

BUILD A SORTING MACHINE

Sorting machines create more efficient processes for everyday life. Students will build their own gravity-powered sorting machines through experimenting with different strategies and techniques to separate two different sizes of beads.

MATERIALS FOR BUILDING:

- 5 x 16 oz plastic cups
- 25 popsicle sticks, regular size
- 1 roll clear adhesive tape
- 10 sheets 8.5 in. x 11 in. printer paper
- 1 stick of glue
- Scissors
- Pencils for drawing designs

MATERIALS FOR TESTING:

- 3 x 16 oz paper or plastic cups
- 25 wooden beads, approximately 1/4"
- 25 wooden beads, approximately 1/2"
- Stopwatch (cell phone stopwatch)

METHOD:

1. Split into teams of four people.
2. Start by experimenting with the materials and sketching design ideas for a gravity powered sorting machine.
3. Start building a prototype.
4. To test the machines, use the same number of beads for each team and a stopwatch to see which machines are the most efficient.
 - Three cups are designated as 'testing' cups: one to hold the initial mix of spheres, two to collect the sorted spheres. These do not count toward the total of five cups allowed to build your machine, but they must be easily removable and cannot be a structural part of your machine.
5. Allow groups time to make improvements.
6. As time allows, have each team demonstrate their machine for the full group, and lead a discussion about the strengths and weaknesses of the various machines.

Hint:

- Paper can be folded to make chutes.
- Groups can roll the beads down various inclines or test gaps between popsicle sticks if they are separating beads by size.

TAKE IT BACK TO CLASS:

- Discuss real world examples: coin SORTER, food manufacturing facility, goldmining pan, winnower for separating wheat from chaff, etc.
- Try different techniques. By having all the students present their machines, figure out which team created the most efficient sorter and why their process worked.
- What would you do differently if you were asked to sort pennies and dimes vs. beads? How would that change your design?
- Assign points to each material and see who can build the most efficient sorting machine with the lowest point value.
 - Cups = 150 points each
 - Popsicle sticks = 30 points each
 - 8.5 in. x 11 in. paper = 75 points each
 - Scotch tape = free
 - Stick of glue = free

SOURCE:

https://www.sciencebuddies.org/science-fair-projects/project-ideas/ApMech_p051/mechanical-engineering/marble-machine#procedure

NOTES
