



TEACHER'S GUIDE

LESSON 36: WHAT IS IN OUR SOLAR SYSTEM?

Video summary: Anna goes into space and gets lost.

Functional purpose: Talk about space, planets and stars; getting lost

Grammar: There is/There are; Review: Comparatives & Superlatives; Ordinal Numbers

Question: What is in our solar system?

Answers: There are eight planets in our solar system. And there is one sun.

Other questions and answers: Which planet is closest to the sun? Mercury. Which planet is 3rd from the sun? Earth. Which planet is farthest from the sun? Neptune.

Unique words and parts of speech:

Adjective	Noun	Noun, Adverb, Adjective	Verb
farthest	asteroids	west	explore
forward	comets		orbiting
poor	Earth		rises
solar	Jupiter		rotate
	Mars		sets
	Mercury		share
	Moon		
	Neptune		
	nothing		
	Pluto		
	Saturn		
	system		
	Uranus		
	Venus		

PREPARE TO WATCH

Get students' attention and connect to students' experiences

This can be done in the native language or English.

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- Draw a model of the solar system on the board, but do not label the planets. Ask students to try to guess what the drawing represents. Alternatively, show an image of the solar system from a large book, poster, or image on a screen. Ask students what they know about it.
- Ask, “What is in our solar system? Have you ever seen a planet in the sky at night?”
- Ask, “Do you like to look at the stars? Would you like to go into space? Why or why not?”
- Ask, “What would you like to do in space?”
- Write responses on the board and say, “Let’s see what we learn in this lesson about our solar system.”

Guess: What will happen?

- Show this image of Anna in a spaceship.



- Ask, “What do you think Anna and Daisy are doing in this picture?”
- Take some student ideas and write them on the board to refer to later.

WATCH AND REVIEW THE VIDEO

Check understanding with specific questions (add your own as necessary)

- How many planets are in our solar system?
- Which planet is third from the Sun? Which planet is closest to the Sun?
- Point to the guesses you wrote on the board earlier. Say, “Here are your guesses. Did you learn about what Anna and Daisy are doing? Where did they go?” (They are exploring the solar system. They went to Neptune; they got close to the Sun.)

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- Say, “Even if you didn’t guess the same thing, guessing can help you listen carefully to English. It can help you get the point of what people are saying or doing. Try it other times you read or listen to English.”

Talk more about the video

- Ask students what they liked, what made them laugh or what parts they want to see again.
- Say, “Earth has a moon. What about other planets? What does Anna say about moons?” (There are many moons in our solar system.)

ACTIVITIES

1. Spacewalk

Set up/materials

- Introduce new words needed for this activity:
 - *atmosphere* - a mass of gases that surround a planet or star
 - *exosphere* - the outermost portion of a planet's atmosphere,
 - Gases that form planets and their atmospheres
 - *ammonia*
 - *helium*
 - *hydrogen*
 - *methane*
 - *oxygen*
 - (*space*) *probe* - a device that is used to obtain information from outer space and send it back to Earth
 - *spacecraft* - a vehicle that is used for travel in outer space
- Cut out and separate each of the images of planets at the end of this lesson.
 - Place them in different locations around the classroom.
- Make enough copies so each group of students has one copy of the Planet Data Card.
 - Depending on how many groups you plan to form, distribute one or two of the matching Planet Data Cards to the appropriate area of each planet.

How to

- Divide students into small groups; at least eight groups if you want to have each planet represented. Assign planets or use the numbered heads method: have students count to 8. All students whose number is “one” are in Group 1, “two” are in Group 2, and so on.
- Pass out a *Spacewalk Activity Sheet* to each group.
- Each group then chooses a planet from the cards displayed around the classroom. Have only one group at a time choose. For example, Group 1 may choose Earth; next, Group 2 may choose Mars, and so on. Each group should write the name of their planet on the *Spacewalk Activity Sheet*.
- Have students choose a “Mission” name for their group. For example, “Mission to Neptune” or “Space Explorers.” They should write the name of their “Mission” on the *Spacewalk Activity Sheet*.
- Explain that in this activity, students will have a “Spacewalk” by imagining travel through the solar system to their chosen planet. They will learn about the planet from their planet data card, and write a story about their travel using the *Spacewalk Activity Sheet*.

