



When Students Ask “Why” Using Science to Build Literacy

**Melissa Hampton, Senior Director of
Teaching and Learning**



Session Focus

What happens when *science instruction* is used to *strengthen literacy*?

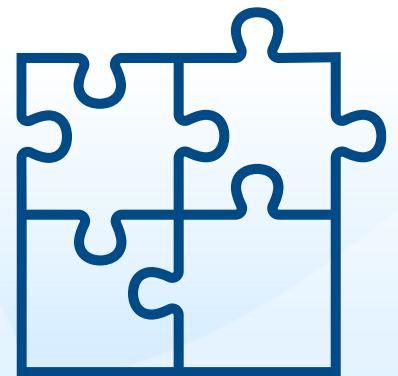
In this session, participants will explore how phenomena-driven science instruction advances literacy by using purposeful reading, evidence-based writing, and structured discussion to support student sense-making through the Science and Engineering Practices (SEPs).



Let's *Connect*

At your table, introduce yourselves

- ✓ Share your context (grade level, role, location)
- ✓ Discuss: *Where do you see science creating authentic opportunities for literacy development?*



What does the *research* say?

“The more *knowledge* a child starts with, the more likely she is to acquire yet more knowledge. She’ll read more and understand and retain information better, because knowledge, like *Velcro*, sticks best to other related knowledge.”

~Natalie Wexler

What does the *research* say?

“Knowledge activation frequently takes place before. Lesson plan templates and curricula often encourage teachers to ask broad questions such as, “What do you know about the solar system?” *before* reading a text about the solar system. Although these open-ended prompts can be helpful, this systematic literature review revealed that explicitly scaffolding students’ knowledge activation *during* and *after* reading is beneficial for their comprehension.”

~Courtney Hattan

What does the *research* say?

According to a meta-analysis by Graham and Hebert (2010), having students *write* about the texts they were reading improved reading comprehension and the learning of information from the texts.

~as cited in Tim Shanahan 2022

Activate Background Knowledge

Build Knowledge (purposeful reading, evidence-based writing, structured discussion)

Increase Comprehension

ASK WHY?!


ASK HOW?!

IT'S OKAY

TO CHANGE

YOUR MIND

Work Like a Scientist: Science and Engineering Practices help scientists figure out real-world phenomenon. How have you been working like scientists or engineers?

 Record your ideas in your notebook.



Ask Questions and Define Problems



Develop and Use Models



Plan and Carry Out Investigations



Analyze and Interpret Data



Use Mathematics and Computational Thinking



Construct Explanations and Design Solutions



Engage in Argument from Evidence



Obtain, Evaluate, and Communicate Information



Phenomena/Phenomenon

What is a phenomenon?





Phenomena/Phenomenon



What is a phenomenon?

- ✓ an observable fact or event : an item of experience or reality
- ✓ a fact or event of scientific interest warranting scientific description and explanation

