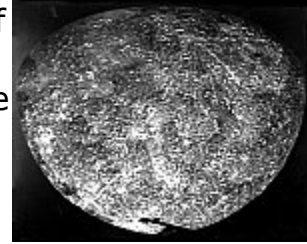


# 13. Mercury

By Sharon Fabian

<sup>1</sup> Mercury is an extreme planet. It is the fastest of all the planets. It is one of the hottest planets, and it is also one of the coldest! It may be the site of the largest crash in the history of the solar system. Mercury may also have the strangest view of the sun in the whole universe!



<sup>2</sup> Mercury zooms around the sun at a speed of 48 kilometres per second, or half as fast as the Earth travels.

<sup>3</sup> At certain times and places, Mercury's surface temperature can rise to twice the temperature inside an oven when you are baking a cake. On the other hand, in the shadow of its North Pole craters, Mercury has ice like our North Pole does.

<sup>4</sup> Since Mercury is so close to the sun, we have never been able to see it in any detail. Even with the most powerful telescope, Mercury looks like a blurry white ball. It wasn't until 1974 that we really began to learn about Mercury. In 1974 and 1975, Mariner 10 flew by Mercury three times and sent back about 12,000 images.

<sup>5</sup> These pictures combined to give a map of about 45% of Mercury's surface, and what they show us is a planet covered with craters, much like our moon. Mercury's largest land feature is the Caloris Basin, a crater formed by a collision with a meteorite long ago. The size of the Caloris Basin, about 1350 kilometres in diameter, suggests that this may have been the largest impact ever. In fact, the impact was so intense, that scientists think it sent shock waves through the centre of Mercury, causing strange landforms to appear on the opposite side of the planet. These landforms, nicknamed "weird terrain," look like nothing we have seen anywhere else except on the moon.

<sup>6</sup> Around some of Mercury's larger craters are secondary craters, formed when rocks from Mercury's surface were thrown up by the impact, and then fell back to Mercury, causing craters of their own.

<sup>7</sup> Mercury also has craters that appear to have shiny rays radiating out from their centres. These rays were probably formed from tiny specks of rock and dust thrown out by the impact. Since Mercury has almost no atmosphere, the specks fell straight back down and settled around their crater in a neat geometric pattern. The tiny specks of rock reflect Mercury's bright sunlight, and give the rays their bright shiny look.

<sup>8</sup> Here is the strangest thing of all about Mercury. If you could stand on the surface of Mercury, your view of the sun would be unbelievable! First the sun might start to rise; then it would speed up and begin to get larger. Then it would stop, reverse its direction, stop again, and then continue on its way! If you could take your eyes away from this sight for a minute, you would notice that the stars in the background were zipping along at three times the speed of the sun. An extreme view, for sure.

<sup>9</sup> Since Mercury is such an extreme little planet, what would we really learn from exploring it? Would it be worth the effort to spend the millions of dollars to send up another spacecraft to explore Mercury? NASA seems to think so, because even though Mercury is a planet of extremes, in some ways it is like Earth. Mercury may have gone through many of the same stages that Earth has gone through over the past few billion years. So, beginning in 2004, the Messenger spacecraft will begin its explorations of Mercury. Messenger will map the rest of the planet, and it will study what the planet is made of. It will take measurements of Mercury's magnetic fields and look for facts about the planet's interior. Why? If scientists can learn more about Mercury, maybe those facts will also help them draw conclusions about planet Earth. By studying Mercury, scientists hope to learn more about how the earth was formed and how it has changed over its lifetime. Maybe the extreme little planet called Mercury will teach us more about our home planet, Earth.