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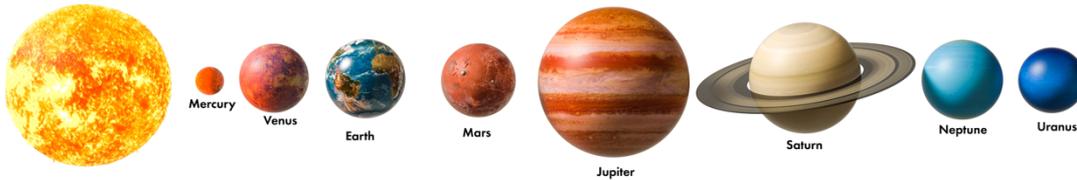
- Each group will present their story to the whole class. Say, “Remember that each person in the group needs to speak when you present your story to the class. For example, one person can tell about the trip to the planet, another can tell about the atmosphere, and so on.”
- Give students a time limit for the activity. When the time is up, ask each group to present their story as a group for the rest of the class.

Variation

- Have students research more about one planet of their choice for a detailed report.



SPACEWALK



Write the name of your planet: _____

What is your group name? _____

Starting from Earth, how do you travel to your planet?

(We went away from the sun and passed Mars and Jupiter...)

Learn about your planet using the Data Card. Then, write an interesting story about going there and what you can see. With your group, tell the class about your trip to your planet.



<https://learningenglish.voanews.com>

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2. Read and Write

Set up/materials

- Ask students to think about all the things they learned to say about the solar system in the lesson.
- Give students a copy of the *Read and Write* activity sheet.

How to

- Have students trace the words. The sentences are:
 - There is only one star in our solar system – the sun!
 - Earth is the third planet from the sun.
 - A solar system is a sun with objects orbiting around it.
 - Neptune is the farthest from the sun.
- Divide students into pairs and see how many more sentences they can form about the solar system.
- Ask pairs to read their sentences out loud.

Variations

- Have students write questions that can be answered with the statements in the activity sheet.
 - How many stars are in our solar system? What is it called?
 - How many planets are closer to the sun than the Earth is?
 - What is a solar system?
 - Which planet is farthest from the sun?
- Students can copy completed sentences into their notebook.



READ AND WRITE

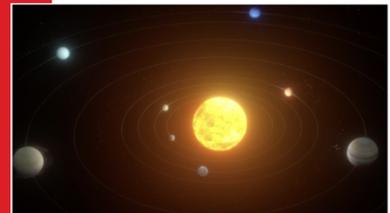
There is only one **star**
in our solar system—
our sun!



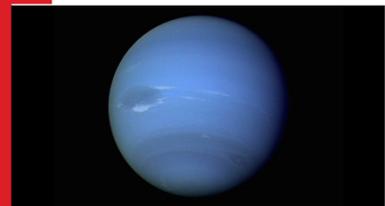
Earth is the **third**
planet from the sun.



A solar **system** is a sun
with objects **orbiting**
around it.



Neptune is the
farthest from the sun.



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3. Listen and Speak – Visit Venus

Set up/materials

- Ask, “Which planet would you like to visit?”
- Say, “In this lesson, we will make a radio or social media advertisement for a planet.”
- Pair the students. Give students copies of the *Listen and Speak* activity sheet.

How to

- Give student instructions on completing the activity sheet:
 - First, they should choose a planet. This can be a different planet from the one they worked with for the spacewalk activity.
 - Next, they should write a short talk (to be sent to radio or used in social media) telling people why they should visit the planet.
- Assign each group another group to pair with. Each group should deliver their talk to try to convince the other group to visit the planet.
- Each pair should ask the other pair, “Will you visit our planet? Why or why not?” and report on their answers.

