



TWIG SCIENCE

DAC/DELAC

JANUARY 21, 2025



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ACRONYMS

- NGSS- Next Generation Science Standards
- CAST- California Science Test



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TODAY'S OBJECTIVES

- Curriculum & Standards
- NGSS Twig Experience
- CAST Science Data



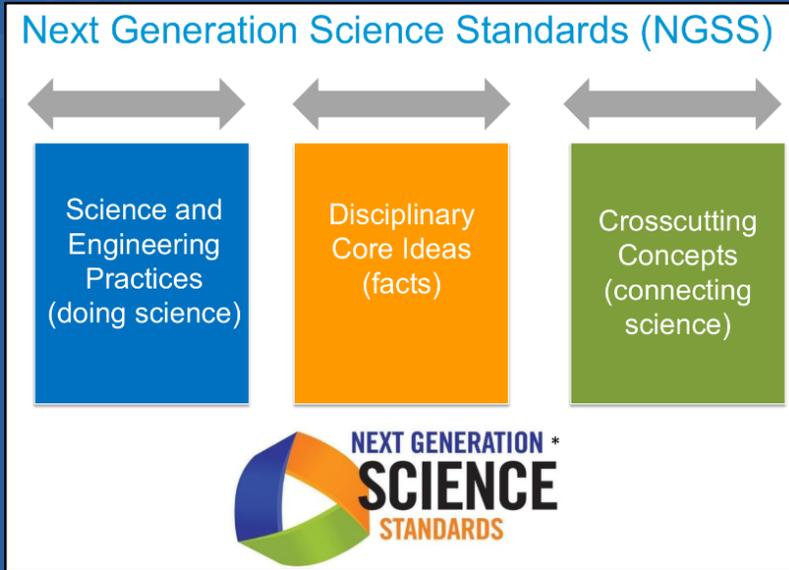
3

NGSS 3-DIMENSIONAL LEARNING



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3-DIMENSIONAL LEARNING



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SCIENCE AND ENGINEERING PRACTICES (SEP)

This block contains a grid of Science and Engineering Practices (SEP) icons and descriptions. The top row shows the English version, and the bottom row shows the Spanish version. Each icon includes a small 'EDUCATION' logo at the bottom.

English Description	Spanish Description
Asking Questions and Defining Problems	Plantear Preguntas y Definir Problemas
Planning and Carrying Out Investigations	Diseñar y Realizar Investigaciones
Using Mathematics and Computational Thinking	Usar Pensamiento Matemático y Computacional
Developing and Using Models	Desarrollar y Utilizar Modelos
Analyzing and Interpreting Data	Analizar e Interpretar Datos
Constructing Explanations and Designing Solutions	Construir Explicaciones y Diseñar Soluciones
Engaging in Argument from Evidence	Participar en Argumentos Basados en Evidencia
Obtaining, Evaluating, and Communicating Information	Obtener, Evaluar, y Comunicar Información

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DISCIPLINARY CORE IDEAS (DCI)

Physical Science



Understand how every system and process on Earth is dependent on physical and chemical subprocesses.

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Earth and Space Science



Investigate the structure, composition, and history of the Universe—as well as Earth's place within it.

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Life Science



Examine living organisms as part of whole systems, studying how they interact in the biosphere with their environments and other organisms.

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Engineering, Technology, and the Application of Science



Uncover how engineering design can be used to create new technology in response to problems or to explore new applications of science.

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CROSS CUTTING CONCEPTS (CCC)



Scale, Proportion, and Quantity

EDUCATION



Patterns

EDUCATION



Structure and Function

EDUCATION



Stability and Change

EDUCATION



Cause and Effect

EDUCATION



Systems and System Models

EDUCATION



Energy and Matter

EDUCATION



Escala, Proporción, y Cantidad

EDUCATION



Patrones

EDUCATION



Estructura y Función

EDUCATION



Estabilidad y Cambio

EDUCATION



Causa y Efecto

EDUCATION



Sistemas y Modelos de Sistemas

EDUCATION



Energía y Materia

EDUCATION

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PERFORMANCE EXPECTATION

1-PS4-3-Plan and conduct an investigation to determine the **effect** of placing **objects made with different materials** in the path of a beam of light.

