16. Mars

By Sharon Fabian

1 There is a story called The War of the Worlds. It's about an invasion of aliens from Mars. At one time, The War of the Worlds was made into a radio play. As people everywhere turned on their radios and heard what sounded like a news broadcast about a Martian invasion, they began to panic. For a long time, people had wondered whether there was life on Mars, and now suddenly it seemed that not only were there creatures living on Mars, but the creatures were coming to attack us here on Earth.

2 Well, that was only a story, but people do have good reasons to wonder whether there might have been life forms on Mars at one time. Mars is next to the earth in the solar system, and may be more like Earth that the other planets. It has some of the same chemicals that Earth has on its surface and in its atmosphere. It has some water vapour in its air, and ice caps at the poles. Mars gets lots of sunlight, and has a solid surface to walk on.

3 However, in other ways, Mars is very different from our planet. Its atmosphere is very thin; it gets so much solar radiation that any creatures on Mars would get an instant sunburn. It is a dry and dusty planet, much of it coated with red, rusty Martian dust. The average surface temperature on Mars is about -60 degrees centigrade, way below freezing. The biggest difference of all is that Mars has no water on its surface.

4 Scientists believe that water may be one of the best signs of life on another planet, and so Mars explorations have focused on finding out whether there is, or was, any water on Mars' surface. In 1971, a spacecraft named Mariner 9 orbited Mars and found out that Mars had valleys and channels on its surface. Perhaps they were carved out by water a long time ago. In 1975, the Viking landers, Viking I and Viking II, searched for any signs of life on Mars' surface. Their results were inconclusive; they weren't able to prove whether or not there had ever been life on Mars.

5 Most scientists today probably lean towards the belief that there is no life on Mars. One of their main arguments is that, with Mars' thin atmosphere, any water on its surface would probably begin to boil away immediately. Other scientists think that water might freeze before it boiled away in Mars' strange atmosphere. There are always two sides to the question of whether there is life on Mars.

[6] An interesting piece of the Mars puzzle was found in a place you would probably never expect -- Antarctica. A meteorite was found in Antarctica that was believed to have come from Mars. This meteorite had what looked like really tiny fossils. Could they be the fossils of some ancient microscopic forms of Martian life? No one knows for sure. However, the Antarctica meteorite does bring up an important point about life on Mars. If it turns out that there was life on Mars at one time, it is much more likely that it was some type of microscopic creature, something like a bacteria or a virus, rather than a movie-style space alien.

[7] Now in 2004 a new Mars exploration is underway. NASA has launched two rovers into orbit around Mars in the hope that at least one will have a successful landing on Mars. Scientists point out that a Mars landing is very tricky, and in fact there have been more Mars missions so far that have failed than missions that have succeeded. On this mission, one of the rovers so far has had very good luck. On January 3, 2004, the rover "Spirit" parachuted safely to Mars surface. There it bounced on its giant air bags before finally settling down in the red dust. Slowly and carefully, Spirit began to exit from its nest of air bags. Spirit is scheduled to send back high-definition pictures of the surface of Mars, and it will explore the rocks and dust to determine their chemical makeup. In the meantime, people here on Earth keep wondering, "Could there really be life on Mars?"

Mars

1. This article is mainly about _____. (A) The Viking spacecrafts (B) The search for life on Mars (C) The solar system (D) The chemicals in Mars' soil	2. "Spirit" is _____. (A) A booster rocket (B) An astronaut (C) An orbiting spacecraft (D) A rover
3. Mars is _____. (A) The smallest planet in our solar system (B) A giant planet like Jupiter (C) Covered by oceans (D) A planet with a solid surface like Earth	4. Which happened first? (A) Mariner 9 orbited Mars (B) Viking I landed on Mars (C) The rover Spirit landed on Mars (D) The War of the Worlds aired on radio
5. The word inconclusive means _____. (A) Positive (B) Negative (C) Giving no definite proof (D) False	6. At the time this article was written, Spirit _____. (A) Was on its way back to Earth (B) Was on its way to Mars (C) Had not been heard from (D) Was on Mars and ready to explore
7. If Mars never had any _____, it most likely never had any life forms as we know them. (A) Water (B) Trees (C) Clouds (D) Volcanoes	8. What do you think scientists might learn from the rocks and dust that Spirit is exploring. List several ideas. _____ _____

17. Jupiter

By Sharon Fabian

1 When I put on my shoes to take a walk, I know that I'll be walking on the nice solid surface of planet Earth. When I look up and see clouds and blue sky, I know that they make up the atmosphere that surrounds Earth. At night, I can see our one moon in the sky. I can't see the ocean from here, but I know that if I take a drive to the beach, it will be there. This is what makes up a planet -- a good solid surface under my feet, bodies of water, atmosphere up there in the sky, and one moon in orbit.