Variations

- Have students research more facts about the planet they choose before they write their short talk. They can use the Planet Data Cards from the Spacewalk activity in this lesson plan.
- Students may create a graphic, such as a travel poster, to accompany their talk on the planet.
- Teachers can find more information about planets and spacecraft exploring them at <https://www.nasa.gov/planetarymissions/>.

● LISTEN AND SPEAK

Imagine it is 50 years from today. People can travel to any planet in the solar system. Choose one of the planets. Use the information below or the Planet Data Cards to learn about it. Write a short talk for radio or a post for social media to tell people why they should visit your planet. Then meet with another pair and share your talk or post. Did the other pair decide to visit your planet? Write your talk or post below.

Ask another pair and write their answers: Will you visit our planet?

Why or why not?

NEPTUNE
6 rings
Ice giant
Thick atmosphere

SATURN
Rings are ice & rock
Gas giant of hydrogen & helium

MARS
Very cold
Red surface
Has seasons

MOON
Earth's one moon
Takes 27 days to orbit Earth
We always see the same side

URANUS
Hydrogen, helium & methane atmosphere
Has rings and 28 moons
Methane makes it look blue

EARTH
70 percent of surface is water
Atmosphere - nitrogen and oxygen
Only planet known to support life

MERCURY
Smallest planet
Thin exosphere
Rocky surface

JUPITER
Largest planet
Gas giant made of hydrogen & helium
Red spot is storm

VENUS
Hottest planet
Atmosphere - mostly carbon dioxide
Metals would melt on its surface

LEARN MORE

Review: comparative and superlative; questions with *which*

Set up

- Write the adjectives *large, small, far, near, cold, hot, and beautiful* on the board.
- Show or draw an image of the solar system.

How to

- Review comparative and superlative—write *large, larger, ___ ___-est* on the board. Ask students how to fill in the blanks (*the biggest*).
- Tell each student to write a comparative and superlative sentence about planets for each of the seven adjectives on the board. (For example, *Jupiter is the largest planet in the solar system.*) So, each student will write 14 sentences in total.
- Have students form pairs. Each student reads sentences to his or her partner. Partners can help each other make sure their sentences are correctly written.
- Have students share their answers with the whole class orally; students can also write their sentences on the board.
- If necessary, review the rule for adjectives with two or more syllables (except for those that end in the letter *y*) by looking at sentences with the adjective *beautiful*: *more beautiful, the most beautiful*.
- Next, ask the class, “Which planet is the largest?” Write the answer on the board: *Jupiter is the largest planet.*
- Show students that for each sentence they wrote, they can also form a question about it using the word *which*. Then, have students write questions with *which* for each of the 14 sentences they wrote.
- Have students form new pairs. Each student asks questions about the planets using their sentences with *which*, and the partner must answer using a complete sentence. For example:

Which planet is larger, Mars or Earth?
Earth is larger than Mars.

Variations

- Have pairs join one other pair. Each pair can quiz the other pair by asking 14 questions using *which*. Each correctly answered question is worth one point. After they have finished, have each group report how many questions they answered correctly (the maximum would be 28 points).

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- Have pairs or groups create a quiz for the entire class based on their questions using *which*.
- Students can use the Planet Data Cards given at the end of this Lesson 36 Teacher's Guide to write more questions about the planets.

CHECK UNDERSTANDING

1. Quiz

Give students the printed quiz at the end of this lesson guide, have them use the online quiz, or simply write the questions on the board. If you want to test only their listening skills, say the questions, but don't write them.

Questions:

1. There is only one _____ in our solar system.
2. The sun sets in the _____.
3. The sun is a _____ at the center of our solar system.
4. All the planets _____ around the sun.

