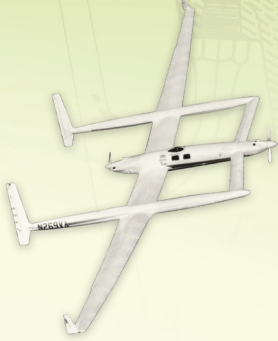




Take off with Flight School



After they saw the program, one student said that he would like to join the military as a pilot when he finishes school. Another student said that he would like to work in the field of meteorology. —Fairfax, Virginia

The **Flight School** series examines historical, scientific, and technological aspects of aviation and its impact on exploration, communication, commerce, and national defense. Each program integrates science, technology, engineering, physics, math, and other fields of study. Students, in grades 4-8, meet pilots, engineers, and astronauts; and are introduced to museum curators and cool artifacts, as a team of educators identify scientific principles that make controlled, heavier-than-air flight possible. Watch the video series on [YouTube](#).

1 **INSPIRED to Fly**

Introduces the principles and practices of early powered flight and concepts of aviation.

2 **Higher, Faster, Farther!**

Examines how the forces of flight inspired engineers and aviators to go higher, faster, and farther than ever before.

3 **Blast Off!!!**

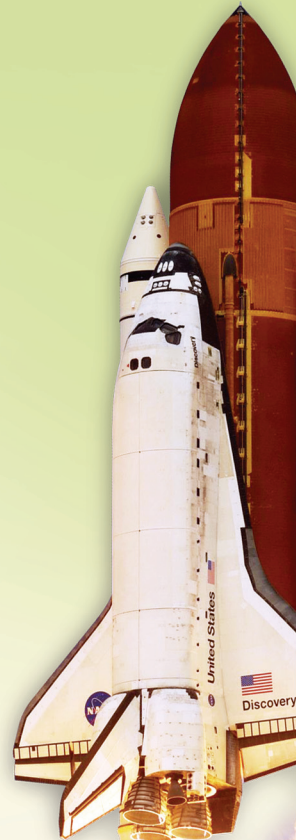
Examines the history of rocket-propelled flight, the space race, the lunar landing, and the space shuttle program.

4 **From Above**

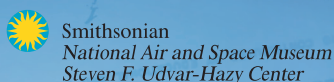
Explores what flying above the Earth teaches us about the planet and its inhabitants.

5 **On the Red Planet**

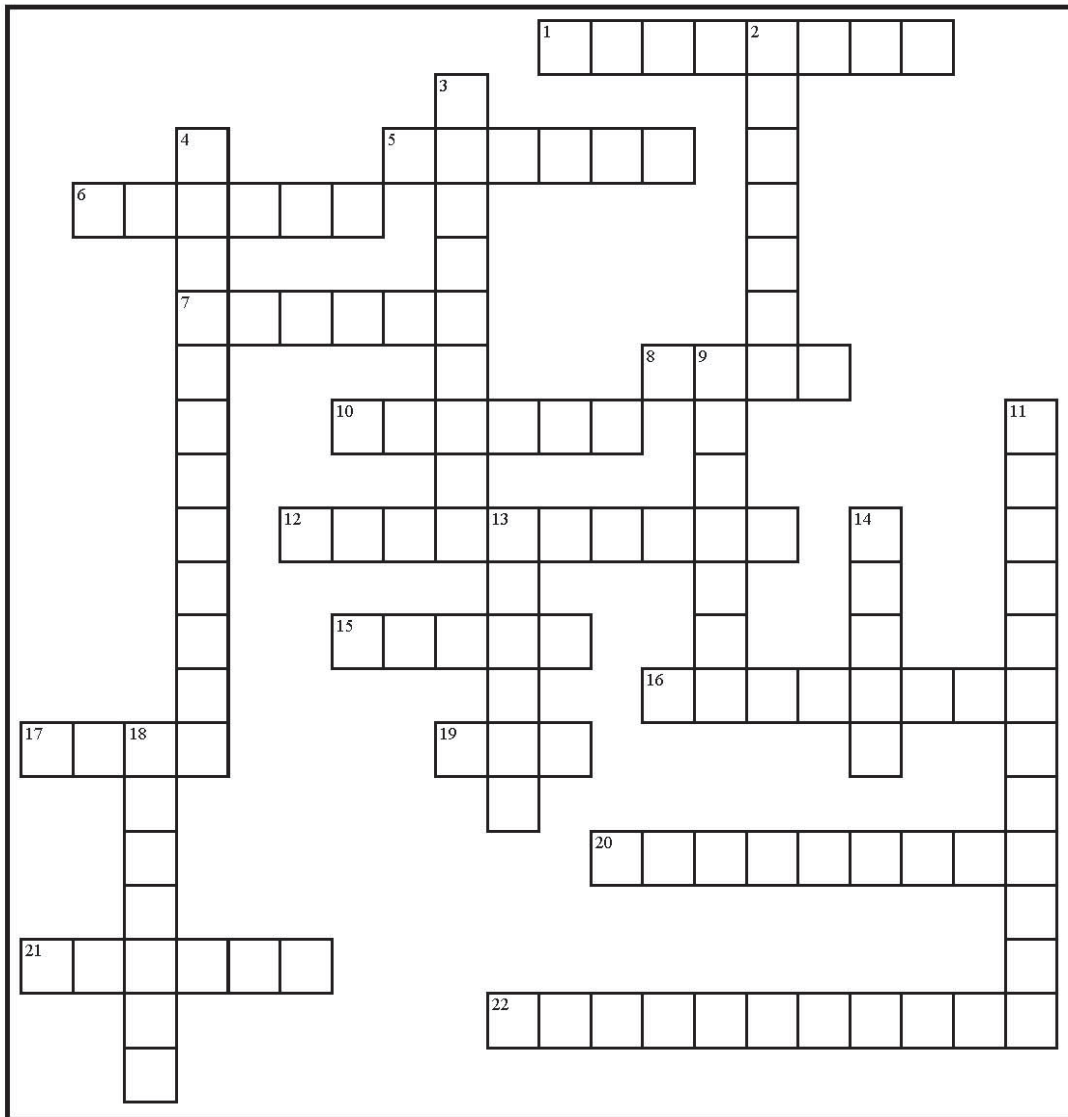
Explores how scientists are studying Mars and what that information tells us about our own planet.