2 At least that is what I thought a planet was, back when the only planet I knew about was Earth. But soon I learned that there were other planets out there.

3 People on Earth have known that there were other planets visible in the sky since ancient times. Since Earth was the only planet they had seen up close, they probably imagined that the other ones were similar to Earth too. As astronomers learned more about Mercury, Venus, and Mars, the three planets closest to Earth, they found out that there were differences as well as similarities.

4 In the 1600's, when Galileo used his telescope to look up at the next planet, Jupiter, he began to notice that Jupiter was very different from the four planets closest to the sun. Jupiter had four moons! This seemed like such a fantastic discovery that many people didn't believe Galileo. Some other astronomers refused to take him seriously. Now we know that the four moons discovered by Galileo -- Europa, Callisto, Ganymede, and Io -- were just the beginning.

5 In the centuries after Galileo's discoveries, astronomers developed better and better telescopes. With each improvement, they were able to see Jupiter in better detail. These early astronomers discovered Jupiter's great red spot, a storm as big as two Earths that has been going on for hundreds of years. They were also able to measure Jupiter's diameter and figure out its mass. Jupiter's diameter at its equator is about 143,000 kilometres. Its mass is about 318 times the mass of earth.

6 Once scientists knew the size and mass of Jupiter they could calculate its density. This is when Jupiter began to get even more interesting. Its density is extremely low, so low in fact that Jupiter is

not a solid planet at all. Jupiter does not have a surface in the way that a planet like Earth does. Jupiter's surface consists of gas, much like its atmosphere, only more compacted.

[7] Even better telescopes eventually revealed details about Jupiter's strange surface. They showed bands and streaks of colours produced by the chemicals that make up Jupiter. They also showed that Jupiter does not even rotate evenly like a solid planet does. Parts of Jupiter turn faster than other parts, more evidence that Jupiter is not a solid object.

[8] In the 1930's, an astronomer named Rupert Wildt discovered that Jupiter is made up mainly of hydrogen and helium. Its composition is something like the composition of a star!

[9] In this century we've also learned more interesting facts about Jupiter from explorations using spacecrafts. The Voyager spacecrafts in particular added interesting facts to our knowledge of Jupiter. The Voyager spacecrafts discovered Jupiter's 14th through 16th moons. They discovered that Jupiter does have rings, made up of dust from Jupiter's many moons. It discovered lightning in Jupiter's atmosphere, and volcanoes on its moon Io.

[10] A later orbiter, named Galileo after the astronomer who discovered Jupiter's first four moons, took a closer look at all of its known moons. It also sent a space probe 150 kilometres into Jupiter's atmosphere to get a first look inside the cloud cover. It seems that there will always be more to discover about Jupiter. The more we find out about this huge and unusual planet, the more questions we can ask.

Jupiter

1. Jupiter is the _____ planet from the sun. (A) Third (B) Fifth (C) Fourth (D) Seventh	2. From the article, you can tell that Jupiter was first discovered _____. (A) In the 1930's (B) In the 1600's or earlier (C) In 1600 BC (D) After 1700
3. _____ discovered the first four of Jupiter's moons. (A) Galileo, the spacecraft (B) Voyager (C) Galileo, the astronomer (D) Wildt	4. Io is a _____. (A) Moon (B) Sun (C) Spacecraft (D) Planet
5. Jupiter's surface is _____. (A) Very different from Earth's (B) Very rocky (C) All water (D) Similar to Earth's	6. A *telescope* is used to _____. (A) Travel in space (B) Take photographs in space (C) Make far away things appear closer (D) Look at things too small to see with the eye
7. Planets _____ are discussed in this article, but the article is mainly about _____. (A) Jupiter and Io, Io (B) Jupiter and Earth, Jupiter (C) Jupiter and Mars, Mars (D) Callisto and Ganymede, Callisto	8. Explain one way that Jupiter is like a planet, and one way that it is like a star. _____ _____

18. Saturn

By Sharon Fabian

1 Saturn is a favourite of people who have a telescope to look at the sky. Other planets are visible through a telescope on Earth, and so is the moon, but Saturn always seems to be the most popular.

