Contents

NAME: _____

Before You Read

The Future of Space Exploration

1. If you were a NASA astronaut, where would you want to go next in the solar system? Explain where, why and how you would get there. Would you go right there, or approach in a series of stages? Plan your trip in your response notebook.
2. Use the words from the bank to fill in all of the spaces below. (Hint: start with f.)

WORD BANK:

ROBOTIC	MOUNT	SCOUT
SURFACE	VAPORIZING	EXPLORATION

a) _ _ _ F _ _ _
b) _ _ U _ _
c) _ _ _ _ T _ _
d) _ _ _ U _ _
e) _ _ _ _ R _ _ _ _ _
f) E _ _ _ _ _ _ _ _ _ _

3. **Match each of the words from #2, A-F with a definition below. Fill the letters in the blanks. Use a dictionary to help you.**

a) _____ a mechanical device operating automatically but seeming like a human
b) _____ the exterior of an object
c) _____ to place or fix on in the proper support
d) _____ to go in search of something
e) _____ the process of examining something carefully
f) _____ changing something into vapor

Reading Passage

NAME: _____

The Future of Space Exploration

Even though it seems like we have just made great strides into space, plans for future missions are already underway. The Mars lander, **Phoenix**, is already built and almost ready for flight. Its **robotic arm** will dig down over 3 feet into the red planet's **subsurface** to collect ice and soil samples while a camera mounted on the arm monitors the action.

Virgin Galactic SpaceShipOne

The next step in our exploration of Mars will be to land the **Mars Science Laboratory**. At the time of printing this book a location was being scouted for the lab by the **Mars Reconnaissance Orbiter.** This new science lab will have six wheels so that it can travel around like the rovers. However, this larger, new lab on wheels will have a **laser** for **vaporizing** the surface layer of rock. This will allow us to see what type of rock and other material is underneath. The goal is that Mars will be the next stop for human travel in space. Manned missions might not be too far away.

STOP

MAKE A PREDICTION: Think of another mission that scientists might have in mind. Write about your prediction for the next step into space.

_____

_____

Also underway were NASA's plans to explore the moons of Jupiter and Saturn. These two planets have moons just like ours. Scientists wondered if some of the moons of Jupiter might have huge underground oceans. If so, there could possibly be alien life on these moons. They were developing the **Jupiter Icy Moons Orbiter (JIMO)** to visit the moons called **Callisto, Ganymede** and **Europa** until they cancelled the project because of funding.

It seems certain that within your lifetime, humans will be able to vacation in space. The **Virgin Galactic Space Company** aims to be taking reservations for space trips by early 2009. It is expected to cost $200,000 for a 2.5 hour flight 75 miles above the Earth's surface. Start saving your allowance!

NAME: _____

After You Read

The Future of Space Exploration

1. Circle the word **TRUE** if the statement is TRUE **or** Circle the word **FALSE** if it is FALSE.
   a) It is likely that humans will go to Mars in the near future.
      TRUE **FALSE**
   b) Scientists hope to explore the moons of Jupiter and Saturn even closer.
      TRUE **FALSE**
   c) A Mars lander has been designed with a robotic arm for taking plant samples.
      TRUE **FALSE**
   d) The new Mars science lab will be a bigger, better version of the earlier rovers.
      TRUE **FALSE**
   e) Humans will soon be able to pay for a ride in space.
      TRUE **FALSE**
2. **Put a check mark (✓) next to the answer that is most correct.**
   a) **The Mars lander, Phoenix, ...**
      ○ **A** is almost ready for flight.
      ○ **B** has a robotic arm.
      ○ **C** will take photos of the work it is doing.
      ○ **D** *all of the above.*
   b) **What will the Mars Science Laboratory do that the rovers, Spirit and Opportunity, could not?**
      ○ **A** drive around the surface of the planet.
      ○ **B** collect rock samples.
      ○ **C** collect subsurface rock samples.
      ○ **D** take photographs.
   c) **Which of the following places was the Jupiter Icy Moons Orbiter NOT planning to go to?**
      ○ **A** Callisto
      ○ **B** Luna
      ○ **C** Ganymede
      ○ **D** Europa
   d) **Which of the following facts is not true of the Virgin Galactic Space Company?**
      ○ **A** It will allow humans to visit the International Space Station.
      ○ **B** A flight will cost approximately $200,000.
      ○ **C** A flight will last about 2.5 hours.
      ○ **D** The trip will allow humans to see what the Earth looks like from space.