The project is a three-way partnership with the Northern Virginia Chapter of the Armed Forces Communications and Electronics Association (AFCEA NOVA) as the funder, Fairfax Network (Fairfax County Public Schools) as the producing and presenting organization, and the National Air and Space Museum's Stephen F. Udvar-Hazy Center as the content partner.



Crossword Puzzle 1



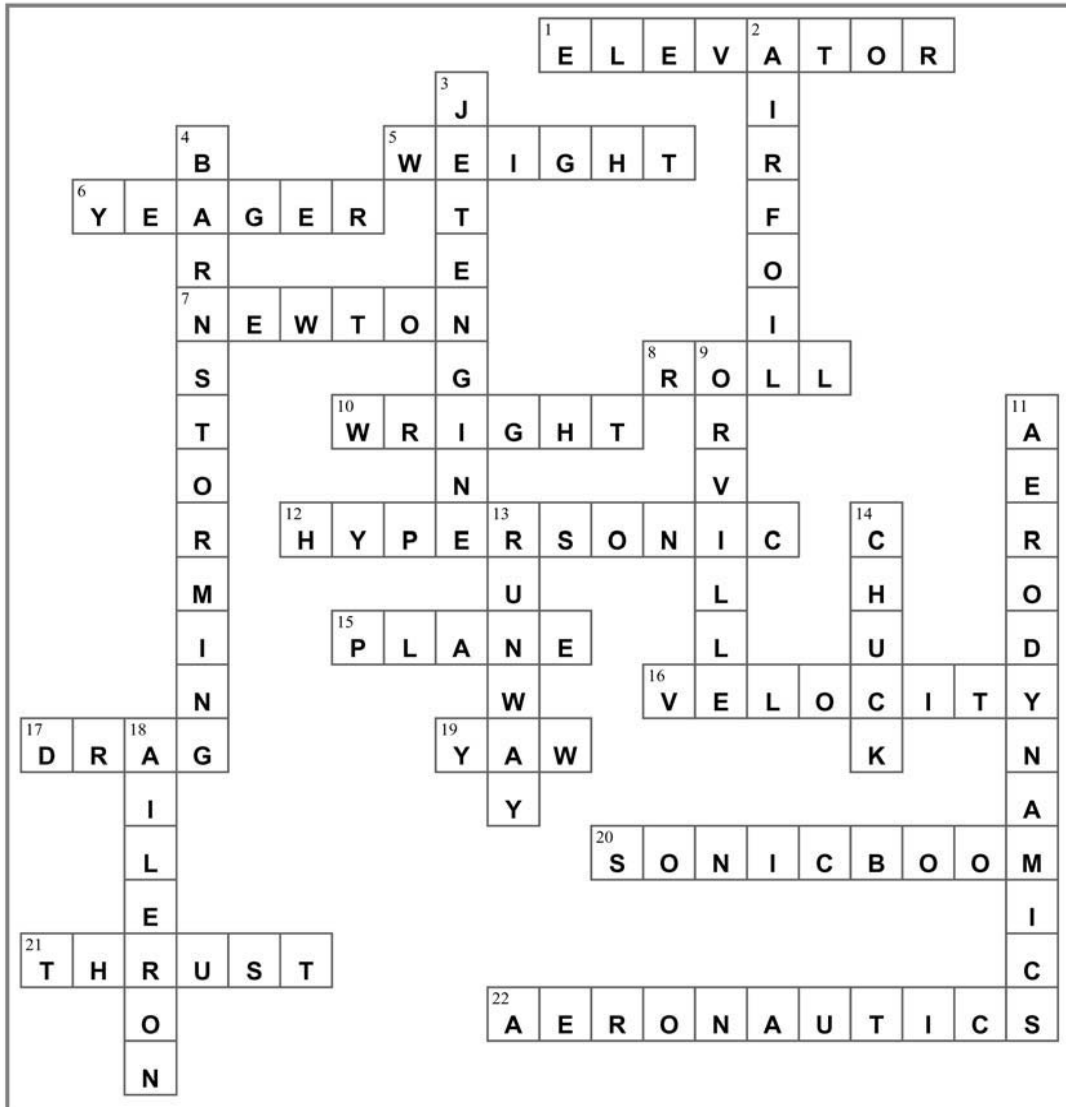
Across

1. The rear section that controls pitch
5. The force that pulls an aircraft toward the ground
6. With 14 Down
7. He discovered that every action has an equal and opposite reaction
8. An up and down movement of the wing tips
10. Wilbur & Orville
12. This speed is five times the speed of sound
15. A vehicle that travels through the air
16. The rate of speed
17. The force that resists an aircraft's motion through the air
19. The motion of an aircraft about its vertical axis
20. The sound of a supersonic shock wave
21. The force that moves an aircraft through the air
