

Organization Name DC STEM Catalyst Project

Activity #1: **So You Think You Can Graph !**

Activity #2: Density Determination

Activity #3: Paper Whirlybird

Activity Name: **So You Think You Can Graph !**

Activity Description: **Participants will gain insight in analyzing and evaluating graphs through kinesthetic movement and motion sensors.**

Graphs are pictures that help us understand amounts. These amounts are called data. There are many kinds of graphs, each having special parts. Analyzing data in the form of graphs is an important skill. In this activity, participants will create movement in front of a motion sensor.

The goal of this activity is to duplicate the graph presented to them in a picture by moving forwards, backwards, fast or slow.

A line graph shows points plotted on a graph. The points are then connected to form a line. Here are a couple of samples that can be used:



Suggested Grade Level / Age Range: **Grades 2-12**

Science Content Covered (just provide keywords - *example - heat, light, energy*): **Data Analysis**

Time needed to complete the activity: **5 Minutes**

Materials Required (per student): **Pasco Motion Sensor, Computer with monitor or LCD Projector.**

Activity Success Tips for Parents and Teachers: None

Insert Any Images / Photos / Drawings needed to help describe or explain the activity:



Figure 1 - Pasco Motion Sensor - Model PS-2103A

Possible follow-up, extension activities or ideas for children and parents to explore (with references or urls):

Typical Applications

1. Discover the relationship between position, velocity and acceleration
2. Study Conservation of Energy and Momentum during collisions
3. Monitor the sinusoidal motion of a mass on a spring
4. Measure the motion of large objects, such as students

Reference:

<http://store.pasco.com/pascostore/showdetl.cfm?&DID=9&PartNumber=PS-2103A&groupID=192&page=Manuals>

Safety comments / considerations:

Be sure to have an area clear of obstructions to allow for free movement and avoid injury.

Activity Name: Density Determination

Activity Description: *Replication of Archimedes Principle*

Suggested Grade Level / Age Range: *3/8*

Science Content Covered: *Buoyancy, volume, mass, metrics, graphing*

Time needed to complete the activity:

35-40 minutes

Materials Required (per student):

Cups, wooden cubes, food coloring, water, coins, measuring cup, scale, graduated cylinder

Activity Success Tips for Parents and Teachers:

Flat surfaces are necessary and all equipment

Possible follow-up, extension activities or ideas for children and parents to explore (with references or urls):

When determining buoyancy, objects will be placed in a cup, measured before and after and charting information

Refer back to math, conversions

Greek myth-the kings crown...was it pure gold?

Safety comments / considerations: *None*

If your activity should be credited to any specific source or citation - indicate that here: *Greek Mythology*

Activity Name: Paper Whirlybird

Activity Description: participants will construct a paper model of a helicopter to observe variables and motion, plus more.

1. Take 4 $\frac{1}{4}$ X 11 inch piece of paper. Hold with short side toward you.
2. Measure and cut about a 5-inch slit lengthwise down the center of the paper.
3. Mark edges at end of slit on opposite sides. Cut a 1-inch slit in from each edge at the marks.
4. Fold in the sides below the slits toward the center; they will overlap.
5. Use tape to attach the two folded sides together.
6. Fold the bottom edge up twice, 1 inch at the time. Fasten with paper clips.
7. Fold one flap toward you and the other away from you.
8. Throw whirlybird straight up in the air to make it fly downward.
9. Have fun!

Suggested Grade Level / Age Range: Grades 1-12

Science Content Covered: motion and gravity and scientific investigation

Time needed to complete the activity: 2-3 minutes

Materials Required (per student): Paper outlined whirlybirds, paper clips and scissors optional

Activity Success Tips for Parents and Teachers:

The spinning effect is due to the action of air on the wings as it rushes past the dropping whirlybird. The longer the wings, the slower the drop because of the uplift on the greater wing area. The more paperclips, the faster the drop and spin because of the greater weight. Flipping the wings will cause it to spin in the opposite direction.

Insert Any Images / Photos / Drawings needed to help describe or explain the activity:

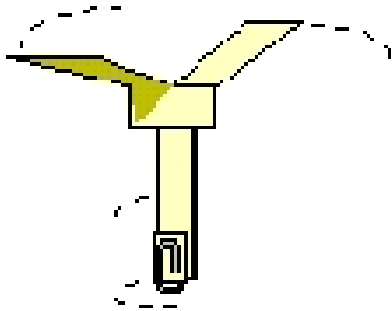


Image from <http://www.maniactive.com/paper-airplanes.jpg>
Description from
http://www.ied.edu.hk/apfslt/v3_issue2/tytler/tytler4.htm

Possible follow-up, extension activities or ideas for children and parents to explore: Encourage students to conduct several trials, test several variables (height of drop, number of turns per drop, speed of drop, direction of rotation and compare results their results).

Safety comments / considerations: Always be careful of objects that are being thrown - for any eye injury. Encourage students to explore in a controlled and thoughtful fashion.

If your activity should be credited to any specific source or citation - indicate that here:

Web info for the Whirlybird Research for Langron EC - Excerpts from:
Carmenita M.S. ; T. Howard and K. Yoshikawa
teacherweb.com/CA/CarmenitaMiddleSchool/King/Whirlybird.doc

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