Mirriam Webster

Observation

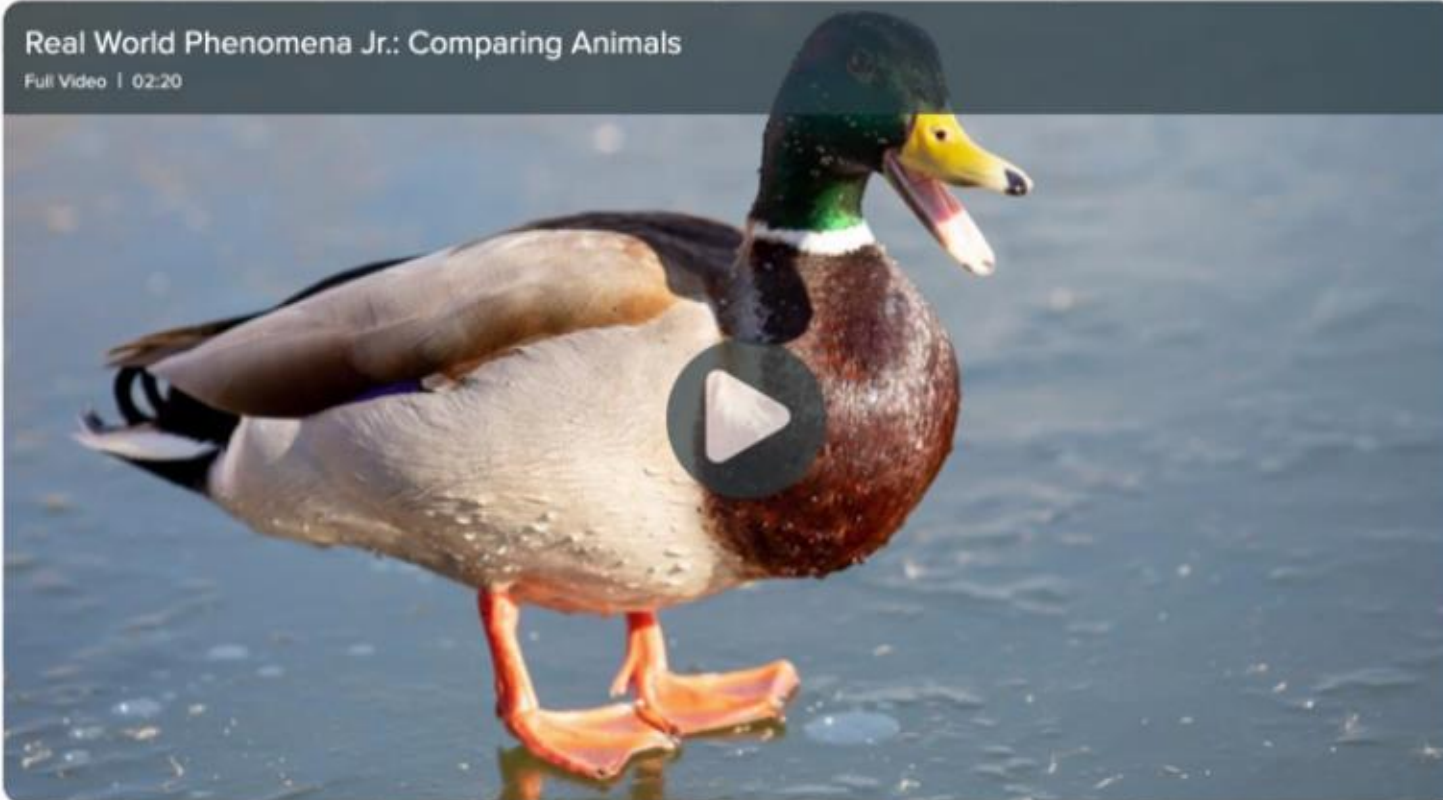


Real World Phenomena Jr.: Comparing Animals

Grade **3-5** Languages **English** ▾

Real World Phenomena Jr.: Comparing Animals

Full Video | 02:20



↗ Create an AI Assessment

🕒 Build an Activity

➔ Assign

➦ Share

♥ Add to Favorites

📁 Save to My Content

🔗 Copy Link

Details

Transcript

Curriculum Standards

Real World Phenomena Jr.: Comparing Animals

Grade | 55 | Languages | English

Real World Phenomena Jr.: Comparing Animals
Duration | 02:00



Details Transcript Curriculum Standards

- Create an AI Assessment
- Build an Activity
- Assign
- Share
- Add to Favorites
- Save to My Content
- Copy Link

I noticed_____.

I think _____ because_____.

I am curious about _____.

This reminds me of _____.

I am wondering why/how _____.

*Observation
leads to
asking
questions
and
research*





Let your compass be your *guide*!

Take out your phones.

Select your compass app.

Walk around the room with your compass to see what happens.

Make observations about the compass.

Generate your own questions as you explore the compass.

How would you investigate? What would you research?



Grade 3-5

Inference

Full Video | 03:44



ails Transcript



Meet the albino squirrels of Olney.

IT'S OKAY

TO CHANGE

YOUR MIND

Purposeful Reading



Animals and the environment



WILD WARNING
Some frogs have brightly colored skin to signal to potential predators that they are toxic.

A male Asian common toad during breeding season

More color changers

Chameleons (below) change color to communicate or attract mates. Goldenrod crab spiders turn yellow or white to hide among flowers. Many octopuses can also change color to blend into their environment. Arctic foxes and stoats transform from brown to white as summer turns to winter.



