



K-2 Physical Science

Southern Nevada Regional Professional Development Program

Paper Airplanes

INTRODUCTION

A paper airplane is a toy plane usually made from paper. Making paper airplanes with your students is an inexpensive, engaging, hands-on approach to teaching children about the basics of force and motion, as well as the force of gravity. (Nevada State Science Standards P2B2, P2B4)

WHERE'S THE SCIENCE?

A paper airplane remains in the air because of the lift created as the air moves over the plane. There are several factors to consider when making a paper airplane. Keep the paper airplane symmetrical and balanced. The largest amount of weight should be in the front of the plane. Paper airplanes that open during flight will cause drag, so make sure to secure the plane with tape, staples or a small paperclip.

MATERIALS

- 1 toy plane
- Paper
- Heavy duty paper
- Cardstock
- Paperclips
- Science notebook

PROCEDURES:

Note: Prior to beginning this lesson, visit one of the websites suggested below in the additional resources section to print out step-by-step directions for constructing a basic paper airplane. I recommend the “Belly-Button Glider” from amazingpaperairplanes.com, but you may find one from another site that is easier for you to make. Construct a sample airplane for step 2 of lesson 1.

Lesson One

1. Call the students to the group area and ask them to think about all the things that can fly. Let the students share out and chart their thoughts.
2. Hold up a toy plane. Tell the students that this is a model of a real airplane. Ask the students, “What holds up an airplane when it flies?”
3. After setting the stage for the lesson, hold up a paper airplane and tell the students that today everyone will be making a paper airplane like this one. Establish safety guidelines before passing out the materials. (See safety note below)
4. Dismiss students in groups to return to their seats, instructing them to collect a sheet of step-by-step directions for making their paper airplane and a sheet of paper.
5. You may choose to construct paper airplanes as a whole group, working step-by-step, or let students tackle the task on their own.
6. As students complete their paper airplanes, check for errors and help students who are having difficulty. Make sure to instruct students to write their names on the paper airplanes so they will be able to identify it later.
7. Once everyone has completed their planes, line up to move to the flight area. Pass out science notebooks with pencils for recording travel distance. **Note:** If you are able to use an indoor location, you can use the floor tiles as a non-standard

- measurement tool. If you are outside you need to set up a method to measure traveling distance. Use a starting line and pre-measure set distances.
8. Demonstrate for students how to release their paper airplanes. Allow time for practice flights. Note: If students have difficulty releasing their planes you can set up a catapult by securing a bent paper clip to the front of their paper airplane as a hook, then use a rubber band with a paper clip attached at the end for launching.
 9. After everyone has successfully released their planes, call the students to a whole group area and share how they will measure their flight distance. Instruct students to fly their planes 3 times and record the traveling distance of each flight in their science notebook. Students will need to work with a partner, taking turns launching and measuring the traveling distance.
 10. Return to the classroom and allow students time to share and discuss flight distance results with their small groups. Walk around the room and record thoughts for the whole group discussion.
 11. Call students to the group area and discuss results, sharing the thoughts you recorded when appropriate. Chart flight distances. Discuss variables in the flight distances and problems encountered.
 12. Ask the students how they think they could change their paper airplanes to make them fly farther. Chart thoughts. **Note:** students are listing variables. A **variable** is anything that you can change in an experiment that might affect the outcome. Some variables students may suggest are: change the types of paper, change the design, and add weight.
 13. Ask the students to return to their seats and add a “Line of Learning” in their science notebook and record what they learned today. Share out whole group.
 14. Ask the students how the air helped their paper airplane fly.

Lesson Two

1. Call the students to the carpet area and review yesterday's lesson. Review their thoughts and ideas for making their planes fly farther. (Chart, Lesson 1, Step 12)
2. Highlight the ideas that you brought materials for and explain that they will select one idea to try out today.
3. Dismiss students in groups according to the variable they've selected (e.g., "if you want to try using cardstock...") to test.
4. As students work, walk around the room checking progress and provide guidance and assistance only when needed.
5. Repeat steps 8-14 from Lesson 1.

Lesson Three

1. Call the students to the group area and tell them that today they will be allowed to construct a paper airplane of their own design or they may modify one that they already made.
2. Share the supplies that are available at the materials table for construction of the paper airplanes.
3. Allow time for the students to complete their planes or modifications. Once everyone is finished, return to the flight area, and repeat steps 8-14 from Lesson 1.
4. Discuss the paper airplanes, include their designs and how they think their designs helped their paper airplanes to fly farther or not.

Extension

Tell the students that in one week you will hold a "Paper Airplane Tournament". Introduce the following categories, high fliers, trick fliers, long fliers. Tell them that they will be allowed to enter as many categories as they wish. Make up certificates to hand out to the winners. Once back in the classroom sort the paper airplanes into groups based on how they flew. (N2A3)

Additional Resources

<http://www.amazingpaperairplanes.com/simple.html>

This site contains very easy step-by-step directions for making simple paper airplanes.

<http://www.RaintreeLibrary.com>

This site contains the book *I Like Planes* by Angela Aylmore

<http://www.paperplane.org>

This site contains lots of useful information. The site belongs to the co-author of *Kids' Paper Air Plane Book*.

<http://www.newbridge.online.com>

This site contains the book *Flying*.

<http://www.paperairplanes.co.uk>

This site contains simple step-by-step directions for making paper airplanes.

<http://www.paperaeronautics.org.home>

This site contains directions for making paper airplanes, tips for making good paper airplanes and information on tournaments.

Nevada State Standards

P2B2 Students know things move in many different ways and at different speeds (e.g. straight line, zigzag, vibration, circular motion, fast/slow). E/S

P2B4 Students know things fall to the ground unless something holds them up. E/S

N2A1 Students know how to make observations and give descriptions using words, numbers and drawings. E/S

N2A2 Students know tools can be used safely to gather data and extend the senses. I/L

N2A3 Students know observable patterns can be used to predict future events or sort items. E/S

N2B2 Students know that, in science it is helpful to work in a team and share findings with others. E/L

Safety Reminder:

When students are ready to launch their paper airplanes take the students outside to a large open area. If one isn't available or the weather is poor, take the students to a large indoor area (e.g., gym or lunchroom).