



TEACHER GUIDE

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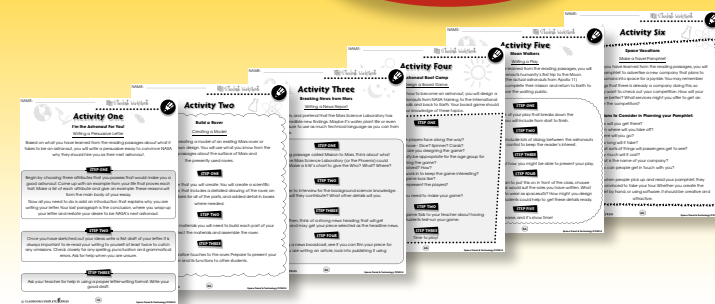
MINI POSTERS

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Mission to Mars

- 1. Activate Your Prior Knowledge:** Visualize what a Martian looks like. Draw a sketch in your notebook. Where does the information you used to create this image come from? Write a brief response of why you think a Martian might look like this.
- An antonym of a word is the opposite meaning. For example, sad is an antonym for happy. For each of the words given below, give an appropriate antonym. You may wish to use a dictionary to help you.

	Word	Antonym
a)	success	
b)	excite	
c)	extreme	
d)	important	
e)	hospitable	

- 3.** Choose a prefix or a suffix from the bubble below that you could add to each of the words above to make a new form of the word. Write the new word, and tell how the meaning is changed.

- a) _____ : _____
- b) _____ : _____
- c) _____ : _____
- d) _____ : _____
- e) _____ : _____

in-
-ly
-ing
-d
un-
-ful



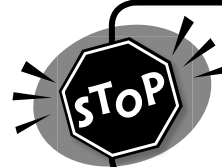
Mission to Mars

In January of 2003, two **Mars Exploration Rovers**, called **Spirit** and **Opportunity**, landed successfully on opposite sides of the planet. This exciting event was the final step in a number of earlier successes and failures at trying to get to Mars.



Image courtesy of NASA

In the section **Blasting Off**, you read about the different types of **spacecraft** that are sent to explore a new planet. In 1964, the **Mariner 4** made the first successful flyby. After two more successful flyby missions, an orbiter/lander was sent in 1971. In 1975, the **Viking 1 and 2** orbited and landed on Mars to send more information back to Earth. It wasn't until 1996 that we were able to take the next step of sending a rover called **Pathfinder**. This sounds like we have had great luck but there were twenty-four failed missions between 1960 and 2003.



RETELL: Make a timeline of the missions to Mars outlined above.

Spirit and Opportunity were sent to Mars to collect more in-depth information about the **terrain** and **atmosphere** of Mars. These rovers are like little science **laboratories** on wheels. They drive around and take data to send back to Earth so that we can understand what things are like on Mars. Each rover weighs over 400 pounds. Scientists only expected them to last for about ninety days, but after two and a half years, they continued to gather useful information.

One of the most important things the Mars Exploration Rovers have taught us is that there might have once been life on Mars. Today, we consider Mars an **extreme planet**. It is rocky, cold, lifeless and home to one of the largest volcanoes in the solar system! However, by collecting samples and looking more closely at the rocky areas, the rovers have given us evidence that there may have once been water on Mars. There may have also been an environment that could have supported life. This is called a **hospitable** environment. For now, we can only imagine what type of life forms might have been there!



Mission to Mars

- 1. Use the words in the box to answer each question.**

atmosphere water hospitable volcano
flyby orbiter/lander terrain

- _____ a) Which type of spacecraft was the first successful mission to Mars?
- _____ b) What type of spacecraft would the Vikings 1 and 2 have been?
- _____ c) What two things about Mars were the Spirit and Opportunity gathering information about?
- _____ d) What object did the Spirit and Opportunity discover on Mars that is the biggest one in the solar system?
- _____ e) What do the rocks on Mars show us that there once might have been there?
- _____ f) What type of environment do scientists now wonder that there might have been on Mars?

