FLIGHT

UNIT OVERVIEW

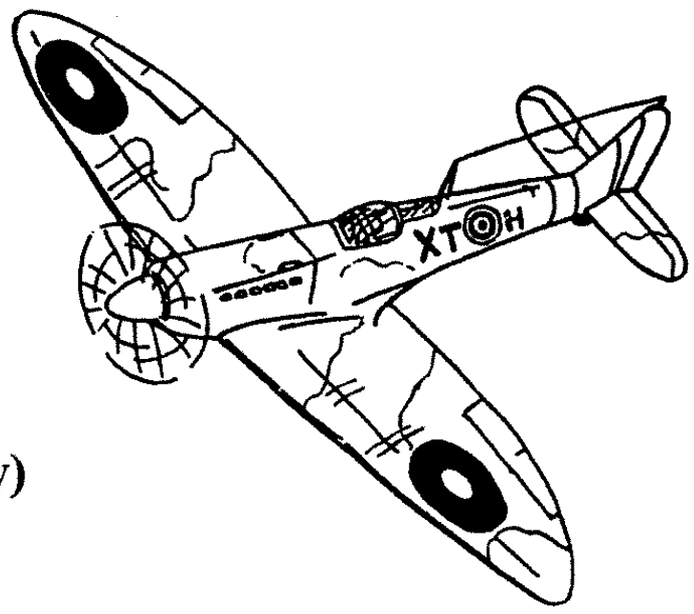
Students study and experience flight in this hands-on science unit. Exciting activities range from learning how wings, rockets and helicopters work to building their own kites and gliders. In general, students participate in meaningful activities associated with the theme of each lesson which are followed 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 Question / 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.

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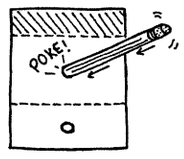
WHY A WING WORKS

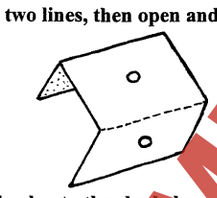
NAME: _____

Instructions:

1. Use a sharp pencil to poke two holes in the paper at the correct places.

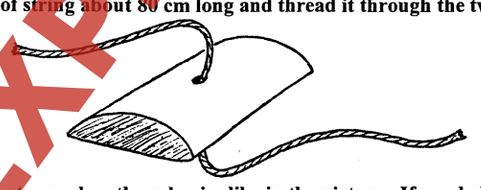


2. Fold the paper on the two lines, then open and lay flat.



3. With a gluestick, apply glue to the shaded part and fold the paper over so it forms a wing shape. (This wing shape is also known as an "airfoil")

4. Cut off a piece of string about 80 cm long and thread it through the two holes in the wing.



5. Hold the string at arms length and spin, like in the picture. If you hold the wing just right, lift will be created and the wing will rise up the string.

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FLIGHT TO THE SUN - A Greek Myth

Daedalus and his son, Icarus, lay rotting in prison. Evil King Minos thought he had finally outsmarted the brilliant Daedalus by sentencing him to life in jail on the inescapable island prison of Crete.

Daedalus sat in the morning sun wondering how to escape. He watched the seagulls circling freely overhead with envy. Suddenly, an idea came to Daedalus and he set to work immediately to build wings. "Icarus, come quickly!" said Daedalus. "Gather the feathers fallen from the wings of the gulls and bring them to me." With these feathers and hardened beeswax, Daedalus began to make two sets of wings. Soon they would be free.

He showed Icarus how to use the wings but warned him,"Never, never fly too high - the heat of the sun will melt the beeswax resulting in disaster!" The two went to the highest building on the island prison and leaped into the air, flapping their wings to freedom.

However, Icarus was young and foolish and would not listen. He could not stop himself from flying high into the sky. He soared so gracefully upward with even the highest flying birds and the world seemed like it was so far away. Then, the feathers started to come loose. Icarus had flown too close to the sun and the beeswax had melted. One by one, the feathers that had taken him to freedom were floating down to the sea. And following them was Icarus plunging to his watery death.

In grief, Daedalus flew onward to the island of Sicily. There, he would plot his revenge on the evil King Minos who had cost him his son's life. And so the myth continues...