After You Read

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The Future of Space Exploration

3. **Answer each question with a complete sentence.**
   a) What new information do scientists hope to get from the Phoenix?
   _____
   _____
   b) How will the Mars Science Laboratory get under the surface layer of rock?
   _____
   _____
   c) What did scientists hope to learn by exploring some of the moons of Jupiter?
   _____
   _____

Research & Extension

1. Scientists believe that we will have humans on Mars within fifty years. Design a structure that would protect humans from the harsh elements on Mars, and allow them to live in relative comfort for a year-long stay. Your diagram should include lots of detail and labels.
2. Sir Richard Branson is the owner of The Virgin Galactic Space Company. Pretend his company is preparing for their first flight, and you want to get on board. Write a letter to Sir Branson to persuade him to let you on for free! You will need to think of some pretty compelling reasons.
3. Here is a list of some other interesting projects NASA had underway in 2007:
   a. A plan to build a **permanent moon base**
   b. The **New Horizons** is on its what for a flyby of Pluto in 2016
   c. The **Cassini-Huygens** probe that is currently investigating Saturn and its moons
   d. The development of **reuseable launch vehicles (RLVs)**

   Choose one of these new projects to research further and write a report of what the project is and where the project is presently at. Present your report orally to your class.
4. Design your own research project. What topic interests you the most about the future of space exploration? Talk with your teacher about how you could learn more about that topic.

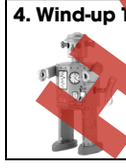
Hands-On Activity #5

Test It!

TOYS IN SPACE

In this activity, you will have the chance to make predictions about how traditional toys will work in space. In scientific experiments, we call these predictions **hypotheses**. Then, you will have a chance to **observe** the toys at work and draw a **conclusion**. These steps are part of the scientific process.

Many of the toys that we play with on Earth work well because gravity helps them to function. Have you ever wondered how toys might work in zero gravity conditions? Some toys might be more fun, and some might be less! Complete the first three columns of this chart. Then, go to: **http://observe.arc.nasa.gov/nasa/exhibits/toys_space/toyframe.html** to watch the toys at work. Complete the final two columns after you watch each toy.

TOY	A) Background: How does gravity help this toy work on Earth?	B) Hypothesis: How will this toy be effected by zero gravity?	C) Observation: What did you learn about how it actually performed in space?	D) Conclusion: Make a statement about what you learned compared to your hypothesis.
1. Ball in Cup 				
2. Jacob's Ladder 				
3. Yo - Yo 				
4. Wind-up Toy 				

