

EXPLORE AERODYNAMIC SCIENCE: PLAY PAPER FOOTBALL



Explore the science of aerodynamics by playing this unique take on paper football. Encourage children to learn about geometry with many different shapes to see how far they can flick their custom-made "footballs."

At Idaho National Laboratory, math is a skill used in many different fields. These include engineering, physics, computer science, chemistry, and many more.

GRADE LEVELS: 3-8

VOCABULARY

Aerodynamics- the study of the properties of moving air and the interaction between the air and solid bodies moving through it.

Projectile Motion- the motion of an object thrown or projected into the air, subject to only the acceleration of gravity.

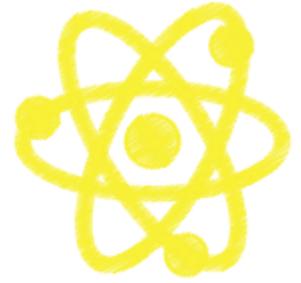
Parabolic Arc- a section of a parabola. A parabola is a curve whose equation is in the form $y = ax^2 + bx + c$.

Geometry- the branch of mathematics concerned with the properties and relations of points, lines, surfaces, solids, and higher dimensional analogs.

MATERIALS

- Recyclables and other objects from around the home (straws, paper cups, cardboard tubes, etc.)
- Scissors
- Tape
- Paper

PROCEDURE



1. Build two goalposts using objects found around the house.
2. Find a smooth, flat surface to use as the game field.
3. Fold sheets of paper into different shapes including triangles and squares or try crumpling the paper into a ball.
4. Attempt to make field goals by flicking these newly created shapes through the goalposts.
5. Discover which paper shapes travel the farthest and highest!

THE SCIENCE BEHIND IT

In this activity, children explore the science behind projectile motion and experience firsthand how gravity causes a thrown, kicked, or flicked object to fall in what's known as a parabolic arc. Additionally, students learn that geometry is everywhere — even in sports!

EXTENSIONS

- Incorporate the power of teamwork by putting family members/friends into teams, having them work together to design and create “footballs” with different shapes and sizes. Encourage them to predict which of their designs will perform best, and then have them record their data. By organizing this game into multiple rounds, they will have the opportunity to engage in creative problem solving by improving on their designs over time.

RESOURCES

- Invent.org/blog
- <https://public.inl.gov/STEMHelpWanted/Brochure/index.aspx?page=1>

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