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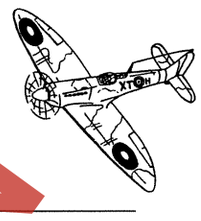

Questions (Answer In Full Sentences)

1. Why are fighter planes fast and maneuverable?

2. List three differences between a Fokker Triplane and a Stealth fighter.

3. Why were pilots not allowed to wear parachutes in World War One?

4. Why did the Red Baron like the Fokker Triplane so much?

6. Why are Stealth Fighters so hard to detect with radar?

7. Describe three things that are similar between a Spitfire and a Fokker Triplane.

8. A single Stealth Fighter is estimated to cost about 45 million dollars to build. Do you think governments should continue to build such high-priced war planes?

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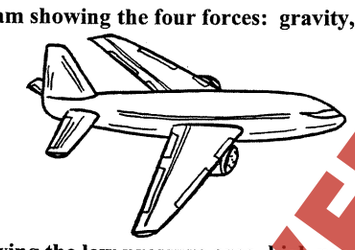
II Short Answer (Answer In Full Sentences)

1. Label the following diagram showing the four forces: gravity, lift, drag and thrust.



2. Label the wing below showing the low pressure area, high pressure area, leading edge, and trailing edge.

3. Use an everyday example to explain Newton's Third Law. (Newton's Third Law says that if there is a force in one direction, there will be an equal force in the opposite direction)

4. Why does hot air rise?

5. The law of flight says that objects tend to go from areas of high pressure to areas of low pressure. Give one everyday example of this law in action.

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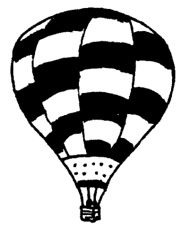
MONTGOLFIER BROTHERS BALLOON

NAME: ________________

Instructions: Use pencil crayons to colour the famous Montgolfier hot air balloon.



FLIGHT WORDSEARCH

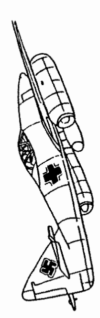
NAME: ______________________

Find These Words:

AILERONS	GODDARD	PRESSURE
AIRSHIP	GRAVITY	PROPELLER
BALLOON	HELICOPTER	ROCKETS
BLIMP	JET	RUDDER
DRAG	KITE	THERMAL
ELEVATORS	LEADING EDGE	THRUST
FUSELAGE	LIFT	TRAILING EDGE
GLIDER	MONTGOLFIER	WING

T	H	H	W	H	H	C	O	U	Q	Z	H	E	B	G
P	R	O	P	E	L	L	E	R	T	T	E	L	R	O
N	E	A	I	L	E	R	O	N	S	G	L	E	Y	D
F	E	J	I	T	S	N	D	Q	D	A	I	V	J	D
Z	Y	Q	I	L	O	P	D	E	M	F	C	A	Z	A
C	Y	K	B	O	I	R	G	R	L	U	O	T	T	R
U	E	L	L	H	P	N	E	O	A	S	P	O	T	D
D	G	L	S	G	I	H	G	G	T	E	T	R	T	H
C	A	R	W	D	T	T	N	E	R	L	E	S	H	Q
B	I	B	A	T	N	I	K	U	D	A	R	G	R	T
A	Z	E	F	O	W	C	S	B	L	G	V	L	U	C
B	L	I	M	P	O	S	I	V	A	E	E	I	S	C
X	L	L	B	R	E	A	I	R	F	V	R	D	T	O
O	D	G	I	R	U	D	D	E	R	J	M	E	H	Y
M	K	G	P	Y	H	F	F	E	Y	G	J	R	O	U

TIMELINE - HISTORY OF POWERED FLIGHT



1903 Wright Flyer becomes the first aircraft to achieve powered flight. The first flight covered a distance of 40 m and lasted about 12 seconds.

1908 The first fatal air crash occurs when Orville Wright crashes and his passenger is killed.

1913 Roland Garros is the first to fly nonstop across the Mediterranean Sea - a distance of 700 kilometers.

1914 The First World War starts and the first bombs are dropped from airplanes on the city of Paris.

1918 The greatest ace of the war, Manfred von Richthofen shoots down his 80th aircraft and is then himself shot down.

1919 Two Canadians named John Alcock and Arthur Brown fly nonstop across the Atlantic ocean.

1926 Robert Goddard launches the first liquid fuelled rocket.

1927 Charles Lindbergh flies the Spirit of St. Louis nonstop from New York to Paris.

1932 Amelia Earhart becomes the first woman to fly solo across the Atlantic Ocean.

1935 First successful helicopter flight by Sikorsky.

1937 The German airship Hindenburg crashes.

1939 World War II starts as German planes help Hitler overwhelm Europe.

1941 Pearl Harbour. Japanese planes, taking off from aircraft carriers, cripple the American navy in a surprise air attack.

