

Magnetic Tools & Design

Ironheart Vault with Snapling

Learning target

Use magnetic evidence to solve a practical problem.



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

Sorting; latches; lifting; testing a design; constraints

Open Ironheart Vault - 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.



Magnetic Tools & Design - key ideas

1. The first clues

Magnetic tools can sort materials, hold closures or lift suitable loads. The best design depends on the material and task.

2. How the clues connect

Tests should compare distance, load and other relevant conditions. A successful trial has limits; it does not establish unlimited strength.

3. Our evidence record

Our sorting tool attracts iron pieces from a mixture but leaves plastic. A smaller working gap improves pickup in repeated model trials. The final plan keeps the tested load and gap limits.

Keep the science accurate

Not all metals are magnetic. Treat electromagnets qualitatively; no field mathematics or unsupervised powered builds.

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. Which material can this tool recover?

Expected answer: Iron pieces

Reasoning: Our sorting tool attracts iron pieces from a mixture but leaves plastic. A smaller working gap improves pickup in repeated model trials. The final plan keeps the tested load and gap limits.

2. Which change improved pickup in the record?

Expected answer: A smaller gap

Reasoning: Our sorting tool attracts iron pieces from a mixture but leaves plastic. A smaller working gap improves pickup in repeated model trials. The final plan keeps the tested load and gap limits.

3. Why retain load limits?

Expected answer: The evidence covers particular conditions

Reasoning: Tests should compare distance, load and other relevant conditions. A successful trial has limits; it does not establish unlimited strength.

4. Which design claim is justified?

Expected answer: It works for the tested task

Reasoning: Magnetic tools can sort materials, hold closures or lift suitable loads. The best design depends on the material and task.

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.