

Wheels, Axles & Gears

Gear Gatehouse with Gearling

Learning target

Explain how connected wheels can move parts of a machine.



Before you begin

Use the reference page and discussion prompts on their own, or open the optional browser adventure. No earlier lesson or physical kit is required.

For online play: use an internet-connected current browser with local storage enabled. Read the three-part Gemling briefing, answer the quick check, and apply the evidence at three checkpoints. Retry feedback supports review; results are not a secure test or gradebook.

Use for teacher-led review, science centers or partner practice. Independent readers may need support with the vocabulary below. The design target is grades 3-5; choose support based on the learner.

Vocabulary and concepts to discuss

Connected rotation; wheel and axle; gears; transferring motion

Open Gear Gatehouse - direct lesson link

Scan the QR code or use the clickable link. This guide is usable offline; the adventure runs on an external educational website.



Wheels, Axles & Gears - key ideas

1. The first clues

A wheel and axle are connected rotating parts of different sizes. They can transfer motion and provide force-distance advantages depending on the use.

2. How the clues connect

Gears are toothed rotating parts that transfer motion. Two directly meshing gears turn in opposite directions in a simple model.

3. Our evidence record

Our diagram has Gear A touching Gear B. If A turns clockwise, B turns counterclockwise. Gears connect to wheel-and-axle mechanisms rather than adding a seventh traditional simple-machine category.

Keep the science accurate

Connect gears to wheels and axles; do not present gears as a seventh traditional simple machine.

Apply the evidence

Use a specific observation from this lesson to explain one choice. Point to a clue, then connect that clue to a scientific idea.

Curriculum reference: <https://www.nextgenscience.org/dci-arrangement/3-ps2-motion-and-stability-forces-and-interactions>

Talk through the evidence

1. How do directly meshing gears turn here?

Expected answer: In opposite directions

Reasoning: Gears are toothed rotating parts that transfer motion. Two directly meshing gears turn in opposite directions in a simple model.

2. If A turns clockwise, how does B turn?

Expected answer: Counterclockwise

Reasoning: Our diagram has Gear A touching Gear B. If A turns clockwise, B turns counterclockwise. Gears connect to wheel-and-axle mechanisms rather than adding a seventh traditional simple-machine category.

3. What connects a wheel and its axle in this model?

Expected answer: Shared rotation

Reasoning: A wheel and axle are connected rotating parts of different sizes. They can transfer motion and provide force-distance advantages depending on the use.

4. Are gears a seventh traditional type in our lesson?

Expected answer: No

Reasoning: Our diagram has Gear A touching Gear B. If A turns clockwise, B turns counterclockwise. Gears connect to wheel-and-axle mechanisms rather than adding a seventh traditional simple-machine category.

Guide the discussion

Ask learners to name the evidence that supports their answer. If an answer differs, revisit the matching key idea on page 2 and invite a revised explanation.

Online rewards: this lesson grants one fixed digital Expedition Discovery. Five saved digital Gemling friends become available only after all six distinct subject lessons are complete, in any order. Digital rewards do not establish physical ownership.