- 2. Number the events from 1 to 5 in the order they occur in...**

- _____ a) The *Pathfinder* lands successfully on Mars.
- _____ b) The first successful flyby mission is sent to Mars.
- _____ c) *Opportunity* and *Spirit* land on opposite sides of Mars to begin their exploration of the planet's environment.
- _____ d) Viking 1 and 2 orbit Mars and land to send back images and data about the planet.
- _____ e) The first failed mission to Mars is attempted. It is the first of twenty-four following failures.



Mission to Mars

- 3. Answer each question with a complete sentence.**

- a) Why do you think the Mariner 4 was sent to Mars before the *Pathfinder* and the rovers?
- _____
- b) How are the rovers like little science laboratories on wheels?
- _____
- c) Why do we consider Mars to be an *extreme* planet?
- _____

Research & Extension

- If you could re-design the Mars rovers, what features would you add to them? What additional purposes would you want them to fulfill and why? Find a photo of one of the rovers and cut it out. Add your own design changes to it by either sketching onto the photo, or by tracing the photo and adding to it. Either way, try to make your sketch look as realistic as possible. Plan a presentation that will explain to viewers what your rover will do and why you thought it was an important feature to add.
- Research the ground that the rovers have covered already. Prepare a model (a beach ball, balloon or some other object could be used) to show the points of landing for Spirit and Opportunity, and the land they have covered since landing. Draw their routes right onto the model. Be sure to use different colors for each rover. Add to the model any points of interest or features of Mars they have discovered. Next, sketch out where they plan to go next, and try to draw that in as well. Prepare a presentation to discuss the route that the rovers have taken and what they have found.

WEB CONNECTION



To play some Mars games, try: http://mars.jpl.nasa.gov/funzone_flash.html
Take a Mars Adventure at: http://spaceplace.nasa.gov/en/kids/mars_rocket.shtml
Learn more about the rovers and see where they are now at:
<http://marsrovers.nasa.gov/home/>



Build It!

MAKE A ROVER

Steps

- STEP ONE:** Design your own rover that you might take to explore another planet. Sketch it out with as much detail as possible.
- STEP TWO:** Plan what types of materials you could use to build a model of your rover.
- STEP THREE:** Collect the needed supplies and assemble the rover.
- STEP FOUR:** Consider what could be used as a model of the planet. (balloon, beach ball, etc.)
- STEP FIVE:** Plan an oral presentation of your rover for your class.

DETAILED SKETCH OF MY ROVER



Crossword Puzzle!

Word List

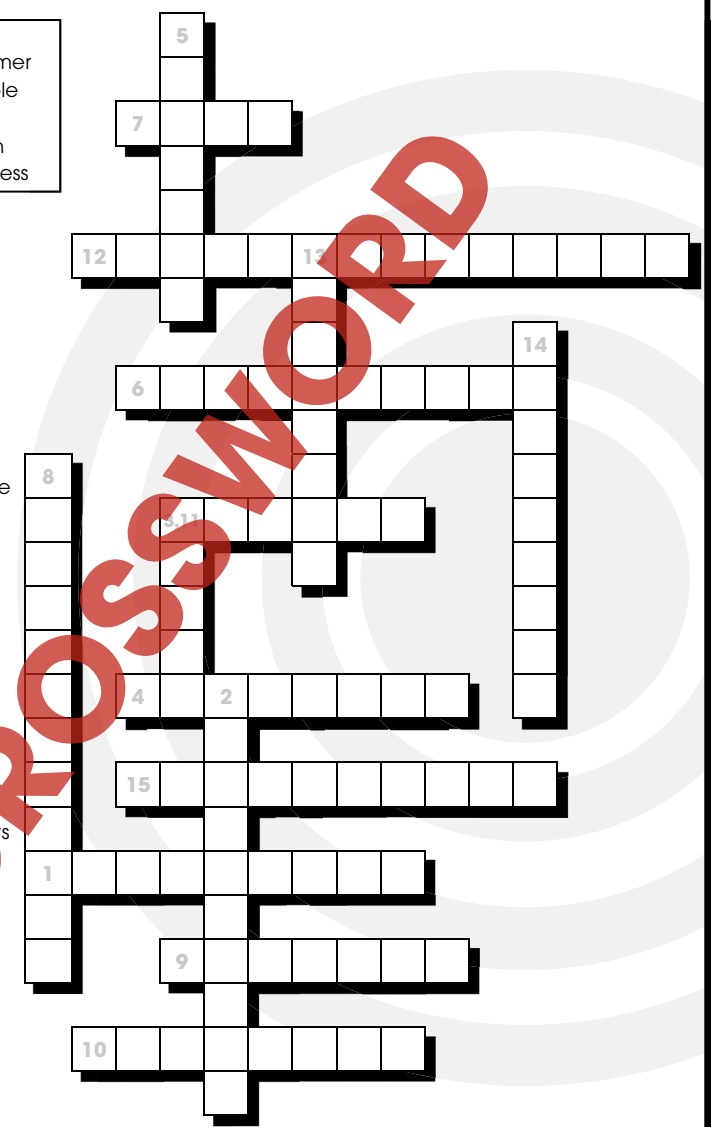
Assemble · Astronaut · Astronomer
 Crew · Disintegrate · Hospitable
 Launch · Lunar · Monitor
 Satellites · Telescope · Terrain
 Training · Transmit · Weightlessness

