

# Convection

Convection Chimneys with Sizzling

## Learning target

Describe heat carried by moving fluid in a simple model.



## 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

Moving liquids and gases; heating and cooling; circulation models

## Open Convection Chimneys - 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.



# Convection - key ideas

## 1. The first clues

Convection transfers energy through motion in liquids or gases. Warmer fluid often becomes less dense and rises while cooler fluid moves into its place.

## 2. How the clues connect

Circulation can carry energy around a system. The phrase warm air rises describes moving air; heat itself is not a material that only travels upward.

## 3. Our evidence record

Our chimney model shows warmer air rising and cooler air returning below. Trace both parts of the loop rather than drawing only a one-way disappearing stream.

## Keep the science accurate

Convection and radiation are descriptive models, not fluid/thermal equations. No hot-material experiments are required.

## 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/4-ps3-energy>

# Talk through the evidence

## 1. Which materials can show convection?

Expected answer: Liquids and gases

Reasoning: Convection transfers energy through motion in liquids or gases. Warmer fluid often becomes less dense and rises while cooler fluid moves into its place.

## 2. What rises in the supplied model?

Expected answer: Warmer air

Reasoning: Convection transfers energy through motion in liquids or gases. Warmer fluid often becomes less dense and rises while cooler fluid moves into its place.

## 3. What completes the circulation loop?

Expected answer: Cooler air returning

Reasoning: Our chimney model shows warmer air rising and cooler air returning below. Trace both parts of the loop rather than drawing only a one-way disappearing stream.

## 4. Is convection just heat moving through a motionless solid?

Expected answer: No

Reasoning: Convection transfers energy through motion in liquids or gases. Warmer fluid often becomes less dense and rises while cooler fluid moves into its place.

## 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.