



Main Street Science

A Collaboratorium for K-12 STEM Learning

BALL SORTING

Objective:

Students design and then construct a device to sort 10 balls that are two different colors.

National Science Education Standard:

Science and Technology Standards, K-4 and 5-8: Abilities of technological design

NYS MST Standard 5: Engineering design

Engineering design is an iterative process involving modeling and optimization used to develop technological solutions to problems given constraints.

Major understandings: Identify appropriate questions to ask about the design of an object. Identify the appropriate resources to use to find out about the design of an object. Build a model of the object, modifying the plan as necessary.

Materials:

- 25 red balls
- 25 white balls
- Clear tubing
- PVC piping
- Various joints
- Duct tape
- Plastic cups
- Popsicle sticks
- Stop watch
- Lesson plan

Creating hands-on science learning activities to engage the mind

<http://www.nbtc.cornell.edu/mainstreetscience>



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5-E CONCEPTS

Engage:

- Teacher shows all materials and asks students to give ideas about how it can all be sorted (shape, color, function).
- Teacher explains that the students will be split into groups and will be using the materials to sort the balls by color.

Explore:

- Students split into groups and first brainstorms ways to sort the balls.
- Students draw a design of their plan for the ball sorter.
- Students build and test their design.
- Students demonstrate their design for the whole class.

Explain:

- Gather as a group to discuss each team's design.
 - Which designs were successful? Why?
 - Which designs weren't successful? Why?
 - Could a combination of designs be the most successful?

Elaborate:

- What are real life examples of sorters?
- How could a sorter be built that would need to separate three different colors? Would it be more or less complicated?
- How could a sorter separate by shape? By size?

Evaluate:

- What was the purpose of designing the ball sorter before building it?
- Is there more than one way to build a ball sorter?
- How can a design be tested to determine its viability?

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*The challenge

You need to design and build a device to sort 10 balls that are two different colors.

The team with the highest amount of correctly sorted balls in the least amount of time will be the *winner!*

1. Your device needs to be sketched on paper **BEFORE** you begin building.
2. You cannot move the device or the collection cups during sorting.
3. You may only use the supplies given **but you must use at least one foot of both the clear and PVC pipe.**
4. Practice trials are encouraged.