The secret of color-changing toads

Male Asian common toads are known for changing the color of their skin from brown to bright yellow for about two days every year. A new study has shown that this glow-up plays a key role in helping the toads find mates.

Asian common toads live in India and southeast Asia. When the first monsoons (heavy rains) occur in June, the toads engage in a two-day mass breeding event. Their eggs then have plenty of time to hatch, and the tadpoles can develop into frogs before the climate dries out in winter.

With so many toads looking for mates during such a brief breeding period, male toads may get confused and accidentally attempt to mate with other males,



The toads are usually brown.

different toad species, or even inanimate objects. Since males change to yellow while females stay brown, researchers believe the color shift helps males avoid each other during breeding time.

Previous research has revealed that male Asian common toads have special cells called chromatophores below their skin, which produce colors with different pigments (substances that give color to animals or plants). When stress hormones are released in the toads' bodies, the cells rearrange themselves. This starts the process of turning yellow, which takes the toads about 10 minutes.

In the new study, researchers from the Schönbrunn Zoo in Vienna used special

instruments to scan the skin color of different toads. They used a computer model to confirm that the toads could distinguish between yellow and brown skin. Then the team 3D-printed model toads and placed them among a group of breeding toads.

The experiment showed that males often tried to mate with fake brown toads but mostly ignored the fake yellow ones. This was true even when the researchers changed other aspects of the models' appearance, such as their size. The findings suggest that male toads turn yellow as a sign to other males to stay away. "Identifying the correct mating partner can be difficult in these dense and stressful conditions," lead author Susanne Stücker told *National Geographic*. "Coloration appears to be one evolutionary solution to this problem."

The Week Junior

Science and technology



Using math to study how crowds move

Sometimes when you walk through a crowd, people move in an orderly line. But other times, people are all over the place and you have to zigzag in order to dodge them. In a new study, researchers determined the point at which crowds naturally go from orderly to disorganized.

Mathematicians at the Massachusetts Institute of Technology created computer simulations of people moving at different angles across spaces of varying widths. They also conducted an experiment with volunteers walking across a gym from different points.

The team found that crowd movement was determined by a measurement called "angular spread," which calculates the number of people

walking in different directions. Angular spread can change depending on whether people are walking in a narrow space, like a corridor, or moving through a wide open space, like a plaza.

Once a crowd's angular spread reaches 13 degrees or higher,

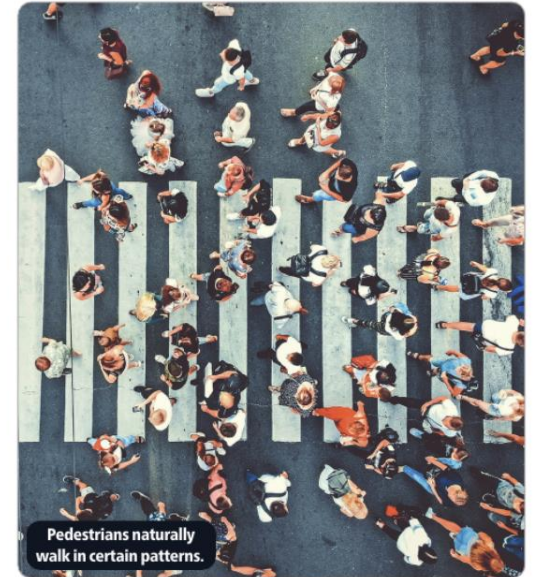
orderly pedestrians can spontaneously make a transition into a disorganized crowd.

Groups with an angular spread of 13 degrees or less, however,

continue moving in lanes. The team also found that people moving in disorderly crowds had to walk slower than people moving in orderly lanes in order to avoid bumping into others.

The findings could lead to designs for public spaces that allow for more efficient movement, the scientists said.

WOW!
An intersection in Tokyo, Japan—called the Shibuya Crossing—is the busiest in the world, with 100,000 people passing through every hour.



Pedestrians naturally walk in certain patterns.