1-PS4-3- Planear y llevar a cabo una investigación para determinar **el efecto** de colocar **objetos de materiales distintos** en la trayectoria de un rayo de luz.

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ANCHOR PHENOMENON



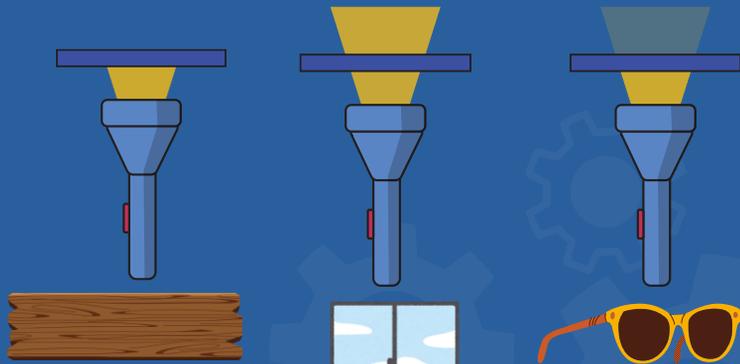
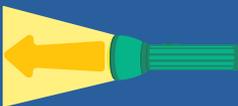
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LEARNING REVIEW

Shadows are caused when an object blocks a light source.



Light travels in a straight line



opaque
opaco

transparent
transparente

translucent
translúcido

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LEARNING REVIEW

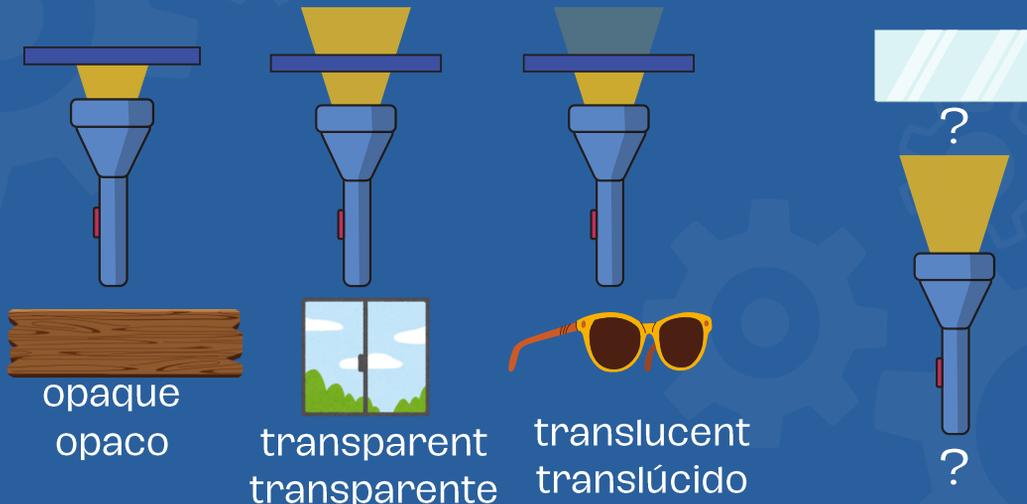
We have discovered that the opaque mountains surrounding Rjukan blocked the light from reaching the town. Now that we understand Rjukan's problem, we should start considering a solution.



How can we get sunlight to Rjukan?

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LEARNING REVIEW



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HIT THE TARGET



target
el blanco

flashlight
la linterna

espejo
el espejo

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PREDICTIONS

- How can you predict where the light will shine?
- How can you predict where to place the target?

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Hit the Target 5

Do Investigations • Finish the sentences.

I predict the light will

When we turned on the flashlight,

Driving Question 3 | Lesson 5
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PREDICTIONS

OBSERVATIONS

Dar en el blanco LECCIÓN 5

Investiga • Completa las oraciones.

Predigo que la luz

Quando prendimos la linterna,

Pregunta guía 3 | Lección 5
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LESSON 5

Share Ideas • Draw your experiment.

www.twigsience.com

Models should have:

- simple drawings
- labels
- arrows
- an explanation

LESSON 5

Comparte ideas • Dibuja tu experimento.

www.twigsience.com

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OBSERVATIONS

- What happens to the light when it reaches the mirror?
- Does light still travel in a straight line when it reaches the mirror?

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SHARE OUT

- When you hit the target, how did you set up the flashlight, mirror, and paper?
- How could you guess where the light would go?
- What did this experiment tell you about light or mirrors?

