

EXPLORING THE UNIVERSE

BY JOAN AND FRED GIESSOW

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The activities in this book reinforce basic concepts in the study of the universe, including the planets, stars, comets, astronomers and their tools, and space travel.

General background information, suggested activities, questions for discussion, and answers are included.

Encourage students to keep completed pages in a folder or notebook for reference and review.

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EXPLORING THE UNIVERSE

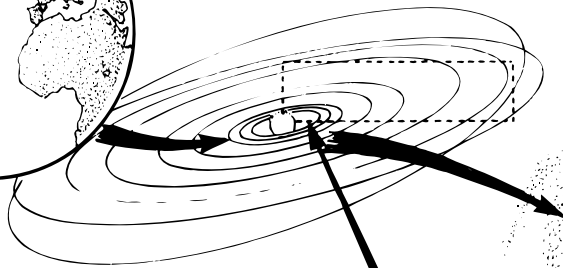
THE SOLAR SYSTEM

Everything in space is part of the universe. The **solar system** consists of the sun and nine known planets that revolve around it. The sun is just one star of the 100 billion or so which make up the **Milky Way** galaxy. In the universe, there are millions of other galaxies, each containing billions of stars. Stars and planets differ. Stars produce and give off their own heat and light; planets reflect the light of the sun. **Asteroids**—chunks of rock and metal, and **comets** orbit between the planets. Comets are loose collections of rock and frozen gas.

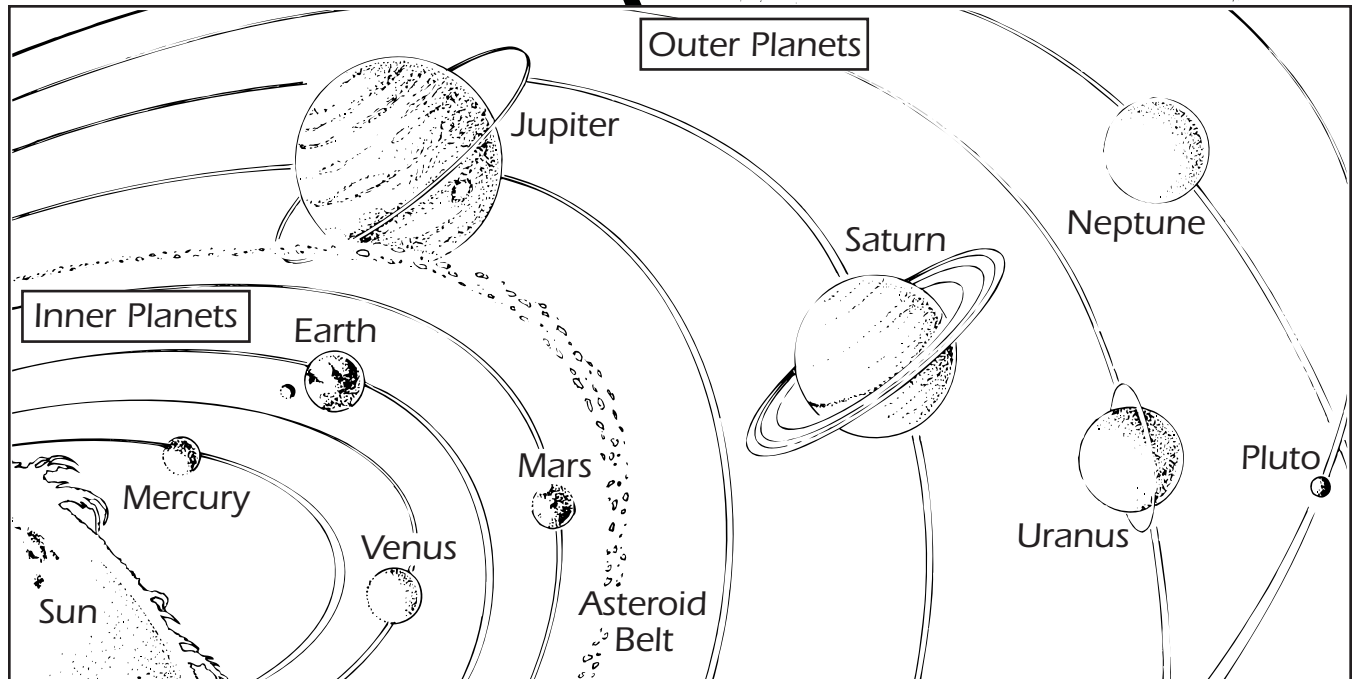
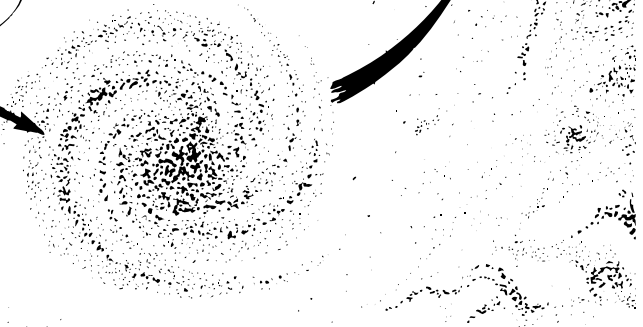
Earth is part of our solar system . . .



