

FLIGHT

UNIT OVERVIEW

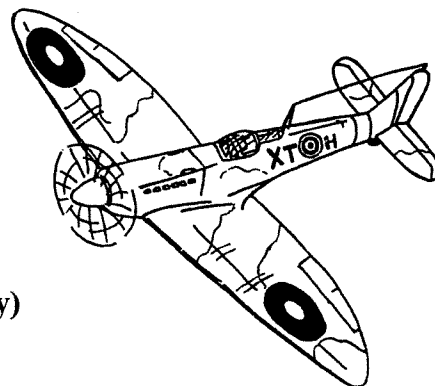
Students study and experience flight in this hands-on science unit. Exciting activities range from learning how wings, rockets and helicopters work to building their own kites and gliders. In general, students participate in meaningful activities associated with the theme of each lesson which are followed by related overhead notes. This format helps to stress process rather than concentrating on memorization of factual information.

STUDENT ASSIGNMENTS AND ACTIVITIES

- 1. Forces of Flight**
 - Flight To The Sun (Introductory Story)
 - Wordsearch
- 2. Three Laws of Flight**
 - Why A Wing Works (Building A Wing)
- 3. Balloons**
 - Montgolfier Balloon (Colour By Numbers)
- 4. Kites**
 - Building A "Mini" Bag Kite
- 5. Gliders**
 - XXVII Glider Olympics
- 6. How a Glider Works**
 - The Shark (Building A "Real" Glider)
- 7. Airplanes**
 - History of Powered Flight (Timeline)
 - Fighter Plane Comparison (Reading Activity/Questions)
- 8. Helicopters**
 - Whirlybird Competition
- 9. Rockets**
 - Building a Water Propelled Rocket
- 10. Review**
 - Matching Questions / Short Answer Questions

OPTIONAL ACTIVITIES

- 1. Review Crossword**
- 2. Airplane Wordsearch**
- 3. Air Miles Frequent Flyer Reading Program**
- 4. F-16 Engineering Design View (Tracing Activity)**
- 5. Who is the Pilot? - Logic Puzzle**
- 6. Flight Pictograms**
- 7. Mayday Mayday - Plane Crash! (Creative Writing Activity)**



STUDENT NOTES

Basic information and concepts are conveyed using student notes. These notes can be put onto overhead transparencies, photocopied for the students or simply written on the board for students to copy into their notebooks.

EVALUATION

Evaluation has been left to the discretion of each teacher, based on what activities are done and what concepts are stressed. A cooperative work skills evaluation form has been included to help monitor student behaviour during group assignments. Each student starts with a perfect mark and the teacher checks off each time a student exhibits poor group-work skills. Once students learn which behaviours are unacceptable, group-work becomes a pleasure.

LESSON #2 - THREE LAWS OF FLIGHT

Student Objectives and Activities

- In this lesson, students study three laws of flight.
 - 1) Bernoulli's Law of Pressure - the faster the air flows, the less pressure it has.
 - 2) The Law of Flight - objects always go from high pressure to low pressure.
 - 3) Newton's Third Law - if there is a force in one direction, there is an equal force in the opposite direction. (for every action there is an equal and opposite reaction)
- Students apply these three laws and discover how a wing (airfoil) creates lift by building a model of a wing using the worksheet, "Why A Wing Works".

Suggested Teaching Strategies

- This lesson is critical if students are to understand flight. The concepts are fairly difficult but should be taught thoroughly since the rest of the unit depends closely on understanding these principals. This material may take more than one class.
- Begin with a demonstration of Bernoulli's Law that shows the effects of fluid (tap water) passing over a curved surface - a pair of spoons.



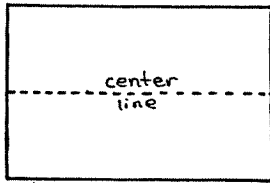
- Ask students to try to predict what will happen to the spoons when the tap is turned on. (the spoons move together)
- Once students see that the spoons go together, ask them to explain why. (This is not an easy question to answer and is mainly designed to get students to think).
- Continue with the notes, being sure to ask students to volunteer their own examples of the concepts.
- After finishing the notes and explaining how a wing works, students each build a working model of a wing following the instructions on the worksheet, "Why A Wing Works".

*** Note ***

The teacher should try this activity first to see exactly how to get the wing to slide up the string. (To help students better remember how the wing works, use the first letters of "The Long part of the wing has Low pressure and creates Lift")

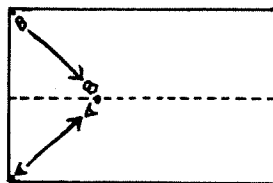
DISTANCE FLYER

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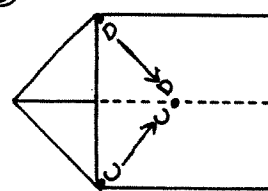
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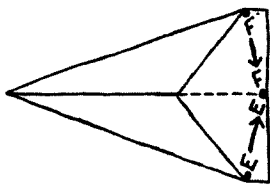
Fold the paper so that dot A on the corner meets dot AB on centerline. Repeat this step with dot B.