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Reflect

Light travels in

When light is reflected, it travels in

Driving Question 3 | Lesson 5

Reflexiona

La luz se mueve en

Cuando la luz se refleja, se mueve en

Pregunta guía 3 | Lección 5

SCIENCE CONCEPTS

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LEARNING REVIEW

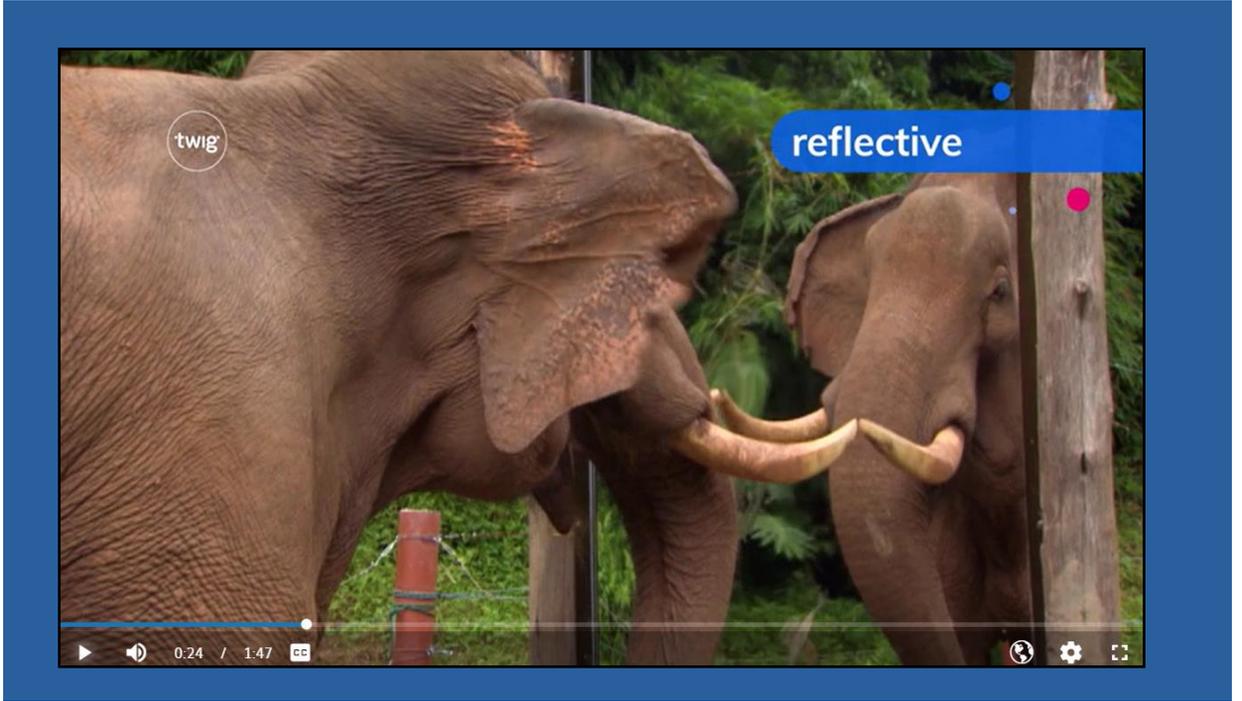
opaque
opaco

transparent
transparente

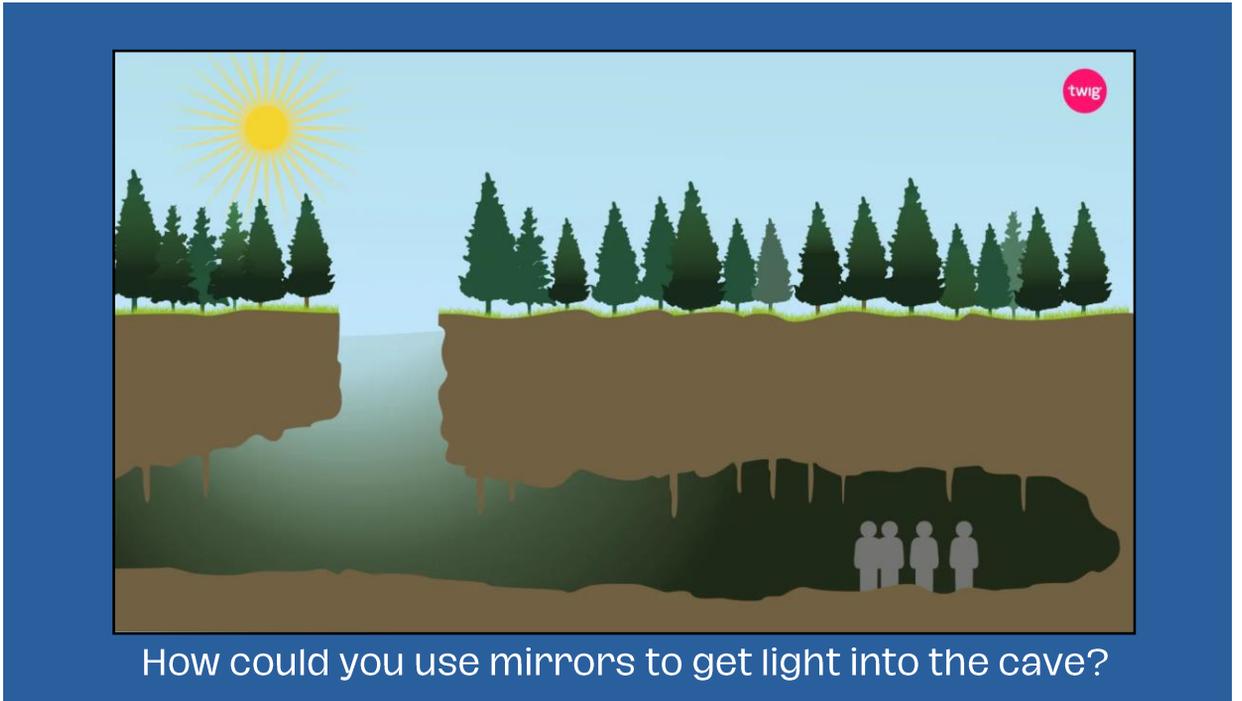
translucent
translúcido

reflective
reflectante

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The screenshot shows a digital learning interface. At the top, there is an orange header bar with a hand icon, a clock icon, and the text "Getting Light to a Cave". To the right of the header is a pink circle with the word "LESSON" and the number "7". Below the header is a white box with a blue border containing the text "Make Models • Draw and label a model of your cave experiment." and a drawing icon. At the bottom right of the white box, it says "Driving Question 3 | Lesson 7".

How could you use mirrors to get light into the cave?

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3-DIMENSIONAL LEARNING

Which Science and Engineering Practice(s) did we use during this investigation?

Which Cross Cutting Concept(s) did we explore during this investigation?

Discuss with a partner



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TWIG COMPONENTS



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ELA INTEGRATION

Lesson 3

How Can We Use the Sun's Energy?

Read and annotate the text. As you read, use these close reading strategies:

- Circle key words.
- Underline confusing words or sentences.