22. The science or art of flight

Down

2. The surface that aids in lifting or controlling an aircraft
3. The gas passes through its nozzle to produce thrust (2 wds)
4. Exhibitions of stunt flying and parachute jumping
9. Wilbur's brother
11. The study of the motion of objects through the air and the reaction of the air
13. Where the plane lands
14. He shattered the sound barrier
18. A movable surface that controls the roll of the aircraft

Crossword Puzzle 1 Answers



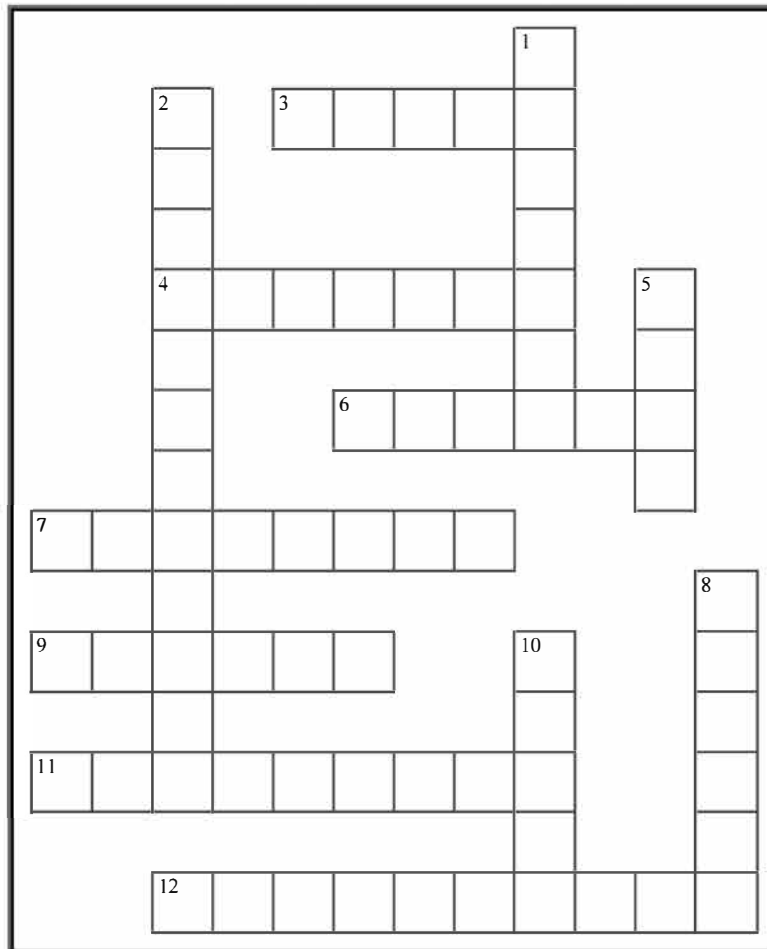
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5. The force that pulls an aircraft toward the ground
6. With 14 Down
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8. An up and down movement of the wing tips
10. Wilbur & Orville
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11. The study of the motion of objects through the air and the reaction of the air
13. Where the plane lands
14. He shattered the sound barrier
18. A movable surface that controls the roll of the aircraft