which is part of the Milky Way galaxy . . .



which is part of the universe.



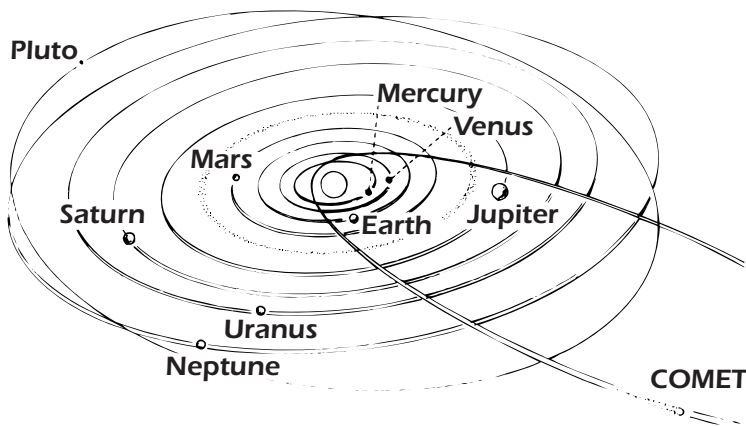
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ORBITS

The planets revolve around the sun. Their paths, called **orbits**, may be elongated or nearly circular. The time it takes to complete an orbit is known as a **period**.

Time to Complete One Orbit as measured in Earth standard time

Mercury	88 days
Venus	224.7 days
Earth	365.25 days
Mars	1.88 years
Jupiter	11.86 years
Saturn	29.5 years
Uranus	84 years
Neptune	164.79 years
Pluto	248.32 years



Circle the planet whose orbit is longer.

- Venus or Earth
- Neptune or Uranus
- Pluto or Mars
- Neptune or Pluto
- Uranus or Jupiter

How much longer?

On Mercury, one year only takes 88 days. It would take 4.15 "Mercury years" to equal one Earth year ($365.25 / 88$). To find out how old you would be on Mercury, multiply your age by 4.15.

- What is your "Mercury age?" _____
- How many "Venus years" is equal to one "Earth year?" _____
- What is your "Venus age?" _____

On Pluto it would take 248.32 "Earth years" before you had your first birthday!

One year on Mars would be as long as 686.67 Earth days. (1.88×365.25)

- How many Earth days would pass in one year on Uranus? _____
- How many Earth days would pass in one year on Saturn? _____

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THE PLANETS

Name of Planet	Number of Satellites	Radius in km	Distance from Sun (A.U. *)	Period of Rotation	Period of Revolution
Inner Planets					
Mercury	0	2442 (1561 mi)	0.4	59 days	88 days
Venus	0	6051 (3758 mi)	0.7	243 days	224.7 days
Earth	1	6378 (3961 mi)	1	23.9 hrs	365.25 days (1 yr)
Mars	2	3397 (2037 mi)	1.5	24.5 hrs	1.88 yrs
Outer Planets					
Jupiter	16	71,371 (44,658 mi)	5.2	9.9 hrs	11.86 yrs
Saturn	23	60,337 (37,267 mi)	9.5	10.2 hrs	29.5 yrs
Uranus	15	26,214 (16,149 mi)	19	17 hrs	84 yrs
Neptune	8	24,747 (15,372 mi)	30	15.6 hrs	164.79 yrs
Pluto	1	1150 (770 mi)	40	6.4 days	248.32 yrs
<p>* Astronomical Unit: 1 A.U. = distance from Earth to the sun (approximately 150,000,000 kilometers)</p>					

Study the chart and answer the questions.

Which planet . . .

1. is the largest? _____
2. is the smallest? _____
3. has a rotation period most like Earth's? _____
4. orbits the sun in 84 years? _____
5. has the most satellites? _____
6. comes closest to Earth in its orbit? _____
7. has the same number of satellites as Earth? _____
8. has nearly the same rotation period as Jupiter? _____
9. Rank the planets from smallest to largest. _____