- Add drawings or notes to help you remember important facts and ideas.

Have you felt how warm it gets inside a car on a hot day? I have you been woken up by light coming through your window in the morning? The heat and light come from the Sun. The Sun is far away, but it only takes about 8 minutes for energy to transfer from the Sun to the Earth. Because light travels at a speed of about 300,000,000 m/s, it is collected and stored all the energy we get from the Sun in

1 minute, we would have enough energy to power everything on Earth for a whole year! However, only a small part of the energy that reaches the Earth can be collected.

All plants and animals rely on energy from the Sun every day, but people have also developed lots of smart ways to use it.

One way we can use energy from the Sun is to heat up water. Have you ever noticed that outdoor swimming pools are often built where the Sun shines on them for most of the day? This is so they can get as much energy from the Sun as possible to heat the water. Using energy from the

Sun to heat up water can also be useful for people who like to go camping but don't want to use cold outdoor showers! They can bring sturdy bags of water called solar showers in direct sunlight and wait for energy from the Sun to heat the water up. Then, when the water is warm, they can open a nozzle at the bottom of the bag and take a warm shower!

NOTES

Reading

Writing

Lesson 3 Identifying Acquired Characteristics

Construct Explanations • Which traits seem to have changed during this dog's lifetime? Which traits do you think it will pass on to its offspring? Explain your evidence and reasoning.