Crossword Puzzle 2



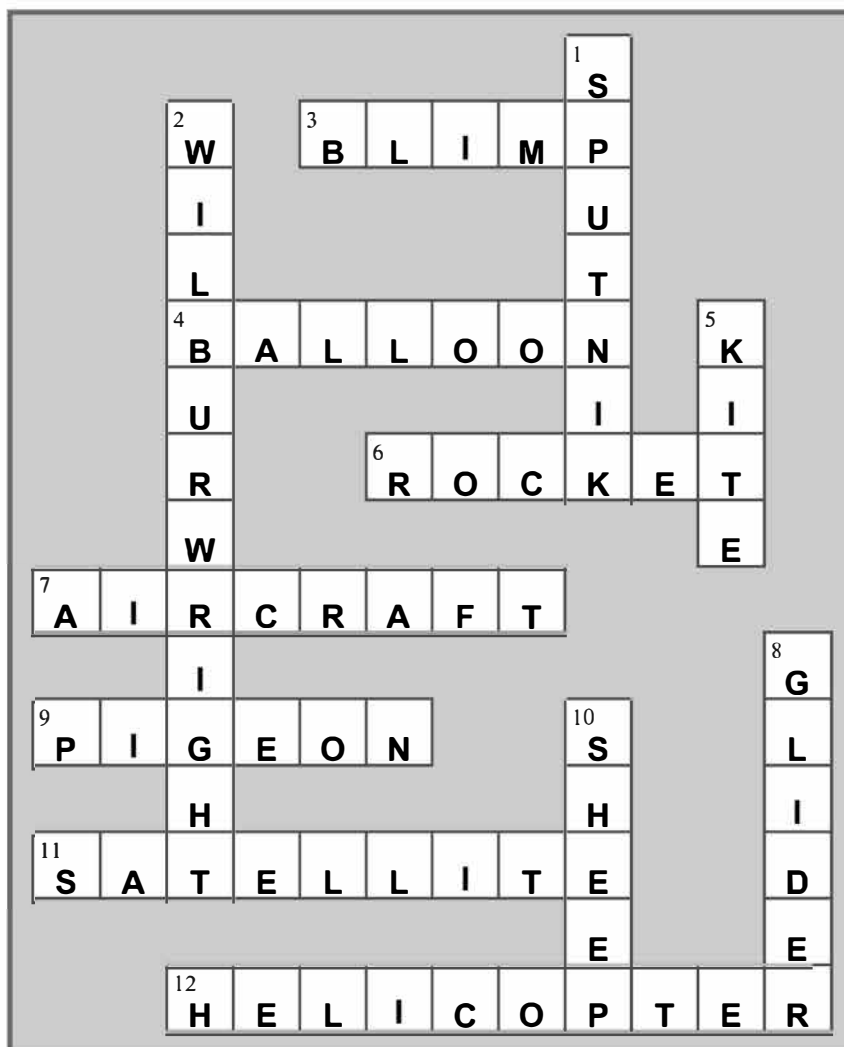
Across

3. IN 1941, THE NAVY ASKS GOODYEAR TO BUILD THESE AIRSHIPS TO WATCH OVER AMERICA'S COASTS
4. GASPARD FELIX TOURNACHON WENT UP IN THIS IN 1858 TO TAKE A PHOTOGRAPH OF THE VILLAGE OF PETIT BICETRE, FRANCE
6. ALFRED NOBEL, IN 1897, SUCCESSFULLY TOOK A PICTURE WITH A CAMERA THAT WAS LAUNCHED ON THIS
7. USED IN WORLD WAR I, IT TO TAKE PICTURES TO MAKE BATTLE MAPS
9. IN A 1903 PICTURE, THIS BAVARIAN FLEET'S WINGS WERE IN THE PICTURE
11. THIS SENDS THE WEATHER IMAGES WE SEE ON TV
12. DURING WORLD WAR II, IT WAS USED FOR OBSERVATION