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



Comprehension Quiz

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5

1. Put a check mark (✓) next to the answer that is most correct.

a) Which of the following is NOT part of astronaut training?

- A studying space
- B flight training
- C astrology
- D aeronautics

b) Which of the following is a type of telescope?

- A refractor
- B retractor
- C refresher
- D reducer

c) Which one of the following statements about spacecraft is true?

- A A flyby mission is a manned mission.
- B An orbiter spacecraft probes into the planet's surface.
- C Lander spacecraft are always manned missions.
- D Rover spacecraft are steered from Earth.

d) Which one of the following statements about satellites is true?

- A A satellite is an object that orbits around a planet.
- B The Earth is a satellite of the moon.
- C Satellites are always man-made.
- D none of the above are true

e) Which of the following is NOT a function of a satellite?

- A To send and receive internet and cell phone signals.
- B To send supplies to the International Space Station.
- C To broadcast radio and television.
- D To observe weather patterns.

Space Shuttle



NAME: _____

Before You Read

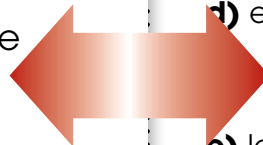


Living in Space

- You've probably already wondered what it would be like to live in space. In your response notebook, pose five "I wonder" statements about life on a space station. For example, "I wonder what kind of food astronauts eat".
- Complete each sentence with a word from the list. Use a dictionary to help you.

crew	disintegrate	assemble	launch
expensive	monitor	experiment	

- The baseball hat we wanted was far too _____ for what he was willing to spend.
- Her parents did not realize that they would have to _____ all the parts of the remote controlled car themselves.
- The doctor told the nurse to take the patient's temperature, change his bandages and continue to _____ his breathing.
- Each student in the class had to design their own _____ to show the effect that sunlight and water have on the rate of plant growth.
- The designer decided to save his new handbag for the spring _____ of his new line.
- When they got to the site of the wreck, they knew it would take a whole _____ of trained people to clean up the mess.
- The walls of the riverbank seemed to _____ right before her very eyes as the waters rushed in.



3. Unscramble the words below. These are the words given in the list for question 2. When you unscramble it, write the letter of the sentence from question 2 beside it.

- _____ HULNAC
- _____ ROTNMIO
- _____ EMLSBAES
- _____ GEDSTTIIRANE
- _____ VSNEEEPXI

1. responses will vary; should be a list of 5 I Wonder statements

2. a) expensive

b) assemble

c) monitor

d) experiment

e) launch

f) crew

g) disintegrate

3. a) E

b) C

c) B

d) G

e) A

31

1. a) disintegrate

b) assemble

c) expensive

d) experiment

e) monitor

f) launch

g) microbe

h) compartment

i) suction

j) engineer

2. a) China, Australia

b) swimming

c) Zvezda, Mir, Salyut

foothbrush

35

3. a) too big/heavy to launch; easier to assemble in microgravity conditions

b) To catch hairs so that they don't float around and get in the way

c) had experience with Mir; for financial contribution



1. responses will vary

2. a) surface

b) mount

c) robotic

d) scout

e) vaporizing

f) exploration

3. a) C

b) A

c) B

d) D

e) F

f) E

37

responses will vary

38

EASY MARKING ANSWER KEY