1944 An early jet plane, the Messerschmitt 262, is first used in the war.

1945 The United States drops atomic bombs from a B-29 bomber on Hiroshima and Nagasaki ending World War II.

1947 The X-1 piloted by Chuck Yeager, breaks the sound barrier, at a speed of Mach 1.015.

1961 Yuri Gargarin, a Russian, becomes the first person in space.

1964 First flight of the Lockheed SR-71 Blackbird, the world's fastest jet.

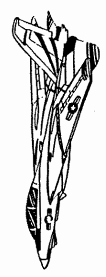
1969 Neil Armstrong becomes the first person to walk on the moon. (Apollo 11)

1970 The supersonic airliner, the Concorde, makes its first flight.

1977 A Boeing 747 Jumbo Jet crashes killing 583 people in the worst air disaster ever.

1986 The space shuttle "Challenger" explodes on takeoff killing all astronauts on board.

1991 The first "stealth" aircraft, the F117A, is used in combat during the Gulf War.



COOPERATIVE WORK SKILLS EVALUATION

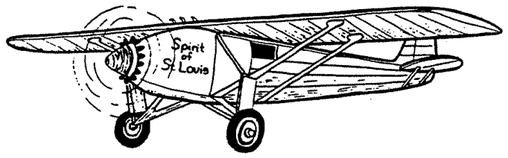
STUDENT	60 cm VOICE	COOPERATIVE WORK SKILLS	ON TASK	TOTAL (15)
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	

FLIGHT REVIEW

NAME: _____

I. Match

a)	A downward force	___ Montgolfier Brothers
b)	A force that works opposite to direction of travel	___ Thrust
c)	Upward force	___ Newton's Third Law
d)	The force that moves a plane forward	___ Wing
e)	The faster air moves, the less pressure it has	___ Leading Edge
f)	The front of the wing	___ Gravity
g)	The back of the wing	___ Rudder
h)	Inventors of the hot air balloon	___ Wright Brothers
i)	Inventors of the airplane	___ Lift
j)	A gas used in modern blimps and airships	___ Fuselage
k)	A spiralling current of warm, rising air	___ Rotor
l)	Inventor of liquid-fuelled rocket	___ Thermal
m)	Spinning blade found on a helicopter	___ Trailing Edge
n)	Body of an airplane or glider	___ Elevators
o)	Gives lift to a bird, glider or a plane	___ Helium
p)	Moving these causes a plane to go up or down	___ Bernoulli's Law
q)	This controls movement from left to right	___ Goddard
r)	First woman to solo across the Atlantic Ocean	___ Gargarin
s)	First person in space	___ Earhart
t)	If there is a force in one direction, there is an equal force in the opposite direction	___ Drag



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#10 - REVIEW

Objectives and Activities
udents complete a review activity.

Teaching Strategies
e review is straight forward and could reflect possible test questions. The matching question designed to allow students to review in pairs or with parents.

Review Answers (Matching Question Only)

atch

downward force	__h__ Montgolfier Brothers
force that works opposite to direction of travel	__d__ Thrust
ward force	__t__ Newton's Third Law
e force that moves a plane forward	__o__ Wing
e faster air moves, the less pressure it has	__f__ Leading Edge
e front of the wing	__a__ Gravity
e back of the wing	__q__ Rudder
ent rs of the hot air balloon	__i__ Wright Brothers
s of the airplane	__c__ Lift
gas used in modern blimps and airships	__n__ Fuselage
spiralling current of warm, rising air	__m__ Rotor
ventor of liquid-fuelled rocket	__k__ Thermal
inning blades found of a helicopter	__g__ Trailing Edge
dy of an airplane or glider	__p__ Elevators
ves lift to a bird, glider or plane	__j__ Helium
oving these causes a plane to go up or down	__e__ Bernoulli's Law
is controls movement from right to left	__l__ Goddard
st woman to solo across the Atlantic Ocean	__s__ Gargarin
st person in space	__r__ Earhart
here is a force in one direction, there is an ual force in the opposite direction	__b__ Drag

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