

Can I Fly Today?
Lesson Plan on Scientific Process, Measurement, Number Sense
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GRADE LEVEL: 3-5

LESSON GOAL:

To conduct a simple investigation to test my hypothesis or prediction

To use appropriate tools to measure distance and length

To collect, organize, and analyze data to answer questions we have generated

To compare results by examining the flying averages of each student

PURPOSE:

The most fundamental skill in science is to be able to conduct a scientific investigation. Students need to be able to ask questions, then examine and organize data to help them form a scientifically valid answer.

After this lesson, students will have a basic introduction to conducting a valid scientific study.

OBJECTIVES:

Given a situation, students will present a hypothesis and test it.

Given a set of data, students will be able to find the average.

Given a set of data, students will be able to organize, examine, and compare with equal and opposing sets of data, to formulate a scientifically sound explanation for the validity of their hypothesis.

MATERIALS:

Student activity worksheet, "Can I fly today?"

Plain white paper (8 ½ x 11) for each student

Masking tape

Measuring tape

Pencils

OPENING/ANTICIPATORY SET

Ask students if they've ever made and flown a paper airplane before.

Ask if they know how a paper airplane flies (What makes it fly?) or what makes a paper airplane fly faster or farther.

Ask students if they know what a HYPOTHESIS is. Reinforce that HYPOTHESIS is a scientific term for a PREDICTION.

Ask students if they've ever made a prediction, and if it's ever been proven.

Tell students that today, they will be making a hypothesis, and conducting a test to determine if it is true.

INPUT/MODELING

1. Show students activity sheet, explain that they're going to be making a paper airplane and see how far it will fly.
2. Read instructions to students:
 - a) Create a paper airplane that has great flight power.
 - b) Make a prediction as to whose airplane will fly the farthest and give reasons for your prediction.
 - c) Test the flying distance of your planes and organize your information in a chart or graph.
 - d) Calculate your average flying distance.
 - e) Discuss the results with the group.
3. Model for students one way of making a paper airplane. Students might have their own creative ways of making a paper airplane, but introduce them to the most "classic" model.
4. Ask students to make a prediction as to how far the teacher's paper airplane will fly. After a prediction is made, write it on the board. You will want to select either a really large number or a really small number for a prediction, to make it easy for students to identify whether or not their prediction was correct.
5. Fly the plane, but with relative contradictory force put into the flight, based on the students' hypothesis.

CHECK FOR UNDERSTANDING:

Ask students why your plane did not meet the prediction. Ask your students how they know their prediction was incorrect. Remind them that they did not measure the distance using any measurement tools.

GUIDED PRACTICE:

Ask how we will figure out how far it will fly? (Measurement)

How can we make a runway? (Masking tape, with measurements on it)

How many notches should be made, and in what measurement? Feet? Yards? (Let students discuss and decide as a class.)

Have students make the paper airplane runway. Help them with measurements.

Have students make their paper airplanes. Each student should only make one paper airplane.

Have students make predictions of how far their plane will fly, what factors can contribute/inhibit a far flight?

CHECK FOR UNDERSTANDING:

Ask students to share some of their predictions, along with their reasoning. Responses should be quantifiable, not simply "My plane will fly the furthest because I'm awesome." An appropriate response should be "My plane will fly far because my plane has large

wings to carry it farther,” or “My plane will fly far because I will put a lot of force into flying it.”

INDEPENDENT PRACTICE:

Have students write down their own predictions and explain why.

GUIDED PRACTICE:

Select one student who has finished his/her prediction, and ask them to demonstrate a flight with their paper airplane. Then ask that student to take a measurement of the plane’s flight distance. Examine the student’s method of measurement and discuss among the class to determine if that measurement is scientifically valid. Ask the student to fly their plane 4 more times, taking measurements for each flight.

INPUT/MODELING:

Talk about AVERAGES. Explain how you find AVERAGE, or MEAN.

CHECK FOR UNDERSTANDING

Students should be familiar finding the average of a set of data, but if there are questions about it, present a sample set of data for the students to work through in class, before the airplane flights. Ask students: Is it better/more accurate to have lots of flights to find AVERAGE? Why or why not?

GUIDED PRACTICE:

Have all students conduct their flight experiments, one at a time. Be sure that every student has the chance to fly their planes and takes the measurements.

INDEPENDENT PRACTICE:

Have student record their results, and possibly chart/graph their results. Ask them to write down whether or not their predictions were correct. Ask them how they would go about doing this. Ask students to share with each other whether or not their predictions were correct, and to discuss possible reasons why or why not.

CLOSURE

(Share) How did you build your airplanes? Did you like this activity? Why or why not?

(Process) Which airplane flew the longest? Fastest? Straightest? Highest? Why? What factors helped your planes fly? What factors hindered your planes’ flights?

(Generalize) What skills do you think you learned with this activity? When have you had to use these skills before?

(Apply) When can you use these skills in the future?

Can I Fly Today?

Extension Activity: Use of Technology as a tool for research

LESSON GOAL:

To use the Internet as a tool for research.

PURPOSE:

OBJECTIVES:

Have students look up on the computer HOW airplanes fly.

INPUT/MODELING:

Direct them to the following sites:

- <http://www.howstuffworks.com> – How Stuff Works offers in-depth articles on various topics, as well as multimedia content. Students can explore aviation by typing in words like “how planes fly” into the search field, then navigate the howstuffworks.com website. They can not only find out how planes fly, but also find information on aviation-related content, such as “how helicopters work”.
- <http://www.askkids.com/> - The kid version of ask.com, where students conduct an Internet search by asking a question, instead of simply typing in keywords. For instance, have students think about what they want to ask, such as “How do paper airplanes fly?” or “What makes a plane fly?” Then, have students type in their question, with appropriate capital letters and punctuation. This website offers search tips on the left side of the screen, providing suggestions for a narrower search or a wider search.
- <http://www.ag.ohio-state.edu/~flight/homepage.html> - Educational and interactive website provided by Ohio State University and the 4-H Youth Development Program. Website offers simple animation and interactive functions to get students to observe, think, and respond.

GUIDED PRACTICE

Ask them what other sites they can go to for information. Students’ responses might simply be “Google” or “Wikipedia”. This would be an appropriate time to have a short review/discussion on the differences between sites like Google and Wikipedia. Also, you can have a discussion on the validity of information found on Wikipedia. For instance, can you trust its information just because it’s been published online? Why or why not?

Have students print up the information they find, so that they can present it to everyone else.

They will need to read and explain HOW airplanes fly.

After each student has at least one source, have them share with the rest of the class what they found.

CLOSURE:

(Share) What did you think about the sites you found? What sites did you go to?

(Process) What did you search for? Did you have an easy time or a hard time finding the information you needed?

(Generalize) When have you had to use the Internet to look up information before? Was it for school or just for you? Have you ever used the Internet to find information you didn't need for a school/class project?

(Apply) Will you use these sites in the future? Will you teach others how to search for information they need on the Internet?