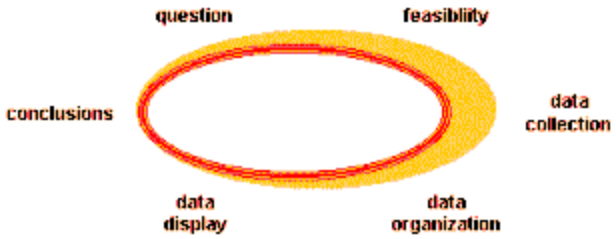
Which Wing Design Works Best

LEARNING AREA: Inquiry & Research
EDUCATIONAL LEVEL: Middle School
CONTENT STANDARD: Inquiry

STANDARD:
1. Direct observations, including framing a question
2. Collecting data through observation, interviews, or surveys
3. Recording and organizing information
4. Evaluating the questions based on their findings

LARGE PROCESSES/CONCEPTS:



NEXT STEP: Assessment Task

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Assessment Task---

DESCRIPTION:
Students will build gliders to test wing design. They will follow all Production Lab procedures and write a report of their findings.

PRODUCTS/EVIDENCE OF LEARNING:

1. Develop three different wing shapes for gliders.
2. Setting up a method to test gliders.
3. Determine how to organize and record the data.
4. Conducting the testing and recording the data.
5. Analyze and evaluate the results.
6. Identifying areas for further testing.
7. Written report on the test results.

OVERVIEW:

Objective:
Students will investigate and create wing designs to test which can glide in the air the longest.

Problem:
Wing design is a problem that airplane manufacturers deal with on a daily basis.

Solution:
Can you design a wing that can keep a glider in the air for a greatest amount of time in the class?

Procedure:
1. Each group of two to three students will be given three glider kits and accompanying literature. (The kits can be found in most I.T. supply catalogs.)
2. Each group will investigate by reading given literature from the glider kits, looking at aeronautical books, looking at an encyclopedia (like MIcrosoft Encarta), on the Internet (www.mnaero.com/aved and go to links, www.ask.com), or have an aeronautical engineer come in to talk to the students. Your local or regional airport may have someone to give lectures on aviation.
3. The students will then generate three designs for wings that they think will glide for the greatest amount of time in the class.
4. The students should draw these plans out to avoid mistakes. The instructor will provide graph paper to do this.
5. Each group will construct their three gliders with three different wing shapes while following all Production Lab procedures and the directions given with each kit.
6. Each group will decide how it will be best to test and record the flying time data to get enough information. Chart A and a stopwatch are appropriate for this activity.
7. Each group will test their gliders in the school gym according to the testing procedures they have set up. Students could either use the launcher that comes with the kits or they could just throw the gliders.
8. Each group will record and analyze the data collected.
9. Each group will write a report, as identified by the teacher, telling about the procedures they used, how they collected the data, and what they think warrants more investigation and why.

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CHART A - Flight Time Recording Sheet

	Flight 1	Flight 2	Flight 3
Glider 1			
Glider 2			
Glider 3			

Things to think about:

1. Which design works best?
2. Do you think you could do minor changes to the others to make it fly longer? How?
3. What does the information you collected tell you about the wing designs you generated?
4. What would you do differently next time?

Check List---

STUDENT	TEACHER	
_____	_____	Shows observations were correctly made.
_____	_____	Shows data displayed correctly.
_____	_____	Shows enough data has been collected.
_____	_____	Identifies appropriate areas that warrant more investigation.
_____	_____	Information for written report is from a credible source and source is identified.
_____	_____	Provides written report with all relevant data explained.

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