Round and Round the Sun

Teacher		**Class**	Year 5
Subject	Science	**Topic**	Planets orbiting the Sun
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

We learn how Earth and the other planets travel round the Sun. We become the solar system and walk each orbit.

Curriculum links

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system [2]

Learning objectives

- Students will name the Sun as the centre of the solar system.
- Students will describe how planets orbit the Sun anticlockwise.
- Students will explain why outer planets take longer to orbit.

Success criteria

- I can say what is in the centre of the solar system.
- I can use orbit and anticlockwise to describe movement.
- I can explain why different planets have different years.

What students already know

Ask: What sits in the middle of our solar system, and what moves round it? Take 3 quick answers and draw one idea on the whiteboard.

Key words

Sun	bright hot star at the middle of our family of worlds [2]
planet	large round world of rock or gas that travels round a star [12]
orbit	path taken round a star, planet or moon [3]
anticlockwise	going in the opposite direction to the hands on a clock [12]

Materials

- chalk
- Sun marker (cone or flag)
- set of eight planet labels in order Mercury to Neptune
- Slides 1-12
- Video clip 1 (0:00-1:30) on slide 6
- Video clip 4 (0:00-4:00) on slide 8
- mini whiteboards
- copies of Worksheet Task D

Before the lesson

- Print eight planet labels in order and copies of Worksheet Task D
- Pre-draw eight chalk circles with anticlockwise arrows in a large flat open space
- Test Slides 1-12 and Video clip 1 and Video clip 4 with sound
- Place Sun marker in the middle and clear space for walking

Lesson outline

0–5 min **Starter** 5 min · Whole class

Hook interest and check what pupils think sits at the centre.

YOU DO

1. Show Slide 1 and say the hook to invite the class to become the solar system.
2. Show Slide 2 and share the three I can ideas for today in own words.
3. Ask what pupils think is in the middle and take 3 answers.
4. Choose a student to hold the Sun marker and stand ready as the Sun.

STUDENTS DO

1. Call out ideas about what sits in the middle.
2. Show thumbs up if they think the Sun moves round Earth.
3. Watch the Sun volunteer stand in the middle space.

Say: We are going to become the solar system, who wants to be the Sun? The Sun stays in the middle while all eight planets travel round it. Today we will show this movement with our own bodies.

Ask: What do you think is at the centre of our solar system? (The Sun, which is a star at the centre [2]) · What do planets do around the Sun? (They travel round it on paths we call orbits [3])

Check understanding: Mini whiteboards: draw an arrow showing what moves round what. If many draw Earth in the middle, reteach with Slide 3 in the next stage.

Support: Talk to a partner first, then answer using word cards for Sun, planet and orbit. **Stretch:** Explain why the Sun looks as if it moves across the sky each day.

Use: Slides 1-3

5–15 min **Teaching** 10 min · Whole class

Teach orbit, anticlockwise and different speeds with a model.

YOU DO

1. Show Slides 4-5 and explain close planets take small fast laps and far ones take long slow laps.
2. Play Video clip 1 on Slide 6 and ask pupils to spot the Sun staying still and which planets move fastest.
3. Model with two volunteers using Slide 7 steps: Sun stands still while Earth walks one anticlockwise lap.
4. Narrate direction, shape and time for one Earth lap.

STUDENTS DO

1. Watch the clip and call out who stays still and who moves fastest.
2. Practise saying orbit and pointing anticlockwise with a finger.
3. Tell a partner what the model shows using Sun, orbit and anticlockwise.

Say: The Sun is a star at the centre of our solar system [2]. An orbit is the path an object takes round another object [3]. Earth and the other planets move round the Sun in an anticlockwise direction [12], on paths that are almost circular [18].

Worked example: I am the Sun - I stand still in the middle. My partner is Earth - she starts close to me, walks anticlockwise round me on a nearly round line [18], then stops after one full lap. That one lap is one orbit, which takes 365 1/4 days for Earth [12]. Inner walkers use small fast steps because the planets travel around the Sun at different speeds [3].

Ask: What is an orbit? (When something travels around a star, planet or moon [12]) · Which way do planets go and what shape is the path? (Anticlockwise round the Sun [12] on almost circular paths [18])

Check understanding: All point anticlockwise together. If directions are mixed, practise with clock hands and Slide 7 arrows again.

Support: Follow an arrow card with a finger while repeating orbit and anticlockwise with a partner. **Stretch:** Predict who moves faster, Mercury or Neptune, and explain using distance from the Sun.

Use: Slides 4-7; Video clip 1 (0:00-1:30)

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15–40 min **Main activity** 25 min · Whole class

Practise describing movement by walking the orbits as planets.

YOU DO

1. Lead class to clear space and place the Sun marker in the middle.
2. Give eight pupils planet labels in order Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune [3] and place them on chalk circles.
3. Direct all walkers to walk slowly anticlockwise [12], inner circles with small fast steps and outer with slower steps.
4. Call freeze, ask each walker to say a sentence with Sun, planet, orbit and anticlockwise, then swap roles.

STUDENTS DO

1. Walk their orbit slowly, following arrows and keeping space.
2. Freeze and say what they are doing using Sun, planet, orbit and anticlockwise.
3. Swap roles so watchers become walkers and check direction and spacing.

Say: The Sun stays still in the middle. Each planet walks round it on its own orbit path [3]. We all walk the same anticlockwise way [12]. Near planets go faster and far planets go slower because they travel at different speeds [3]. Walk, do not run, keep space, and do not look directly at the Sun [1].

