Exploring Creation with Astronomy, 2nd Edition – Errata File

This file contains the corrections for the **Textbook.** The printing for the Textbook may not be the same as for the Notebooking Journal. Corrections for the Notebooking Journal are in separate files. (Posted 2024)

1st – 3rd Printings – February 2016; May 2017, March 2018:

Clarifications:

Page 33 – 'think about this' section, 2nd paragraph, 1st sentence was revised to: "Thermonuclear fusion shows that there **could not have been** any life on Earth…"

Page 33 – 'think about this' section, 3rd paragraph, last sentence was revised to: "…that life on Earth **is** young and not…"

Page 85 – Activity 6.1, Step 2, second sentence should read: "Now move your CD in **a way** that makes the light **reflect** off of the CD…"

Page 142-143 – Revised Activity 10.2 Launch a Rocket for clarity and success of launch. See attached pages below.

Page 184 – add a picture of a homemade astrometer. See attached page below.

Page 201 – Lesson 10 – added Empty can to the list.

Corrections:

Page 46 – updated image of Mercury to correct planet. See attached page below.

Page 151 – in paragraph under Titania, change 'circumference' to '**diameter**.'

Page 151 – in paragraph under Oberon, change '500 miles around' to '**950 miles across**.'

Page 152 – in paragraph under Miranda, change 'only 300 miles around' to '**about** 300 miles **across**.'

Page 152 – in paragraph under Ariel, change 'About 719 miles around' to 'About **720** miles **across**.'

Page 152 – in paragraph under Umbriel, change 'It is about the same size as Ariel' to '**It is about 750 miles in diameter,** the same size as Ariel,…'

4th – 6th printings – March 2020; July 2020; March 2021:

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7th printing – January 2022:

Clarifications:

Page 142-143 – Revised Activity 10.2 Launch a Rocket for clarity and success of launch. See attached pages below.

Page 184 – add a picture of a homemade astrometer. See attached page below.

Page 201 – Lesson 10 – added Empty can to the list.

Corrections:

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8th printing – August 2023:

Clarifications:

Page 142-143 – Revised Activity 10.2 Launch a Rocket for clarity and success of launch. See attached pages below.

Page 184 – add a picture of a homemade astrometer. See attached page below.

Page 201 – Lesson 10 – added Empty can to the list.

9th printing – January 2024 – No known corrections.

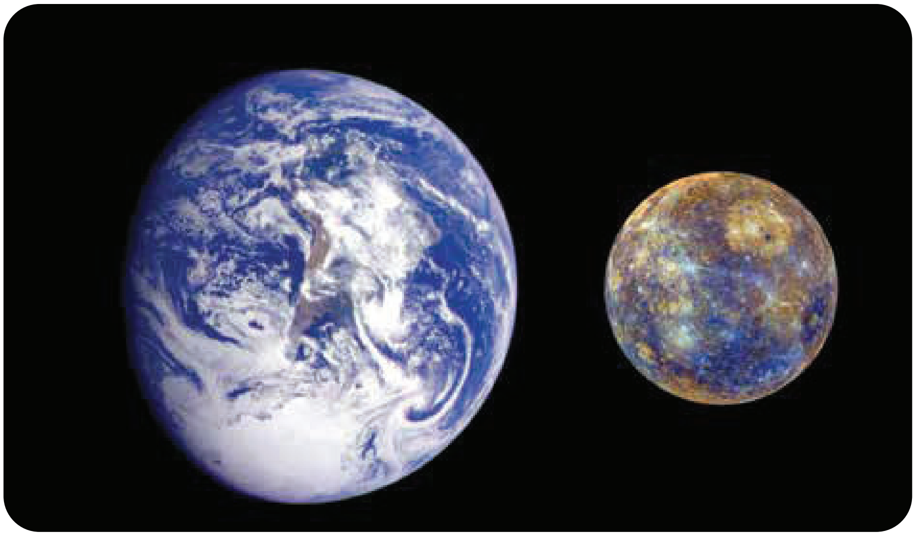
think about this

If you were standing on Mercury (in a spacesuit of course), the morning sun would appear to rise briefly, set, and then rise again. This is because Mercury has an elliptical orbit as well as rotates so slowly. At sunset, the sun would set, rise and then set again. Now that would be something to see!

How long does it take Mercury to make one rotation?
How long does it take Mercury to make one revolution?

FEATURES OF THE PLANET MERCURY

Mercury is small. It is much smaller than Earth. If Earth were the size of a baseball, Mercury would be the size of a golf ball. It's about the same size as our Moon. Mercury is the smallest planet in the solar system.


A size comparison of Earth and Mercury.

Mercury is a rocky planet. We call it a **terrestrial** (tuh res' tree uhl) planet. Terrestrial means *Earth-like*. Of course, this doesn't mean that a terrestrial planet is *a lot* like Earth. It just means that the planet is solid. In other words, you can stand on its surface. There are 4 terrestrial planets in our solar system (Mercury, Venus, Earth, and Mars). The other 4 are **gaseous** (gas' ee us) planets (Jupiter, Saturn, Uranus, and Neptune). As you might guess, this means they are made of gas. They are not solid; there is no ground to stand on. If you tried to land on a gaseous planet, you would sink through it.