GETTY IMAGES; ALAMY; THE LIGHT PHONE INC./ONLETT PAGE; GETTY IMAGES; CAMBRIDGE UNIVERSITY LIBRARY (2); ALAMY; GETTY IMAGES; RE WILD/ONLETT PAGE; GETTY IMAGES; ALAMY

The Week Junior

Read & Annotate

Scientists solve mystery of orange cat fur

For more than 100 years, scientists have searched for the genetic code behind their distinctive orange fur—and it's finally here.

Genes are responsible for the color of a living thing's eye and hair color. Scientists at Kyushu University in Japan discovered a colorful fur gene.

Way to go!

You have read and gathered text evidence to identify the main idea and supporting details from informational text.

"Scientists solve mystery of orange cat fur" The Week Junior, July 18, 2025. Issue 274 pg. 15.



Identifying the main idea, and identifying supporting details to solve mystery

5 mins

20 mins

15 mins

Cognitive Strategies	Metacognitive Questions
Previewing	What do I already know about this topic ? What is the general structure ?
Making Connections	Does this remind me of anything I've done or read before ?
Clarifying	Is there anything I missed or need to try to better understand ?
Visualizing	Can I picture this in my mind ?
Questioning	What parts of this passage do I still need to figure out ?
Predicting	Can I think ahead about what might happen next?
Summarizing	What information do I know so far ?

Evidence- Based Writing



Informative Writing in a Language Arts Class

Structure: Typically includes an introduction (with a clear topic sentence/thesis), body paragraphs (supporting facts, evidence), and a conclusion.

~Google search

Claim, Evidence, Reasoning

What is your claim?

What evidence is presented to support your claim?

What reasoning can you use to tie the evidence to the claim?

Explicit Instruction



Segmenting
complex skills into
smaller
manageable tasks



Modeling or
thinking-aloud to
address the
important features
of the content



Promoting
successful
engagement
using fading
supports and
prompts



Providing
feedback



Creating
purposeful
practice
opportunities

Vocabulary

What challenges do you face when trying to teach complex science *vocabulary* to your students, and how have you tried to overcome them?

“But kids with less overall knowledge and vocabulary are always at a disadvantage.”

~Natalie Wexler, *The Knowledge Gap*

On the topic of assessments.

Vocabulary Development

 Details

 Images

 Video

 Animation



Definition

a pull or push that is applied to an object

Key Context

What is the difference between a bowling ball and a soccer ball? A bowling ball is much heavier. It takes a lot of force to move a bowling ball. Force is a push or a pull on an object. In this case, the object is the bowling ball.