# Mercury

<p>1. Mercury is the _____ planet.</p> <p><input type="radio"/> A Hottest</p> <p><input type="radio"/> B Fastest</p> <p><input type="radio"/> C Largest</p> <p><input type="radio"/> D None of the above</p>	<p>2. Scientists used a powerful telescope to discover the Caloris Crater on Mercury.</p> <p><input type="radio"/> A False</p> <p><input type="radio"/> B True</p>
<p>3. The landforms on Mercury called "weird terrain" are located _____.</p> <p><input type="radio"/> A On the side of the planet opposite a large crater</p> <p><input type="radio"/> B Around large craters</p> <p><input type="radio"/> C In the Caloris Crater</p> <p><input type="radio"/> D At the North Pole</p>	<p>4. Messenger is the name of one of Mercury's moons.</p> <p><input type="radio"/> A False</p> <p><input type="radio"/> B True</p>
<p>5. Mercury has an "extreme" view of _____.</p> <p><input type="radio"/> A Pluto</p> <p><input type="radio"/> B Earth</p> <p><input type="radio"/> C The moon</p> <p><input type="radio"/> D The sun</p>	<p>6. Which happened last.</p> <p><input type="radio"/> A Scientists tried to see Mercury through telescopes.</p> <p><input type="radio"/> B The spacecraft Messenger explored Mercury.</p> <p><input type="radio"/> C The spacecraft Mariner 10 explored Mercury.</p> <p><input type="radio"/> D The planet Mercury was formed.</p>
<p>7. This article is mainly about _____.</p> <p><input type="radio"/> A An unusual planet and what we can learn from it</p> <p><input type="radio"/> B Planets and stars</p> <p><input type="radio"/> C A planet that is more like earth than any other planet</p> <p><input type="radio"/> D The Messenger spacecraft</p>	<p>8. The word collision in paragraph 5 means about the same thing as _____.</p> <p><input type="radio"/> A Landing</p> <p><input type="radio"/> B Crash</p> <p><input type="radio"/> C Crater</p> <p><input type="radio"/> D Planet</p>

# 14. Venus

By Sharon Fabian

<sup>1</sup> People love to complain about the weather, and they love to blame the weatherman. Weather forecasters give us the bad news about rain, snow, and sleet. They report summer weather that is too hot to have fun in the sun, and winter weather that is so cold you just want to stay inside wrapped up in an old quilt. Of course, they also get to report sunny days, blue skies with puffy little white clouds, rain to



make the crops grow, spectacular thunderstorms and tornadoes, and snow holidays. Being a weather forecaster here on Earth is really not a bad job. Weather forecasters report beach weather, ski weather, and travel weather too. Overall the weather here on Earth is really pretty good, especially compared to the weather on, say, Venus.

<sup>2</sup> Being a weather forecaster on Venus would be a totally different matter. Being a weather forecaster on Venus might just be the worst job of them all. Just for starters, a day on Venus lasts as long as 117 days on Earth. How would you like to prepare the weather report for one of those days? Just take a look at some of the weather conditions you would have to report.

<sup>3</sup> **Sunshine** -- None. Even though Venus is a hot planet, it never, ever, gets a nice sunny day. Its dense atmosphere filters out most of the sun, letting only very weak sunlight through.

<sup>4</sup> **Sunrise / Sunset** -- On Venus the sun rises in the West and sets in the East, but not very often. Remember, one Venusian day is the same length as 117 Earth days.

<sup>5</sup> **Storms** -- Thunder and lightning are an everyday thing in Venus' atmosphere, but on the surface Venus is a dry planet with no rain or snow.

<sup>6</sup> **Clouds** -- Venus has a thick atmosphere with several layers of clouds. In fact, it is always cloudy on Venus. In the upper atmosphere the clouds, containing poisonous sulfuric acid, give Venus its pale yellow colour.

<sup>7</sup> **Atmosphere** -- Venus' atmosphere contains mostly carbon dioxide and sulfuric acid, and almost no water. In the lower layers of the atmosphere there are solid particles floating around which scientists have not yet identified. At the surface, the atmosphere is 91

times as dense as our atmosphere here on Earth. If you could walk in this atmosphere on Venus you would be walking in slow motion, almost like you were swimming.

<sup>8</sup>     **Temperature** -- The temperature on Venus is approximately the temperature of a very hot oven. Venus' dense atmosphere keeps it hot even at night. In fact, Venus is hotter than Mercury, which is closer to the sun.

