

Connections to School —


Children gain hands-on experience with important ideas contained in K-8 state and national science standards. In Trebuchets they explore how momentum, weight, fulcrum, friction, torque and inertia affect the operation of a working trebuchet.

All NPASS2 after school projects are relaxed, informal and fun. They stress five common process skills that are mentioned in state and national science standards: observing, investigating, questioning, explaining and problem-solving. We call these the *Master Scientist Skills*.

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MASTER OBSERVER

- Curious: looks at everything
- Studies the *details*
- Keeps records



Examine the whole situation, but look carefully at the *details* too.
Make notes, lists, charts, and sketches or take pictures so you can check the facts again later.

Have you seen this other *Design It!* project?



Balloon-Powered Cars

Students design a model car and make it go straight and far with an inflated balloon.

EDC Learning transforms lives.

NPASS2 is a project of Education Development Center
43 Foundry Ave.,
Waltham, MA 02453

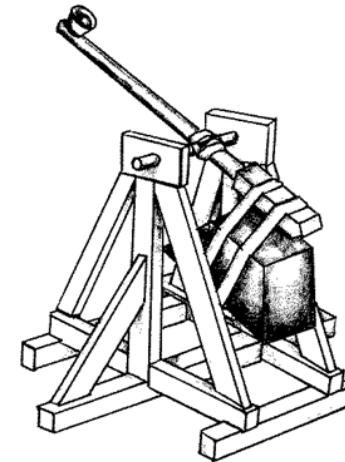
NPASS2 on the Web
<http://npass2.edc.org>

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MAKING SCIENCE FUN

Trebuchets: an after school science and engineering project from the *Design It!* curriculum series



▶ Students engineer a working model of a trebuchet, an ancient throwing machine.

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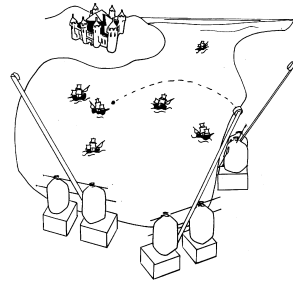
FOR PARENTS*

Summary

Children work in teams to engineer a working model of a trebuchet. They learn to control aim and distance in preparation for a mock sea battle.

Design It! Trebuchets Activities

- Assembling a Trebuchet
- Finding the Best Load
- Adjusting the Balance Point
- Sinking the Fleet



Suggested Materials

- | | |
|--|---------------------------|
| Sturdy yardstick | Strong rubber bands (#64) |
| Masking tape | Paper cannonball |
| 1-gallon milk jugs with caps (2) | Ruler |
| Styrofoam or paper cup | Binder clips |
| Large metal washers or similar heavy objects | |
| 20-inch dowels (1/4" diameter) | |
| 4-inch dowel (1/4" diameter) or pencil | |

Troubleshooting & Questioning

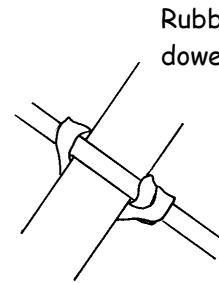
Ask these types of questions as your child builds a trebuchet.

- What happens to the cannonball range when you change the balance point?
- What happens to the cannonball range when you change the counterweight?
- What is the connection between the balance point and the counterweight?
- How could you change these materials to make it a stronger and more accurate machine?

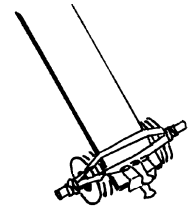
* For more information about this project go to:
<http://npass2.edc.org/resources/curriculum-guides/trebuchets>

FOR KIDS

Build your own trebuchet at home using the suggested materials. Practice launching a cannonball until you get your best distance. Then, prepare and set up cardboard targets and practice your accuracy hitting them. Invite a friend to build a trebuchet, too. Hold a competition to see whose is most accurate and whose has the farthest distance.

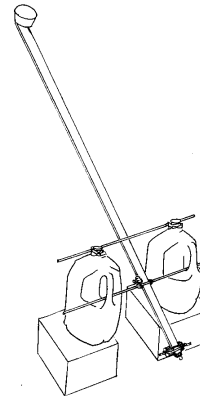


Rubber band holds dowel onto yardstick.



Thread washers onto short dowel and secure to yardstick with rubber band and binder clip.

Experiment with different designs. Try hanging the weight from the yardstick rather than attaching it directly. How does it affect the cannonball distance?



Try some other way to release the cannonball at the right time. (See diagram.)