Vocabulary Development

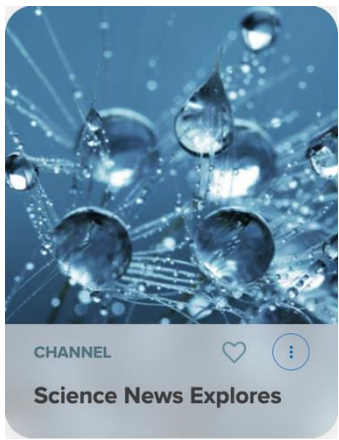


Building Vocabulary

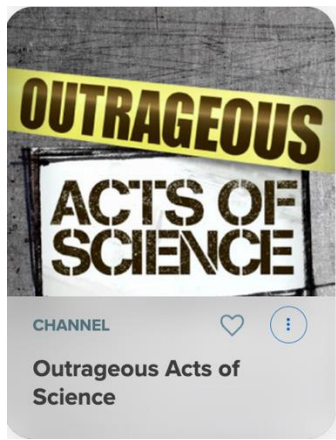


Quick Peek

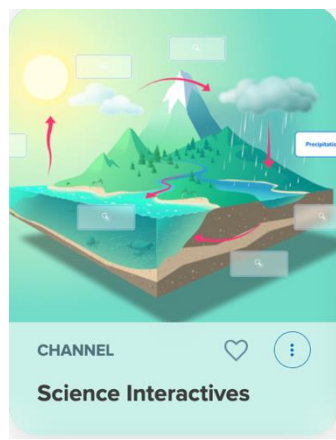




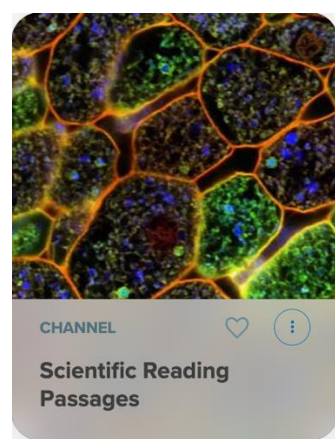
CHANNEL Science News Explores



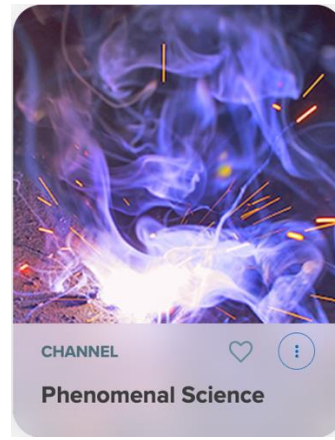
CHANNEL Outrageous Acts of Science



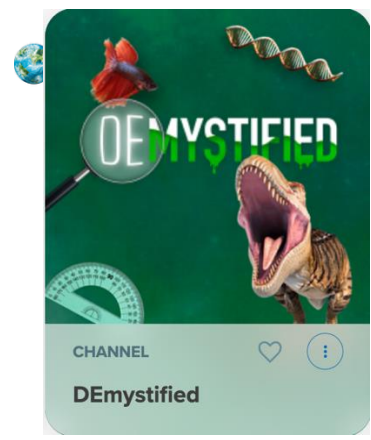
CHANNEL Science Interactives



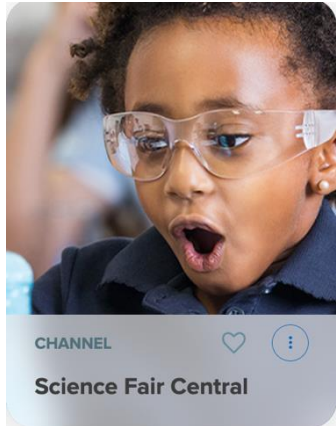
CHANNEL Scientific Reading Passages



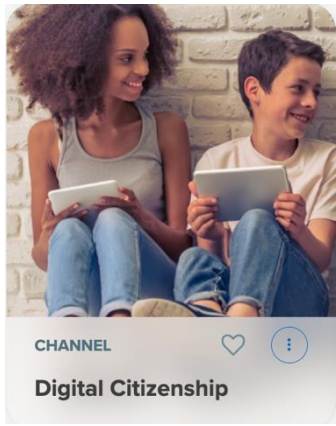
CHANNEL Phenomenal Science



CHANNEL DEmystified



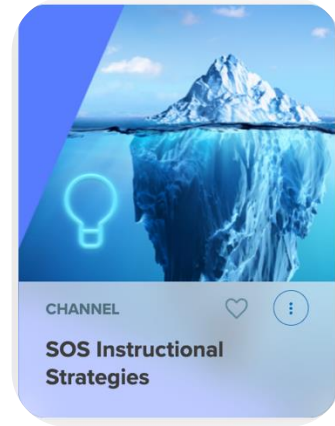
CHANNEL Science Fair Central



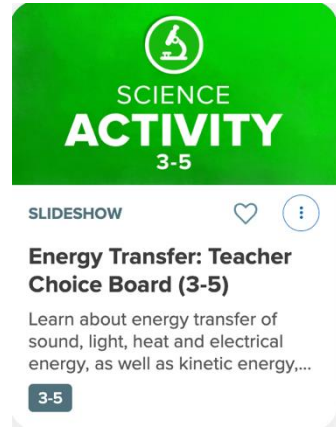
CHANNEL Digital Citizenship



Even More Resources!