Answer key:

1. sun
2. west
3. star
4. orbit



QUIZ

1. There is only one
 in our solar
system.



2. The sun sets in
the .



3. The sun is a
 at the center
of our solar system.



4. All the planets
 around the
sun.



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Neptune



Uranus



Jupiter



Saturn



Earth



Mars



Mercury



Venus

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Planet Data Cards (Source: <https://spaceplace.nasa.gov/menu/solar-system/>)

Mercury

Structure and Surface

- Mercury is the smallest planet in our solar system.
- Mercury is a terrestrial planet. It is small and rocky.
- Mercury has a thin exosphere.
- Mercury's surface can be as hot as 800 degrees F during the daytime and as cold as -300 degrees F during the nighttime. (But Mercury is not the hottest planet in the solar system. The hottest planet is Venus.)
- Mercury's poles have water-ice.



Time on Mercury

- A day on Mercury lasts 59 Earth days.
- A year on Mercury lasts 88 Earth days.

Mercury's Neighbors

- Mercury does not have any moons.
- Mercury is the closest planet to the Sun.
- Venus is Mercury's neighboring planet.

Quick History

- Mercury has been known since ancient times because it can be seen without advanced telescopes.
- Because it is so close to the Sun, Mercury is hard to study from Earth. No people have ever gone to Mercury, but two robotic spacecraft have visited. The spacecraft were called Mariner 10 and MESSENGER.
- MESSENGER mapped Mercury by taking pictures of the planet's surface, including some areas that had not been seen before. It also collected information about what the surface and insides of Mercury are made of.

Venus

Structure and Surface

- Venus is the hottest planet in our solar system.
- Venus is a terrestrial planet. It is small and rocky.
- Venus has a thick atmosphere. It traps heat and makes Venus very hot.
- Venus has an active surface, including volcanoes!
- Venus spins the opposite direction of Earth and most other planets.



Time on Venus

- A day on Venus lasts 243 Earth days.
- A year on Venus lasts 225 Earth days.

Venus's Neighbors

- Venus does not have any moons.
- Venus is the second planet from the Sun. That means Mercury and Earth are Venus's neighboring planets.

Quick History

- Venus has been known since ancient times because it can be seen easily without a telescope.
- Venus has been visited by several spacecraft: Mariner 2, Mariner 5, Mariner 10, Pioneer Venus 1, Pioneer Venus 2, and an orbiter called Magellan.

Earth

Structure and Surface

- Earth is a terrestrial planet. It is small and rocky.
- Earth's atmosphere is the right thickness to keep the planet warm so living things like us can be there. It's the only planet in our solar system we know of that supports life. It is mostly nitrogen, and it has plenty of oxygen for us to breathe.



Time on Earth

- A day on Earth lasts a little under 24 hours.
- One year on Earth lasts 365.25 days. That 0.25 extra means every four years we need to add one day to our calendar. We call it a leap day (in a leap year).

Earth's Neighbors

- Earth has just one Moon. It is the only planet to have just one moon.
- Earth has lots of spacecraft watching it. There is still a lot we can learn about our home planet.
- Earth is the third planet from the Sun in our solar system. That means Venus and Mars are Earth's neighboring planets.

Quick History

- We have known about our planet since ancient times, of course. But we didn't know our place in the solar system for a long time.

Mars

Structure and Surface

- Mars is a terrestrial planet. It is small and rocky.
- Mars has a thin atmosphere.
- Mars has an active atmosphere, but the surface of the planet is not active. Its volcanoes are dead.



Time on Mars

- One day on Mars lasts 24.6 hours. It is just a little longer than a day on Earth.
- One year on Mars is 687 Earth days. It is almost twice as long as one year on Earth.

Mars' Neighbors

- Mars has two moons. Their names are Phobos and Deimos.
- Mars is the fourth planet from the Sun. That means Earth and Jupiter are Mars' neighboring planets.

Quick History

- Mars has been known since ancient times because it can be seen without advanced telescopes.
- There was even a flying helicopter on Mars. Seriously! The Mars Helicopter, [Ingenuity](#), successfully tested powered, controlled flight on another world for the first time. It hitched a ride to Mars on the Perseverance rover and worked with the rover to explore Mars. Ingenuity was designed as a tech demo expected to fly no more than five times over 30 days. It ended its mission in early 2024 having completed 72 flights in just under three years. Thanks Ingenuity!
- Several missions have orbited, landed on, or roved around on Mars: [InSight](#), [MAVEN](#), [Mars Reconnaissance Orbiter](#), and [many more!](#) Mars is the only planet we have sent rovers to. They drive around Mars, taking pictures and measurements.