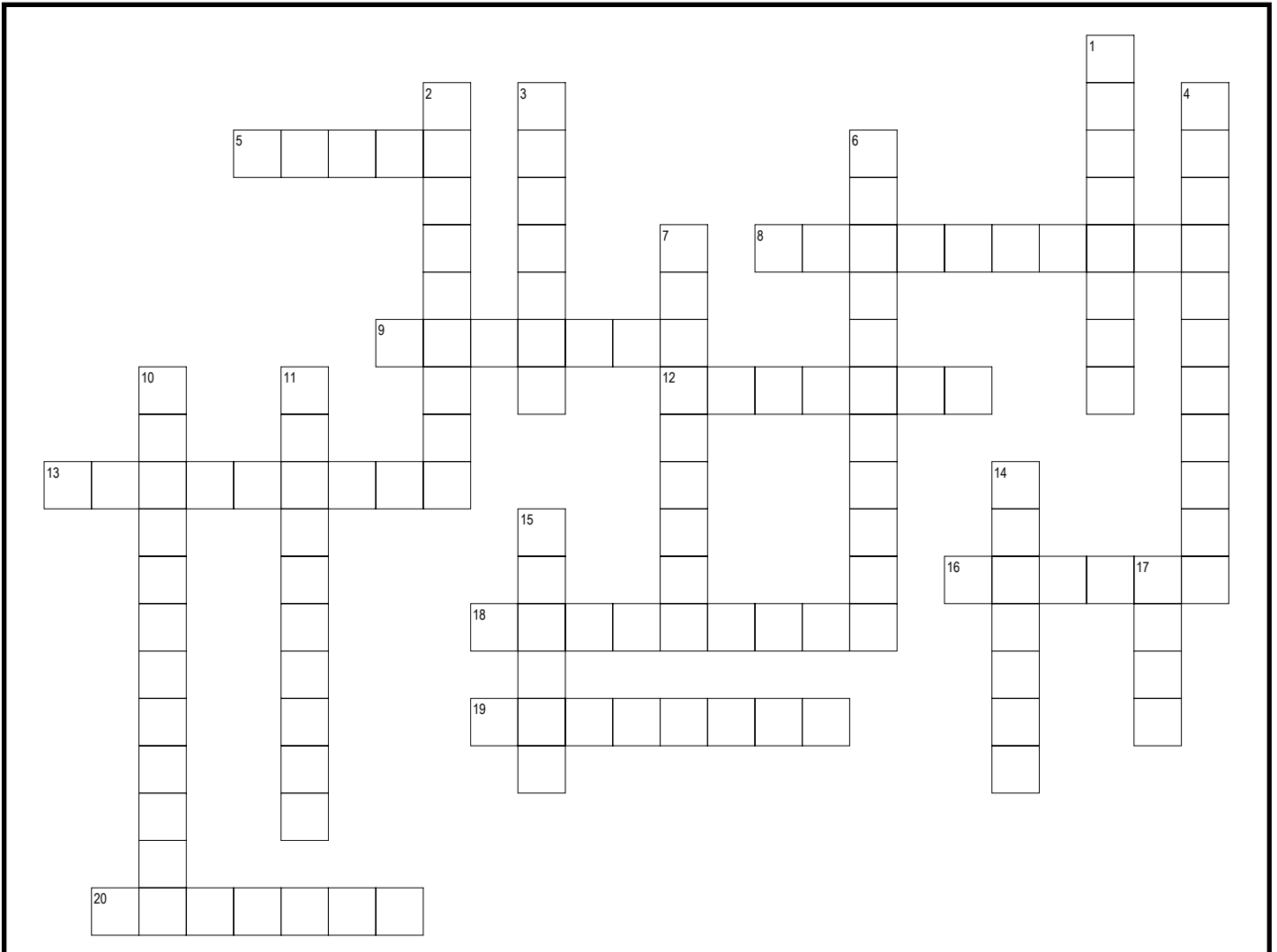
Down

1. RUSSIA'S FIRST SATELLITE
2. HE TOOK THE FIRST RECORDED PHOTOGRAPHS FROM AN AIRPLANE IN 1909. (2 wds)
5. IN 1906, GEORGE LAWRENCE USED A STRING OF THESE TO TAKE A PICTURE ABOVE SAN FRANCISCO
8. THE U-2'S LONG AND NARROW WINGS MAKES IT LOOK LIKE THIS AIRCRAFT
10. ONE OF THE FIRST LIVING CREATURES TO FLY IN A BALLOON