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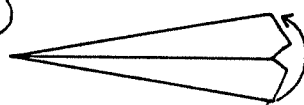
Fold the paper so that dot C on the corner meets dot CD on the centerline. Repeat this step with dot D.

④



Fold the paper so that dot E on the corner meets dot EF on the centerline. Repeat this step with dot F.

⑤



Fold in half.

⑥



Fold each side down halfway to form a right angle. (90°)

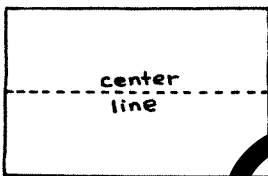
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If your flyer does not look anything like this, you should seek help from anyone but your teacher!

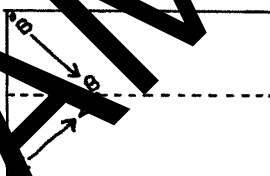
AIRTIME FLYER

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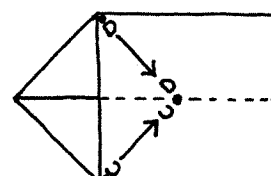
Fold the paper along the dotted centerline, then open and lay flat.

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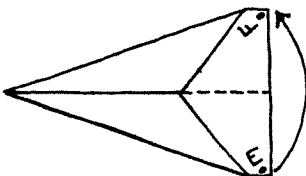
Fold the paper so that dot A on the corner meets dot AB on centerline. Repeat this step with dot B.

③



Fold the paper so that dot C on the corner meets dot CD on the centerline. Repeat this step with dot D.

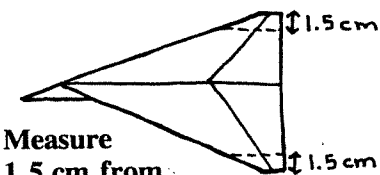
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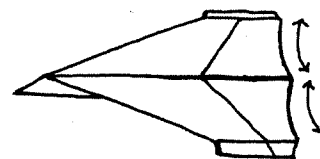
Fold this in half so that dot E meets dot F.



Measure 1.5 cm from the bottom, then fold the rest towards you. Turn and repeat on the other side. Wings should form a right angle (90°) from the side.



Measure 1.5 cm from wingtip edges and fold

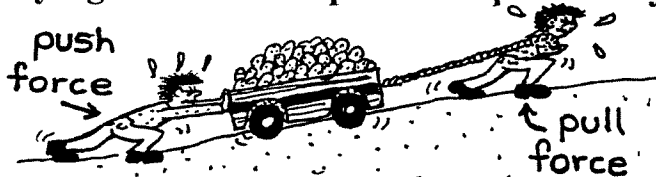


Curl trailing edge a bit upwards and TA-DA!

FLIGHT

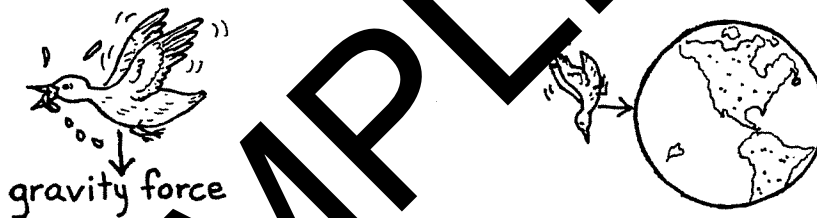
Four Forces of Flight

Before a person can understand flight, they must first learn about the forces that control flying. A force is a push or a pull in any direction.



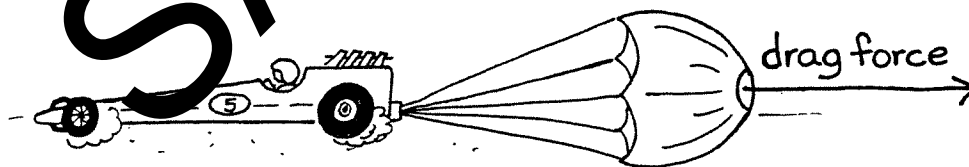
Gravity Force

Gravity is an invisible force which pulls objects together. Objects with a large mass pull and attract objects with less mass. Because the earth has a very large mass, all objects near it are pulled towards the center of the earth. This downwards "pull" is called the force of gravity and works against things that are trying to fly.



Drag Force

Drag is a force that slows you down and works in the opposite direction than you are traveling. For example, when a parachute on a dragster opens up after the race, it creates a drag force that helps to slow the car down.



Lift

Lift is a force upward. If the lift force is greater than the gravity force, the object will stay in the air.



Thrust

This is the force that moves an airplane forward and is usually produced by a plane's engines.