A picture of Mercury's surface.

What is Mercury like? It's empty, like our Moon. It is also very dry. If you stepped on Mercury you would get dust all over you. Mercury has many craters on its surface. A crater is a large dent on the surface of the planet. It is a place where space rocks, called **asteroids** (as' tuh roids), crashed into Mercury, leaving big dents. If you have ever had a sandbox, it would be like dropping rocks into the sand and then picking them up to see the dents they left. Craters are like a scar on the surface of a planet.

The asteroids that astronomers believe fell out of the sky and crashed into Mercury could have come from a planet that exploded at one point in time. Many believe that there was once a planet between Mars and Jupiter that exploded and sent pieces flying into space. The

Titan's Ligeia Mare, a hydrocarbon sea.

Cassini captured this image of Titan; the darker spots are some of the largest seas and some of the many hydrocarbon lakes that are present on Titan's surface. Titan is the only place in the solar system, other than Earth, that has stable liquids on its surface. In this case, the liquid consists of ethane and methane rather than water. Titan's largest sea is Kraken Mare.

Take a moment to explain the Cassini mission and Saturn's moons.

Activity 10.2

LAUNCH A ROCKET

Cassini was sent into space with the help of a rocket weighing about 1,038 tons. Rockets launch spacecraft, such as *Cassini*, out of our atmosphere and into space using the force that results from a chemical reaction. You are going to explore the power of chemical reactions by launching your own rocket.

You will need:

- Adult supervision
- Empty water bottle
- Eye protection (such as safety goggles or glasses)
- 2 or more Alka Seltzer® tablets
- Water
- Clay plug
- Paper towel
- Empty can
- Imagination

You will do:

1. Use your imagination to decorate your empty water bottle so that it looks like a rocket. Be sure to leave the cap off.

(Continued on next page.)

2. Crush two or more Alka Seltzer tablets and roll them tightly into a 4 x 4 inch square of paper towel. The roll should be able to fit through the mouth of your bottle. Set aside.
3. Use clay to form a tight cork-like seal for the mouth of your water bottle. **DO NOT use the cap that came with your bottle!** Set your cork aside.
4. Gather your rocket, fuel (rolled up tablets), and cork. Go outside and find a clear spot where your rocket can stand up easily AND everyone can move away quickly.
5. Fill your rocket about 1/3 full with water. Insert your paper towel fuel rod into the water bottle and quickly put your cork in place.
6. Turn the water bottle upside down and set it into the can on the ground. Move away quickly.
7. **Your rocket will launch with a very powerful force!** Enjoy the reaction.

Discussion

Your rocket launches because there is a chemical reaction when the Alka-Seltzer® mixes with the water. This reaction causes gases to build up in the container. These gases are very active, moving around a lot. As the reaction continues, more and more gases develop. These gases need more room in which to move around, so they begin to expand inside the container. They push harder and harder until they push the cork out of the container. When they do this, the gases fly out the open end of the container, causing the whole rocket to go flying into the air.

The Centaur rocket that launched *Cassini* into space. Notice how small the engineers look!

Cassini was launched at night.

Activity 14.4

MAKE AN ASTROMETER

In this activity, you will build an **astrometer** (as troh' meh tur) that will measure the brightness of the stars according to the numbers given stars by astronomers. Your astrometer will measure grades 1-4. Please note that because we are on Earth, our astrometer will measure the *apparent* brightness of the stars (how bright they are from Earth), which is different than the *actual* brightness of the stars. If you ever study astronomy in college, you will learn how to take the brightness you see here on Earth and turn it into the actual brightness of a star.

You will need:

- Adult supervision
- Cardboard
- Clear plastic wrap
- Tape
- Scissors
- Marker

You will do:

1. Cut 4 rectangular slots in the cardboard.
2. Tape a long piece of plastic wrap over all 4 rectangles.
3. Tape another piece of plastic wrap over the 3 top rectangles.
4. Tape another piece of plastic wrap over the 2 top rectangles.
5. Tape another piece of plastic wrap over the top rectangle. Now you have 4 rectangles covered in plastic wrap.
6. Write a **1** next to the rectangle with four layers of wrap. Write a **2** next to the one with three layers, a **3** next to the one with two layers, and a **4** next to the one with only one layer of wrap. You have just made an astrometer. You can use it tonight to measure the brightness of stars.
7. Take your astrometer outside on a clear, dark night, and begin by looking through square number four. You will see many stars through it.
8. Look through square number three. You will see fewer stars this time.
9. Look through number two, and move to number one. The rectangle with the most plastic wrap only shows the brightest stars in the sky.

Discussion

If you want to determine the brightness of a single star, look at it through each rectangle, starting at rectangle 4 and progressing through the rectangles in decreasing order. The number of the last rectangle through which you can still see the star gives you the brightness of the star.

LIGHT YEARS

Did you know that light travels very quickly? Light travels at 186,000 miles per second. Say that out loud. Light travels at one hundred eighty-six thousand miles per second. That means that when you turn on the light, it traveled that fast to light up your room. When you see the light from the sun, the light you are seeing has traveled 93 million miles, going 186,000 miles per second to get here. That means it takes the light from