Crossword Puzzle 2 Answers



Space Firsts Crossword Puzzle



Across

5. FIRST TO LEAVE EARTH FOR SPACE
8. FIRST WOMAN IN SPACE
9. FIRST CAPSULE TO CARRY FIRST AMERICAN IN SPACE
12. FIRST AMERICAN IN SPACE
13. FIRST TEACHER IN SPACE
16. FIRST SPACE TELESCOPE
18. FIRST AMERICAN TO SUCCESSFULLY ORBIT THE EARTH (2 WDS)
19. FIRST SPACE SHUTTLE
20. FIRST MANNED SPACE CAPSULE

Down

1. FIRST U.S. SATELLITE IN ORBIT
2. FIRST AMERICAN WOMAN IN SPACE (2 WDS)
3. FIRST SPACECRAFT TO LEAVE THE SOLAR SYSTEM
4. FIRST AMERICAN TO WALK IN SPACE (2 WDS)
6. FIRST MAN IN SPACE (2 WDS)
7. FIRST PERSON ON THE MOON
10. FIRST MANNED PRIVATE SPACEFLIGHT
11. FIRST CAPSULE TO ORBIT THE EARTH
14. FIRST MAN-MADE SATELLITE TO ORBIT THE EARTH
15. FIRST MAN TO WALK IN SPACE
17. FIRST SUCCESSFUL LUNAR SOFT LANDING

Space Firsts Answer Key

The crossword puzzle grid contains the following words:

- 1. Explorer: **E X P L O R E R**
- 2. Satellite: **S A T E L L I T E**
- 3. Pioneer: **P I O N E E R**
- 4. Explorer: **E X P L O R E R**
- 5. Lunar Module: **L A I K A**
- 6. Yuletide: **Y U L T I D E**
- 7. Astronaut: **A S T R O N A U T**
- 8. Terrestrial: **T E R R E S T R I A L**
- 9. Freedom: **F R E E D O M**
- 10. Spaceship: **S P A C E S H I P**
- 11. Frontier: **F R O N T I E R**
- 12. Shepherd: **S H E P H E R D**
- 13. Columbus: **C O L U M B I A**
- 14. Sputnik: **S P U T N I K**
- 15. Lennon: **L E N N O N**
- 16. Hub: **H U B**
- 17. Bell: **B E L L**
- 18. Johnson: **J O H N S O N**
- 19. Columbia: **C O L U M B I A**
- 20. Mercury: **M E R C U R Y**

Space Quotes Cryptograms

Solve the cryptograms to read a famous quote from space.

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

		A	
--	--	---	--

	N
--	---

		A	L	L
--	--	---	---	---

--	--	--	--

C P L C' J D M T J V L Z Z J C T G

--	--	--

	A	N
--	---	---

	N
--	---

		A	N
--	--	---	---

S D X V L M : D M T H Y L M C

L		A
---	--	---

--	--	--

	A	N		N
--	---	---	--	---

Z T L G S D X V L M N Y M B.

	N		L
--	---	--	---

A

A						N
---	--	--	--	--	--	---

— M T Y Z L. L X V J C X D M H,

			A	N		
--	--	--	---	---	--	--

A		L	L	11
---	--	---	---	----

W D V V L M B T X L G D Z Z D 11

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

	E		E
--	---	--	---

	E
--	---

		O
--	--	---

			E	T
--	--	--	---	---

D B J B O B K R J E O N V H K B P

E			T
---	--	--	---

			T
--	--	--	---

	E	T
--	---	---

	O	O	T
--	---	---	---

B H J P D R I J C P C B P R E E P

		O
--	--	---

T	E
---	---

	O	O
--	---	---

W N E K P D B O E E K

			1969
--	--	--	------

--

	E
--	---

		E
--	--	---

--	--

U W V Y 1969 H. X. S B T H O B I K

	E		E
--	---	--	---

	O
--	---

--	--	--

N B H T B R E J H V V

--	--	--	--	--	--

				E
--	--	--	--	---

O H K A I K X. — N V H F W B

		T		O
--	--	---	--	---

T	E
---	---

	O	O
--	---	---

V B R P E K P D B O E E K.