2 Saturn is a lot like Jupiter and Uranus, the other two giant gas planets. It is the second largest planet, with a diameter of 119,300 kilometres. It rotates very fast on its axis and revolves very slowly around the sun. It is the least dense of all the planets, even less solid than Jupiter. In fact, the density of Saturn is less than the density of water, which means that it could float if it had a big enough pond to float in. Like Jupiter, Saturn has a solid, rocky core surrounded by a layer of liquid metallic hydrogen. Beyond that is the giant outer layer of mostly ordinary hydrogen.

3 Saturn was named after the god of agriculture. Our word Saturday comes from the same root word.

4 But why does everyone like to look at Saturn? Saturn is a lot like some of the other planets, but it also has something the others don't -- those beautiful rings. Saturn's many colourful rings, made up of many more ringlets, are what keep people coming back for another look. Like the wide brim on a colourful Easter hat, Saturn's rings are something to see.

5 The rings around Saturn are made up of particles of ice and ice-covered rock. Some particles are just tiny specks, and some may be elephant-sized. Some rings have more ice, and some have more rock; some have more space between the particles. This means that some rings let more light through than others. This is part of the reason why the rings appear to be different colours. Saturn's rings show up bright in the sky, while other planets have either thin, faint rings or no rings at all.

6 Scientists think that the rings may have been formed from bits of a moon that exploded in space.

7 Saturn is a huge planet, but its rings are enormous. They spread out hundreds of thousands of kilometres around Saturn. For their vast size, however, Saturn's rings are surprisingly thin. They are only a

hundred or so meters thick.

[8] If those beautiful rings aren't enough to keep you looking at Saturn, then how about Saturn's approximately 31 moons? Saturn's largest moon, Titan, can be seen with any good telescope. Four more of its brightest moons can also be viewed through many telescopes on Earth.

[9] The best time of year for viewing Saturn is when it is in opposition to the sun. In other words, when the sun is on one side of the earth, and Saturn is directly opposite on the other side. At that time, a telescope with 30x magnification will allow you to see the rings. If you are lucky enough to get a look through a more powerful telescope, say 100x to 200x, you will get a really magnificent view. The three rings that were first discovered around Saturn, rings A, B, and C, can be seen at this magnification. It is even possible to see Saturn's own shadow falling across its rings. Some museums have special programs in which they set up telescopes for anyone who wants to take a look.

[10] Of course we can get an even closer look from pictures sent back by the spacecrafts that flew by Saturn. Saturn has had three of these visitors so far, Pioneer 11 and Voyagers 1 and 2. Pictures sent back by these spacecraft often have their light colours enhanced by computers. This makes it easier for us to see individual features like the separate rings, and also shows off the rings in brilliant colour.

Saturn

1. Saturn is similar to _____. (A) Jupiter (B) Uranus (C) Mars (D) Both (a) and (b)	2. Saturn has _____. (A) Many rings and one moon (B) One ring and many moons (C) Many rings and many moons (D) One ring and one moon
3. According to this article, people like to look at Saturn because _____. (A) Of its orbit (B) It is close to Earth (C) Of its rings and moons (D) It is the largest planet	4. This article names _____ spacecraft that landed on Saturn. (A) One (B) Three (C) Two (D) No
5. The unusual metal found on Saturn is _____. (A) Metallic oxygen (B) Iron (C) Metallic hydrogen (D) Steel	6. The meaning of the word density is most similar to the meaning of _____. (A) Colour (B) Brightness (C) Size (D) Weight
7. Two synonyms for huge are _____. (Choose two of the best answers.) (A) Enormous (B) Bright (C) Vast (D) Thick	8. There are other planets with rings. (A) False (B) True