Worked example: Mercury says: I am Mercury. I am a planet close to the Sun. I orbit the Sun on a small path, walking anticlockwise with quick little steps. Saturn says: I am Saturn. I orbit the Sun on a much bigger path, walking anticlockwise with slow long steps because I am far out and take much longer [12].

Ask: Who stays still and who moves? (The Sun stays in the middle [2] while planets travel round it [12]) · How do inner and outer laps differ? (Inner laps are faster and shorter, outer laps are slower and longer because times depend on distance from the Sun [12])

Check understanding: Listen for correct use of Sun, planet, orbit and anticlockwise. If wording is wrong, stop, re-model one lap and repeat sentences together.

Support: Use pre-drawn circles and pair each walker with a partner who points which way to step and reads the planet label aloud. **Stretch:** Explain what would change if one walker went the wrong way or left the flat circle.

Use: Slide 9; Slide 10

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40–50 min **Compare years** 10 min · Pairs

Explain why planet years are different lengths.

YOU DO

1. Show Slide 8 and play Video clip 4 comparing a short Mercury year and long Neptune year.
2. Mark one Earth lap on a strip as 365 1/4 days, or one year [12].
3. Add Neptune much further along because one year on Neptune takes almost 165 Earth years [3].
4. Ask pairs to order Mercury, Earth and Neptune cards and explain using distance.

STUDENTS DO

1. Watch and compare which planet finishes first and last.
2. Place Mercury, Earth and Neptune cards on the strip from the Sun outwards.
3. Tell a partner why Neptune waits longer, using distance and orbit.

Say: It takes 365 1/4 days, or one year, for Earth to complete one orbit of the Sun [12]. Different planets take different lengths of time because they are different distances from the Sun [12]. One year on Neptune takes almost 165 Earth years [3].

Worked example: Earth: 1 lap = 1 year [12]. Mercury: very small lap close to the Sun = much shorter year. Neptune: huge lap far from the Sun = 165 Earth years before its next birthday [3]. Closer planets need less time than planets further out [12].

Ask: How long does Earth take to complete one orbit of the Sun? (365 1/4 days, or one year [12]) · Why does Neptune take much longer than Mercury? (They are different distances from the Sun [12]; Neptune takes almost 165 Earth years [3])

Check understanding: Mini whiteboards: write Earth time and Neptune time side by side. If swapped or missing, replay key part and point to strip again.

Support: Give a part-filled timeline with Earth already marked and match time cards to planet cards with a partner. **Stretch:** Work out how many Earth birthdays would pass during one Neptune orbit using whole years.

Use: Slide 8; Video clip 4 (0:00-4:00)

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50–60 min **Plenary** 10 min · Pairs

Check the I can ideas and fix any gaps about orbiting.

YOU DO

1. Show Slide 11 and ask pairs to discuss the Neptune birthday question.
2. Show Slide 12 and run the quick quiz with cold-call answers.
3. Hand out Worksheet Task D and ask pupils to tick the best answer about orbits on their own.
4. Link answers back to the three I can ideas.

STUDENTS DO

1. Discuss with a partner why a Neptune birthday takes 165 Earth years.
2. Answer quiz questions aloud and point to the centre and orbit paths.
3. Complete Worksheet Task D on their own and check answers.

Say: If you lived on Neptune you would wait much longer for a birthday because you are far from the Sun so one orbit takes much longer [12]. The Sun is at the centre [2] and to orbit means to travel round a star, planet or moon [12].

Ask: What is at the centre of our solar system? (The Sun, which is a star at the centre [2]) · Who orbits faster, Mercury or Neptune, and why? (Mercury, because closer planets take less time than planets further out [12]) · What does orbit mean? (To travel round a star, planet or moon [12])

Check understanding: Collect Worksheet Task D and check hands-up answers to Slide 12. If errors remain, show the big idea again: the Sun stays in the middle while planets travel round it.

Support: Give sentence starters and word cards for Sun, centre, planet and orbit to hold up while talking.
Stretch: Make up one more true statement about what orbits what, ready for the class to judge.

Use: Slides 11-12; Worksheet Task D

Common mistakes

Mistake	How to spot it	How to fix it
Thinking Earth is in the middle with the Sun going round it	Draws or says Earth stays still in the middle	Re-model with Sun marker still: the Sun is a star at the centre [2] while Earth travels round it [12]
Thinking all planets take the same time to orbit	Says Mercury and Neptune both take one year	Point to strip: times depend on distance from the Sun [12]; Earth takes one year but Neptune takes almost 165 Earth years [3]
Thinking planets go different ways or in perfect circles	Walks clockwise or draws a perfect circle with a compass only	Practise arrows: all go anticlockwise [12] on paths that are almost circular, like a nearly round oval [18]

Support

- Pre-draw circles with arrows and pair each walker with a partner who points direction and reads labels.

Stretch

- Explain what would change if a walker went the wrong way or left the flat shared circle.

For the LSE or teaching assistant

Stay with the walking group: guide direction, prompt target words Sun, planet, orbit and anticlockwise, and support Task D choices.

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Safety

- Use a clear flat space, walk do not run and keep space between walkers
- Remind class not to look directly at the Sun, even with dark glasses
- Carry the Sun marker safely and keep floor clear of bags and coats

Check for understanding

Question	Answer
What is at the centre of our solar system?	The Sun.
Describe how planets move relative to the Sun.	They travel round it on orbits, all going anticlockwise.
Why does Neptune take longer to orbit than Earth?	Because it is further from the Sun.

Homework

Draw the Sun in the middle with two orbits and label who stays still and who moves.

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