<sup>9</sup>     **Precipitation** -- None.

<sup>10</sup>    **Winds** -- Always heavy in the upper atmosphere, moving at hurricane speed. Always slow on the surface, and always moving in the same direction.

<sup>11</sup>    Now for your special forecasts for viewers who are thinking about a day at the beach or on the ski slopes, followed by your travelers' forecast.

<sup>12</sup>    **Beach Forecast** -- None. No oceans, no beaches.

<sup>13</sup>    **Ski Forecast** -- None. Mountains, but no snow.

<sup>14</sup>    **Travel Forecast** -- None. No travelers.

<sup>15</sup>    Kind of makes the job of an Earth weather forecaster look like a day at the park, doesn't it?

# Venus

<p>1. Venus has _____. <input type="radio"/> A Oceans <input type="radio"/> B Mountains <input type="radio"/> C Comfortable temperatures for humans <input type="radio"/> D Short days</p>	<p>2. This article is mainly about _____. <input type="radio"/> A Conditions on Venus <input type="radio"/> B Whether Venus has any water <input type="radio"/> C Conditions on Mars <input type="radio"/> D How to be a weather forecaster</p>
<p>3. The temperature on Venus does not become cool at night because of _____. <input type="radio"/> A The bright sunlight <input type="radio"/> B Its revolution <input type="radio"/> C Its rotation <input type="radio"/> D The dense atmosphere</p>	<p>4. At one time, people thought that Venus might be much like Earth. Now we know that that is not true because Venus has _____. <input type="radio"/> A Clouds in its atmosphere <input type="radio"/> B Five moons <input type="radio"/> C An atmosphere that is way too harsh for humans <input type="radio"/> D Many forms of precipitation</p>
<p>5. From the facts in the article, you can infer that the temperature on Venus is _____ degrees Fahrenheit. <input type="radio"/> A Over 250 <input type="radio"/> B Approximately 100 <input type="radio"/> C Over 2000 <input type="radio"/> D Below zero</p>	<p>6. The meaning of the word atmosphere is most like _____. <input type="radio"/> A Land <input type="radio"/> B Water <input type="radio"/> C Air <input type="radio"/> D Temperature</p>
<p>7. Spacecraft that have landed on Venus have only lasted for a few hours there. This is probably because of _____. <input type="radio"/> A Lightning <input type="radio"/> B The harsh atmosphere <input type="radio"/> C Falling in craters <input type="radio"/> D Aliens</p>	<p>8. Where do you think would be the best places for a weather forecaster to work? The worst?</p> <hr/> <hr/> <hr/>

# 15. Earth

By Sharon Fabian

<sup>1</sup> People have always known about planet Earth. Even the most ancient people knew about Earth. It was what they slept on every night. The trees that they took shelter under grew from the earth. Earth provided plants for their food and animals for them to hunt.



<sup>2</sup> There is one thing that these ancient people didn't know about Earth; they didn't know that Earth is a planet. If someone had told them that Earth floats in space and revolves around the sun, they probably would have just looked at that person like he was crazy.

<sup>3</sup> Common sense told people that Earth was at the centre of the universe and that it was standing still. After all, no one could see it move, and no one could feel it move. From all appearances, Earth stood still while other objects in the sky moved around it. Everyone could see that the sun rose in the east every morning and set in the west every evening. The moon traveled across the sky too. Even some stars changed their position in the sky.

<sup>4</sup> Another nice thing about the earth was that it was flat. No one had to worry about falling off the Earth, as they would if they lived on something round like the moon.

<sup>5</sup> By the time of the ancient Greeks, there was some disagreement about all of this, but a famous scientist, Ptolemy, provided the most convincing theory. Ptolemy's theory said that the earth was the centre of the universe, and that is what most people continued to believe.

