4 paper clips
- 4 rubber bands
- 5 Post-It notes
- push pins
- 1 pencil
- 1-foot length of scotch tape
- Stopwatch

Each team will have two bags taped to the floor approximately 8 feet apart. Materials will be distributed. Teams have 20 minutes to make a device that moves the rocks from one bag to another without human contact.

You will be graded in these three areas:

**Contributions:** Always willing to help and do more. Does more than required. Routinely offers useful ideas.

**Cooperation:** Always listens to, shares with, and supports the efforts of others. Tries to keep people working together.

**Focus on the Task:** Almost always focused on the task and what needs to be done. Self-directed.

<b>Group Work Rubric</b>			
<b>Category</b>	<b>Below Target</b>	<b>At Target</b>	<b>Above Target</b>
<b>Contributions</b>	Seldom cooperative. Does little work and rarely offers useful ideas.	Cooperative. Works at assignments. Usually offers useful ideas.	Always willing to help and do more. Does more than required. Routinely offers useful ideas.
<b>Cooperation</b>	Rarely listens to, shares with, or supports the efforts of others. Often is not a good team member.	Usually listens to, shares with, and supports the efforts of others. Does not cause problems in the group.	Always listens to, shares with, and supports the efforts of others. Tries to keep people working together.
<b>Focus on the Task</b>	Does not focus on the task and what needs to be done. Lets others do the work.	Focuses on the task and what needs to be done most of the time.	Almost always focused on the task and what needs to be done. Self-directed.