Space Quotes Cryptograms Answer

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

T H A T ' S **O N E** **S M A L L** **S T E P**
 C P L C' J D M T J V L Z Z J C T G
F O R **M A N ;** **O N E** **G I A N T**
 S D X V L M : D M T H Y L M C
L E A P **F O R** **M A N K I N D .**
 Z T L G S D X V L M N Y M B .
 — **N E I L** **A .** **A R M S T R O N G .**
 — M T Y Z L . L X V J C X D M H ,
C O M M A N D E R **A P O L L O 1 1**
 W D V V L M B T X L G D Z Z D 1 1

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

H E R E **M E N** **F R O M** **P L A N E T**
 D B J B O B K R J E O N V H K B P
E A R T H **F I R S T** **S E T** **F O O T**
 B H J P D R I J C P C B P R E E P
U P O N **T H E** **M O O N**
 W N E K P D B O E E K
J U L Y 1969 **A .** **D .** **W E** **C A M E** **I N**
 U W V Y 1969 H . X . S B T H O B I K
P E A C E **F O R** **A L L**
 N B H T B R E J H V V
M A N K I N D . — **P L A Q U E**
 O H K A I K X . — N V H F W B
L E F T **O N** **T H E** **M O O N .**
 V B R P E K P D B O E E K .

Flight School: From Above Word Search

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

Match each word with the correct phrase. Then find the words in the puzzle. We did the first one for you.

- | | |
|---------------|---|
| Aircraft | This sends the weather images we see on TV |
| Balloon | Gaspard Felix Tournachon went up in this in 1858 to take a photograph of the village of Petit Bicetre, France |
| Blimp | In 1941, the Navy asks Goodyear to build these airships to watch over America's coasts |
| Glider | During World War II, it was used for observation |
| Helicopter | In 1906, George Lawrence used a string of these to take a picture above San Francisco |
| Kite | Alfred Nobel, in 1897, successfully took a picture with a camera that was launched on this |
| Pigeon | In a 1903 picture, this Bavarian fleet's wings were in the picture |
| Rocket | Used in World War I, it took pictures to make battle maps |
| Satellite | He took the first recorded photographs from an airplane in 1909. (2 wds) |
| Sheep | Russia's first satellite |
| Sputnik | One of the first living creatures to fly in a balloon |
| Wilbur Wright | The U-2's long and narrow wings makes it look like this aircraft |

Word Search 1

PIONEERS OF FLIGHT

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

Find the names of these pioneers of flight. After all of the names are found, the letters that are not used will reveal a hidden message!

Bessie Coleman —A female barnstormer

Chuck Yeager—broke the sound barrier

Tuskegee Airmen—Colonel Benjamin Davis, Jr. was their commander

Otto Lilienthal—designed a glider that could fly for long distances

George Cayley—designed gliders

Amelia Earhart —first to fly solo across the Pacific from Honolulu to California

Jeana Yeager—first to fly around the world without landing or refueling

Charles Lindbergh —flew the first non-stop flight between New York and Paris

Octave Chanute—gave the Wright Brothers advice

Leonardo Da Vinci—his designs to showed how man could fly

Montgolfier Brothers—Invented of the first hot air balloon

Samuel Langley—invented the Aerodrome

Hero—made the first steam engine

Wiley Post—took off in the Winnie Mae

Dick Rutan—Yeager's copilot

Word Search 1 Answers

PIONEERS OF FLIGHT Answers

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

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Montgolfier Brothers—Invented of the first hot air balloon

Samuel Langley—invented the Aerodrome

Hero—made the first steam engine

Wiley Post—took off in the Winnie Mae

Dick Rutan—Yeager's copilot

Word Search 2

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

Read each definition, fill in the blanks, and find the word in the puzzle above.

- _____ A rock or other body of matter in the solar system.
- _____ A rock that has fallen to Earth from outer space.
- _____ NASA's human spaceflight program from 1961-1975 with the goal of conducting moon landing missions. (2 wds)
- _____ A person trained to work and travel in space.
- _____ The part of the Space Shuttle that looks like an airplane, flies into space and back down again.
- _____ The second human spaceflight program undertaken by NASA between 1965 and 1966. (2 wds)
- _____ The first human spaceflight program's objective was to put a human in orbit around the Earth. (2 wds)
- _____ A vehicle used to launch people and objects into space.
- _____ Tiny meteoroids that are a danger to space vehicles and astronauts in space.
- _____ An object that orbits a planet or other object.
- _____ The space exploration competition between the United States and the Soviet Union from 1957 to 1975. (2 wds)
- _____ A vehicle that stays in space and circles the Earth for a long time so that experiments can be done. (2 wds)
- _____ Any activity done outside the spacecraft.