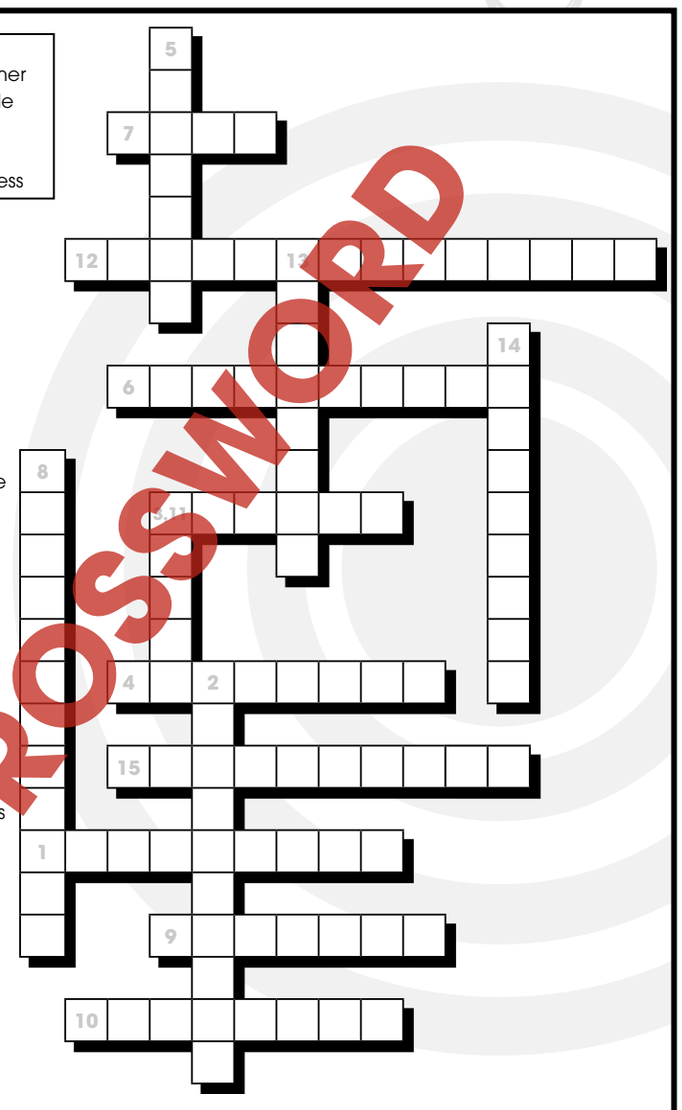
After You Read

NAME: _____

Crossword Puzzle!

Word List

Assemble · Astronaut · Astronomer
Crew · Disintegrate · Hospitable
Launch · Lunar · Monitor
Satellites · Telescope · Terrain
Training · Transmit · Weightlessness



Across

1. A scientist trained to make flights in space
4. To send (as in a signal)
6. Describes conditions that will support life
7. Term given to the members who work together on a shuttle
9. To watch or observe
10. To put parts together
11. A _____ pad is where shuttles take off from
12. The result of being in zero-gravity
15. Objects that orbit around another object

Down

2. A scientist who studies the stars and planets
3. Relating to the moon
5. A tract or expanse of land
8. To break up into parts
13. The instruction or lessons needed to prepare for a task
14. A magnification tool used to see objects that are far away

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After You Read

Comprehension Quiz

2. Circle the word **TRUE** if the statement is TRUE **or** Circle the word **FALSE** if it is FALSE. /5

a) Astronauts at the International Space Station get to watch more than a dozen sunrises and sunsets each day
TRUE **FALSE**

b) Since the ISS is so large and heavy, special launchers were designed to get the unit into space.
TRUE **FALSE**

c) Crews of the ISS rotate in and out about once per year.
TRUE **FALSE**

d) Microgravity provides us an opportunity to conduct experiments that we couldn't do here on Earth.
TRUE **FALSE**

e) Since astronauts need to keep up their strength, they work very short days, and get lots of sleep.
TRUE **FALSE**

3. Answer each question with a complete sentence. /10

a) Why is an astronaut an "extraordinary" person?

_____

_____

b) Explain the context of the phrase, "*The Eagle has landed.*"

_____

_____

c) Give an example from this book that proves "If at first you don't succeed, try, try again."

_____

_____

d) Why do so many astronauts and scientists seem so interested in finding evidence of water on other planets and moons?

_____

_____

e) Why is the cooperation of many countries needed on a project like the ISS?

_____

_____

SUBTOTAL: /15

Construction of the International Space Station

Image courtesy of NASA

After You Read

NAME: _____

The Future of Space Exploration

3. Answer each question with a complete sentence.

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_____

_____

b) How will the Mars Science Laboratory get under the surface layer of rock?

_____

_____

c) What did scientists hope to learn by exploring some of the moons of Jupiter?

_____

_____

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3.

a) going 3 ft. into the subsurface to collect rock and soil data

b) using a laser to vaporize surface

c) if there are huge underground ocean

Crossword Puzzle!

EZ