Why Unsupported Things Fall to Earth

Teacher		**Class**	Year 5
Subject	Science	**Topic**	Gravity
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Pupils learn gravity pulls unsupported objects towards Earth. They discuss, watch and test falling objects.

Curriculum links

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

Learning objectives

- Students will explain why unsupported objects fall towards the Earth when let go.
- Students will describe gravity as a force pulling between Earth and falling object.

Success criteria

- I can say why a let-go object falls down to Earth.
- I can describe gravity as a pull between Earth and object.

What students already know

Show a rubber held in the air for 2 minutes: ask pupils to point which way it will go if you let go and say why they think that.

Key words

gravity	unseen pull that brings everything down to the ground [7]
force	a push or a pull that makes things move [7]
unsupported	not held up by anything
pull	to bring something closer towards you [7]

Materials

- ball
- whiteboard and pen
- Slides 1-2, 4-6 and 8-11
- Video clip 2 (0:00–4:30)
- Worksheet Task B copies
- paper and pencils

Before the lesson

- Print Worksheet Task B, one per pupil, plus paper for diagrams
- Test Slide 5 Video clip 2 (0:00–4:30) with sound and subtitles
- Set out ball, whiteboard and pen where all can see
- Arrange tables for small-group talk and clear floor space for drops

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Lesson outline

0–7 min **Starter** 7 min · Whole class

Hook pupils with the falling ball and recall what happens when support is removed.

YOU DO

1. Hold a ball still in the air where all can see.
2. Use the hook and ask pupils to show with a finger which way it will go.
3. Show Slides 1-2 and give 1 minute think, pair, share: You let go of a ball. What happens next, and why?
4. Take 3 quick ideas and link to lesson goal about unsupported falling.

STUDENTS DO

1. Point to show predicted direction of fall.
2. Discuss with partner what happens next and why.
3. Share ideas with the class.

Say: Look at this ball in my hand. It is staying still. What do you think will happen the second I stop holding it, and why? Show me with your finger which way it will go if I open my fingers. Tell your partner what you think will happen and why.

Ask: What will happen the second I stop holding the ball? (It will fall down towards the floor/Earth.) · What is holding it up now, and what changes when I let go? (My hand is supporting it now; when I let go it is unsupported so it will fall.)

Check understanding: Hands-up vote for down or stay; if unsure, repeat hold and ask again before moving on.

Support: Let pupils answer with a partner and copy the point-down action. **Stretch:** Ask pupils to add because and a reason to their prediction.

Use: Slides 1-2

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7–22 min **Teaching** 15 min · Whole class

Teach that gravity is a force acting between Earth and a falling object.

YOU DO

1. Show Slides 4-6 to introduce force as a push or a pull that makes objects move [7].
2. Play Video clip 2 (0:00–4:30) on Slide 5; pupils listen for what pulls let-go objects down.
3. Explain gravity is an invisible force which pulls objects towards the centre of the Earth [1] and pulls everything down to the Earth's surface [7].
4. Model with the ball: hold supported, then let go unsupported and draw a down arrow to Earth on the whiteboard.

STUDENTS DO

1. Watch the video and listen for what pulls objects down.
2. Watch the modelled drop and copy the point-down action.
3. Repeat key sentence with the teacher.

Say: Scientists call a push or a pull that makes things move a force [7]. Gravity is the invisible force that pulls everything down to the Earth's surface [7]. It pulls objects towards the centre of the Earth [1]. It acts between the Earth and the falling object.

Worked example: I hold a rubber at shoulder height. It is supported by my fingers so it stays still. I open my fingers so it is unsupported and not held up by anything. I let go and watch. It falls straight down. I explain: it fell down because gravity pulled it towards the centre of the Earth [1].

Ask: What is gravity and which way does it pull? (An invisible force which pulls objects towards the centre of the Earth [1].) · Between what two things does gravity act when a rubber falls? (Between the Earth and the falling rubber, it is the attraction of all matter for all other matter [6].) · Why did the supported ball stay still but the let-go ball fall? (Supported means held up; unsupported means gravity pulls it to Earth.)

Check understanding: Mini whiteboards: write down or stay for a pencil let go in the air; re-teach with another demo if many write stay.

Support: Show supported on table and unsupported in air side by side and label each. **Stretch:** Ask who pulls whom: the Earth pulls on you, and you pull on the Earth [4].

Use: Slides 4-6, Video clip 2 (0:00–4:30)

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22–37 min **Main activity** 15 min · Groups

Describe gravity as a pull between the Earth and the object using supported and unsupported talk.

YOU DO

1. Hold the ball in hand, place it on the table, then hold it out and let go low over the table.
2. Lead small-group talk on supported, on a table or in a hand, and unsupported, held out then let go.
3. Model a quick diagram: ball in the air with an arrow down to Earth labelled gravity.
4. Circulate, prompt with sentence starters and ask groups to show their arrow and explain.

STUDENTS DO

1. Discuss in groups what the support does and what happens when it is removed.
2. Draw the ball in the air with a down arrow to Earth and label it.
3. Practise explaining to a partner using the sentence starters.

Say: When it is on the table or in my hand it is supported so it stays still. When I hold it out and let go it is unsupported. Gravity is the attraction of all matter for all other matter [6]. The Earth pulls on the object and the object pulls on the Earth [4], so it falls towards the centre of the Earth [1].