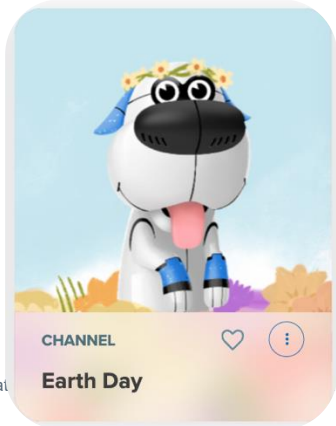
CHANNEL SOS Instructional Strategies



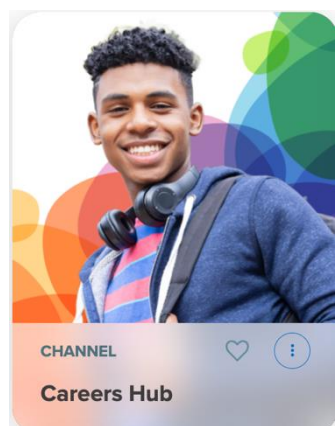
SLIDESHOW Energy Transfer: Teacher Choice Board (3-5) Learn about energy transfer of sound, light, heat and electrical energy, as well as kinetic energy...



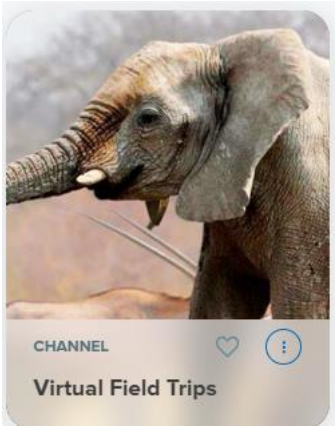
CHANNEL Vooks



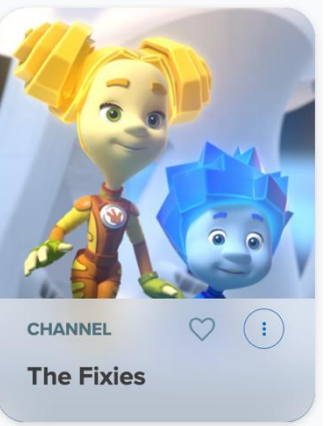
CHANNEL Earth Day



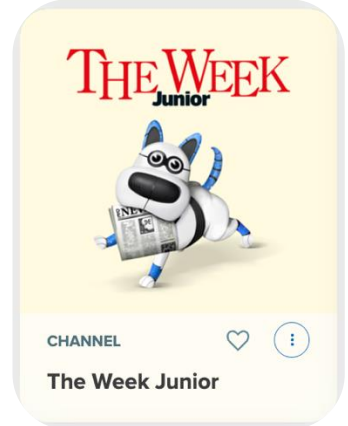
CHANNEL Careers Hub



CHANNEL Virtual Field Trips



CHANNEL The Fixies



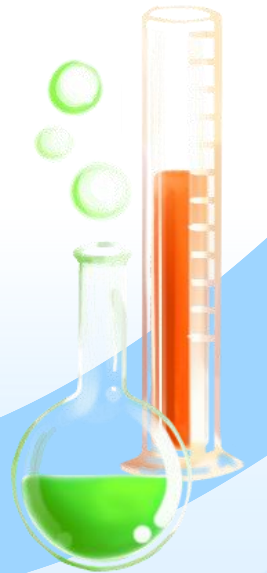
CHANNEL The Week Junior

Activate Background Knowledge

Build Knowledge (purposeful reading, evidence-based writing, structured discussion)



Increase Comprehension

What are *three things* that
you plan to share with a
colleague?



We are here all day!

Strengthen **SCIENCE INSTRUCTION**

 Thursday, April 16  8:00 AM - 4:40 PM PT  Room 304C

8:00-9:00 AM PT Step Into the Science Playground: Discover, Experiment, and Innovate with Discovery Education!

10:50-11:50 AM PT When Students Ask "Why": Using Science to Build Literacy

1:00-2:00 PM PT Designing for Discovery: Using Phenomena to Drive Three-Dimensional Learning

2:20-3:20 PM PT What Can We Make from This? Problem Solving Through Upcycling

3:40-4:40 PM PT Inside the Lab: Bringing Real Biomedical Research to Life



Virtual Field Trips



Whale Wonders: Virtual Field Trip to Maui

Grade 6-8 | Premieres April 30

Dive into a Virtual Field Trip with Discovery Education and the **LEGO Group's Build the Change program** to learn how whales travel, explore ocean science, and find creative ways we can help our planet.



Thank You!

Visit **Booth 352** to explore
Discovery Education
Science Techbook.



Scan to request a
personalized demo