<sup>6</sup> One person who disagreed was Nicolaus Copernicus. Copernicus was an astronomer who lived from 1473 to 1543. He had his own theory about the earth, and he was certain that he was right. Copernicus's theory was that the earth, like all of the other planets, revolves around the sun. He also suggested that the earth rotates on its axis once every day. He couldn't prove his theories, but he used math to show that they were likely to be right. He explained his theories in his book, *On the Revolution of the Heavenly Spheres*.

<sup>7</sup> In the meantime, many people continued to believe that the earth was the centre of the universe. In churches, people learned that this is what they should believe.

<sup>8</sup> At the same time too, scientists kept looking for proof. In Italy, Galileo used the new science of physics to try to prove Copernicus's theory. In Germany, Johannes Kepler studied the same problem. Both scientists developed evidence that showed that Copernicus's theory was correct. At the time, people did not want to believe them, but today we know that Copernicus was right.

<sup>9</sup> Still, it is easy to see why people wanted to believe that Earth is the centre of the universe. Earth is certainly the most important planet to every one of us. Earth is a unique place. It is the only planet with an atmosphere that provides oxygen to breathe and at the same times protects us from the sun's radiation. It is the only planet with oceans and seas, rivers and streams, and rain. It's the only planet with green plants to produce the oxygen for us to breathe and food for us to eat. It's the only planet with insects, and birds, and fish, and animals. It's the only planet with people. So it's no wonder that the earth seems like the centre of the universe. In most ways, to the people who live on Earth, Earth is the centre. It's the only place to be. But in another more scientific way, Earth is only one little planet revolving around the sun, along with at least eight other planets.

<sup>10</sup> Then there are all of the other suns in the universe. Many of them have systems of planets revolving around them too. Maybe in one of those systems somewhere, there is another planet with all of the good things -- a planet that seems like the centre of the universe to its inhabitants.



# Earth

<p>1. Copernicus's theory was that the _____.</p> <p><input type="radio"/> A Earth revolves around the sun</p> <p><input type="radio"/> B Sun revolves around the earth</p> <p><input type="radio"/> C Moon revolves around the sun</p> <p><input type="radio"/> D None of the above</p>	<p>2. Galileo and Kepler _____. <input type="radio"/> A Developed proof for Copernicus's theory</p> <p><input type="radio"/> B Proved Copernicus wrong</p> <p><input type="radio"/> C Proved Ptolemy's theory</p> <p><input type="radio"/> D None of the above</p>
<p>3. Who came first?</p> <p><input type="radio"/> A Galileo</p> <p><input type="radio"/> B Copernicus</p> <p><input type="radio"/> C Ptolemy</p> <p><input type="radio"/> D Kepler</p>	<p>4. To many people, Earth seemed like the centre of the universe because _____. <input type="radio"/> A The sun and the moon appeared to move around the earth</p> <p><input type="radio"/> B It was home</p> <p><input type="radio"/> C It provided everything people needed</p> <p><input type="radio"/> D All of the above</p>
<p>5. There are _____ planets in the universe.</p> <p><input type="radio"/> A Nine</p> <p><input type="radio"/> B Eight</p> <p><input type="radio"/> C One thousand</p> <p><input type="radio"/> D Many</p>	<p>6. Copernicus's book is called On the Revolution of the Heavenly Spheres. We can infer that the word spheres in the title means _____. <input type="radio"/> A Moons</p> <p><input type="radio"/> B Round objects in the sky such as planets and stars</p> <p><input type="radio"/> C Comets</p> <p><input type="radio"/> D Suns</p>
<p>7. The main idea of this article is _____. <input type="radio"/> A Copernicus</p> <p><input type="radio"/> B The amount of time it takes Earth to rotate on its axis</p> <p><input type="radio"/> C Comparing Earth to the other planets</p> <p><input type="radio"/> D Earth as the centre of the universe</p>	<p>8. When scientists talked about the centre of the universe, they meant the point that everything else revolved around. When other people say that Earth still seems like the centre, they mean that Earth is the _____. <input type="radio"/> A Roundest</p> <p><input type="radio"/> B Most important to them</p> <p><input type="radio"/> C Largest</p> <p><input type="radio"/> D Fastest</p>