Word Search 2 Answers

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

Meteor—A rock or other body of matter in the solar system.

Meteorite—A rock that has fallen to Earth from outer space.

ApolloProgram—NASA's human spaceflight program from 1961-1975 with the goal of conducting moon landing missions. (2 wds)

Astronaut—A person trained to work and travel in space.

Orbiter—The part of the Space Shuttle that looks like an airplane, flies into space and back down again.

ProjectGemini—The second human spaceflight program undertaken by NASA between 1965 and 1966. (2 wds)

ProjectMercury—The first human spaceflight program's objective was to put a human in orbit around the Earth. (2 wds)

Rocket—A vehicle used to launch people and objects into space.

Micrometeoroids—Tiny meteoroids that are a danger to space vehicles and astronauts in space.

Satellite—An object that orbits a planet or other object.

SpaceRace—The space exploration competition between the United States and the Soviet Union from 1957 to 1975. (2 wds)

SpaceStation—A vehicle that stays in space and circles the Earth for a long time so that experiments can be done. (2 wds)

SpaceWalk—Any activity done outside the spacecraft.

Word Search 3

FLIGHT SCHOOL VOCABULARY

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

Read each definition and then find the word in the word search puzzle.

1. The study of the motion of objects through the air and the reaction of the air.
2. Exhibitions of stunt flying and parachute jumping.
3. The motion of an aircraft about its vertical axis.
4. The science or art of flight.
5. The nosing of an airplane or spacecraft up or down.
6. An up and down movement of the wing tips.
7. Any surface, as a wing, aileron, or stabilizer, designed to aid in lifting or controlling an aircraft by making use of the air currents through which it moves.
8. The forward end of an aircraft.
9. Airfoils attached to the fuselage of an aircraft to provide lift.
10. A movable surface, usually near the trailing edge of a wing, that controls the roll of the aircraft.
11. The force of attraction by which objects fall toward the center of the earth.
12. A movable control surface attached to a vertical stabilizer that is used to generate and control the yawing motion of the aircraft.
13. The movable section at the rear of the horizontal stabilizer that is used to generate and control the pitching motion of the aircraft.
14. Control surface on the trailing edge of an aircraft wing used to increase lift or drag.
15. The aerodynamic force that resists an aircraft's motion through the air.
16. A paved or cleared strip on which planes land and take off.
17. The force that directly opposes the weight of an airplane and holds the airplane in the air.
18. The force which moves an aircraft through the air and is generated by the engines of the aircraft through some kind of propulsion system.
19. The rate of speed with which something happens.
20. The force generated by the gravitational attraction of the earth on the airplane.
21. The industry concerned with the design and manufacture of aircraft, rockets, missiles, spacecraft, etc., that operate in aerospace.

Word Search 3 Answers

FLIGHT SCHOOL VOCABULARY Answers

Aerodynamics	The study of the motion of objects through the air and the reaction of the air.
Aeronautics	The science or art of flight.
Aerospace	The industry concerned with the design and manufacture of aircraft, rockets, missiles, spacecraft, etc., that operate in aerospace.
Aileron	A movable surface, usually near the trailing edge of a wing, that controls the roll of the aircraft.
Airfoil	Any surface, as a wing, aileron, or stabilizer, designed to aid in lifting or controlling an aircraft by making use of the air currents through which it moves.
Barnstorming	Exhibitions of stunt flying and parachute jumping.
Drag	The aerodynamic force that resists an aircraft's motion through the air.
Elevator	The movable section at the rear of the horizontal stabilizer that is used to generate and control the pitching motion of the aircraft.
Flaps	Control surface on the trailing edge of an aircraft wing used to increase lift or drag.
Gravity	The force of attraction by which objects fall toward the center of the earth.
Lift	The force that directly opposes the weight of an airplane and holds the airplane in the air.
Nose	The forward end of an aircraft.
Pitch	The nosing of an airplane or spacecraft up or down.
Roll	An up and down movement of the wing tips.
Rudder	A movable control surface attached to a vertical stabilizer that is used to generate and control the yawing motion of the aircraft.
Runway	A paved or cleared strip on which planes land and take off.
Thrust	The force which moves an aircraft through the air and is generated by the engines of the aircraft through some kind of propulsion system.
Velocity	The rate of speed with which something happens.
Weight	The force generated by the gravitational attraction of the earth on the airplane.
Wing	Airfoils attached to the fuselage of an aircraft to provide lift.
Yaw	The motion of an aircraft about its vertical axis.