Jupiter

Structure and Surface

- Jupiter is the biggest planet in our solar system. It is actually more than twice as massive than the other planets of our solar system combined.
- Jupiter is a gas giant. It is made mostly of hydrogen and helium.
- Jupiter has a very thick atmosphere.
- Jupiter has rings, but they're very hard to see.
- The giant planet's Great Red Spot is a centuries-old storm bigger than Earth.



Time on Jupiter

- One day on Jupiter goes by in just 10 hours.
- One year on Jupiter is the same as 11.8 Earth years.

Jupiter's Neighbors

- Jupiter has 95 officially recognized moons.
- Jupiter is the fifth planet from the Sun. That means Mars and Saturn are Jupiter's neighboring planets.

Quick History

- Jupiter has been known since ancient times because it can easily be seen with just our eyes. No special equipment is needed.
- Jupiter has been visited or passed by several spacecraft, orbiters and probes, such as Pioneer 10 and 11, Voyager 1 and 2, Cassini, New Horizons, and Juno.
- Jupiter has auroras, just like Earth! Not only are the auroras huge in size, they are also hundreds of times more energetic than auroras on Earth. And, unlike those on Earth, they never cease.

Saturn

Structure and Surface

- Saturn is a gas giant like Jupiter. It is made mostly of hydrogen and helium.
- Saturn has a thick atmosphere.
- Saturn has a lovely set of seven main rings with spaces between them.



Time on Saturn

- One day on Saturn goes by in just 10.7 hours.
- One year on Saturn is the same as 29 Earth years.

Saturn's Neighbors

- As of June 8, 2023, Saturn has 146 moons.
- Saturn is the sixth planet from the Sun. That means Jupiter and Uranus are Saturn's neighboring planets.

Quick History

- Saturn has been known since ancient times because it can be seen without advanced telescopes.
- Four robotic spacecraft have visited Saturn, including Pioneer 11, Cassini, and Voyager 1 and 2.

Neptune

Structure and Surface

- Neptune is encircled by six rings.
- Neptune, like Uranus, is an ice giant. It's similar to a gas giant. It is made of a thick soup of water, ammonia, and methane flowing over a solid core about the size of Earth.
- Neptune has a thick, windy atmosphere.



Time on Neptune

- One day on Neptune goes by in 16 hours.
- Neptune has such a long journey around the Sun it takes 165 Earth years to go around once. That's a long year!

Neptune's Neighbors

- Neptune has 16 moons.
- Neptune is the eighth and most distant planet from the Sun. That means Uranus is Neptune's only neighboring planet.

Quick History

- Neptune was discovered in 1846 by Urbain Le Verrier, John Couch Adams, and Johann Galle.
- Only Voyager 2 has visited Neptune.

Uranus

Structure and Surface

- Uranus is surrounded by a set of 13 rings.
- Uranus is an ice giant (instead of a gas giant). It is mostly made of flowing icy materials above a solid core.
- Uranus has a thick atmosphere made of methane, hydrogen, and helium.
- Uranus is the only planet that spins on its side.
- Uranus spins the opposite direction as Earth and most other planets.



Time on Uranus

- One day on Uranus lasts a little over 17 hours (17 hours and 14 minutes, to be exact).
- One year on Uranus is the same as 84 years on Earth. That's a long time to wait for a birthday cake.

Uranus' Neighbors

- Uranus has 28 known moons.
- Uranus is the seventh planet from the Sun. That means Saturn and Neptune are Uranus' neighboring planets.

Quick History

- Uranus was discovered in 1781 by William Herschel in Great Britain.
- Uranus has only been visited by Voyager 2.