Worked example: Drawing steps: 1. Draw the ball in the air and the ground below for Earth. 2. Draw a straight arrow from the ball pointing down to Earth. 3. Label it gravity pulls it to the centre of the Earth [1]. 4. Say: When it is unsupported it falls because Earth is pulling it.

Ask: What is the difference between supported and unsupported? (Supported is held up by a hand or table and stays still; unsupported is not held up and falls.) · Who pulls whom when the ball falls? (The Earth pulls on the ball and the ball pulls on the Earth [4], the ball moves towards the centre of the Earth [1].)

Check understanding: Groups hold up diagrams; check all arrows point down to Earth, redraw together if arrows point up or sideways.

Support: Provide sentence starters such as When it is supported it, When it is unsupported it, with diagrams showing that gravity pulls objects towards the centre of the Earth [1]. **Stretch:** Pupils discuss what would happen if the support was taken away slowly or quickly and whether the direction of fall would change.

Use: Slides 8-9

37–50 min **Practice** 13 min · Pairs

Practise using force, gravity, pull and fall to explain an unsupported rubber.

YOU DO

1. Hand out Worksheet Task B about an unsupported rubber.
2. Model the first speech bubble on the whiteboard using fall, pull and Earth.
3. Pairs complete the talk using the word bank: gravity, force, unsupported, pull.
4. Take feedback and agree the correct explanation as a class.

STUDENTS DO

1. Read the conversation stems in pairs.
2. Write missing lines using gravity, pull and fall.
3. Read finished talk aloud pointing down on fall.

Say: You will complete the talk about an unsupported rubber. Remember a force is a push or a pull that makes objects move [7]. Use your diagram. Tell exactly why the dropped thing hit the floor.

Worked example: Student A: I am holding the rubber in the air. It is supported. Student B: Now you let go. It is unsupported. Student A: It fell down because gravity pulled it towards the centre of the Earth [1]. Gravity pulled it to the Earth's surface [7].

Ask: How should you finish: It fell because...? (Gravity pulled it towards the centre of the Earth [1].) · Why use the word unsupported in your answer? (To show it was not held up, so gravity pulled it down.)

Check understanding: Listen to two pairs read; if key words missing, show model answer and let pairs improve one line.

Support: Give a frame: The ___ fell ___ because ___ pulled it, and allow copying of key words. **Stretch:** Add between the Earth and the object to the sentence and say it clearly.

Use: Worksheet Task B

50–60 min **Plenary** 10 min · Whole class

Check which tests show gravity and secure the explanation for unsupported falling.

YOU DO

1. Show Slide 10 and run the vote on best proof.
2. Confirm holding a book still does not show pull; dropping and throwing up do because even if you throw something up, gravity still pulls it down [7].
3. Show Slide 11 exit ticket and ask pupils to write the finish to Unsupported objects fall because...
4. Revisit success lines and praise exact use of between Earth and object.

STUDENTS DO

1. Vote and explain which test does not show gravity pulling to Earth.
2. Write exit ticket sentence and one question they still have.
3. Self-check against I can statements with thumbs up.

Say: Dropping a pencil and throwing a ball up both show gravity because light things are pulled down too [7]. Holding a book still on a desk does not show falling. Unsupported objects fall straight down because gravity acts between Earth and the object.

Ask: Which test does not show gravity pulling things to Earth and why? (Holding a book still, because it is supported and does not fall.) · Why does a ball thrown up still come back? (Gravity slows it down and then pulls it back down to the ground [7].)

Check understanding: Read exit sentences; if many miss between Earth and object, repeat class sentence together before finishing.

Support: Allow pointing down and saying gravity pulled it to finish the sentence. **Stretch:** Ask pupils to explain what the support is doing in the held-book case.

Use: Slides 10-11

Common mistakes

Mistake	How to spot it	How to fix it
Only heavy things fall; very light things stay where they are.	Predicts cotton wool or leaf will stay up when let go.	Test light objects; even light things like feathers fall down [7] and gravity acts on all objects, heavy and light [1].
Things thrown up escape gravity or stay up.	Says ball thrown up will stay in the air.	Throw a paper ball low and watch; gravity slows it down and then pulls it back down [7] no matter what direction it travels [7].
Only Earth pulls; the falling object does not pull at all.	Says gravity is just Earth pulling down, not between.	Teach gravity is the attraction of all matter for all other matter [6]; the Earth pulls on you, and you pull on the Earth [4].

Support

- Provide sentence starters such as When it is supported it, When it is unsupported it, with diagrams showing that gravity pulls objects towards the centre of the Earth [1].
- Give word bank with fall, down, pull and Earth and test fewer objects first.

Stretch

- Pupils discuss what would happen if the support was taken away slowly or quickly and whether the direction of fall would change.
- Add between the Earth and the object to spoken and written explanations.

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For the LSE or teaching assistant

Stay with target pupils in main talk and practice; prompt sentence starters, check arrows point down, scribe one line of Task B if needed.

Check for understanding

Question	Answer
Unsupported objects fall towards Earth because...?	Gravity, an invisible force, pulls between Earth and object towards the centre of Earth [1].
What does unsupported mean? Give an example.	Not held up by anything, e.g. a rubber just after fingers open in the air.
A pencil and cotton wool are let go together. What happens and why?	Both fall down because gravity pulls everything down to the Earth's surface [7].

Homework

Spot two unsupported drops at home, draw each with a down arrow and write why it fell.

Sources

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