First Draft

Second Draft

Third Draft

Final Draft

Challenge

Construct Explanations • Which trait seems to have changed during this deer's lifetime? Which traits do you think it will pass on to its offspring? Explain your evidence and reasoning.



Writing Question 1 | Lesson 3

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ELD SUPPORT

English Learners

Scaffold for ELs by offering oral sentence frames.

Substantial Support (Emerging Proficiency)

- The volcano _____.
- I saw _____.

Moderate Support (Expanding Proficiency)

- The land changed because _____.
- The changes happened _____ (quickly/slowly).

Light Support (Bridging Proficiency)

- When the volcano _____, the land _____ because _____.
- I observed the _____ (noun) _____ (verb) _____ (when, before, after) the eruption happened.

English Learners

Pull a small group of ELs together for a guided reading of half of the article prior to the whole group lesson, and again for the remaining half during the lesson. Show ELs photos of glaciers to provide visual support, and review the definition of *glacier* in the article glossary. Ensure that ELs understand the meanings of the terms *sculpture* and *carving* by providing visual samples.

As you read together, highlight and list new verbs encountered in the text. Illustrate the meaning of new verbs through gestures and/or visual samples, and have students repeat them chorally. Have ELs circle words that explain how glaciers move, and underline parts of the article that explain what changes made by glaciers can be observed today.

English Learners

Model the photo comparison task for ELs by doing a meta-think-aloud about the first pair of photos in their Twig Books. Briefly write what you are saying on the board to provide additional visual support for ELs.

- In the first photo, I see lots of snow and ice. It looks like a river of ice. I think it's a glacier. I don't see any trees.
- In the second photo, the front part of the river looks like water, not ice. There are trees in the front. The land on the right side sticks way out into the water. That's different than in the first photo.

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LEVELED READERS

Above-Level Below-Level **English Learners** On-Level

Overview

Surviving in Different Environments



Leveled Reader Supports

Multiple supports are provided in the text to assist you in helping students access the vocabulary presented.

- **Cognates:** Highlight those words that are similar in Spanish and English to accelerate vocabulary building (e.g., *extinct/extinto*).
- **Define It:** Point out the definitions of key academic words needed for understanding, but are without sufficient context clues.
- **Visual Glossary:** Refer to the visual glossary before, during, and after reading to reinforce key content vocabulary.

LEVELED READERS

Unpack It!

It is the only monkey that can live in such a cold place. The reason? It has very thick fur that keeps it warm in winter. It also has, as you might guess, a snub nose. Its short, stubby nose doesn't get frostbite in the freezing cold.

There are no leaves or fruit in winter. So what can it eat? Luckily in winter, the trees are covered in a crunchy, dry-looking plant called **lichen**. Lichen is actually two living things together. A fungus and a type of plant called algae. Lichen is hard to pull off the trees. But that's no problem for this monkey! Its strong, tiny fingers can easily grab this hard-to-reach plant. The snub-nosed monkey's fingers and warm fur are perfectly suited to help it survive. These are **adaptations**. Adaptation is the process in which a plant or animal changes to be better suited to its environment.

Snub-Nosed Monkey

Lichen on a Tree

COGNATES
adaptation adaptación

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VISUAL GLOSSARY



adaptation
the process where a plant or animal changes to become better suited to its environment



extinct
no longer any living members



cilia
very thin, hair-like structures



habitat
the natural home of a specific plant or animal



climate
the typical weather in a certain place



nutrients
the substances a living thing needs to stay alive



environment
the natural world



survive
to stay alive

ELPAC SUPPORT

MONITORING ENGLISH LANGUAGE PROFICIENCY

During your leveled reader instruction, engage students in the following tasks to monitor their growing English Language development. These tasks are best administered individually.

WRITING DOMAIN

Have students look at the photos and write a brief description of what is happening.

READING DOMAIN

Use the photos on pages 6–7. Write these sentences: **The giraffe has a long neck. The giraffe's tongue is long and dark. The tree has sharp spikes. The giraffe has adapted to its habitat.** Have students read each sentence, then match it to the correct photo or part of photo.

LISTENING DOMAIN

Describe the illustrations on pages 8–9. Add key details included in the illustrations, but not in the main text (e.g., details in the diagram text). Ask: **What is special about the roots of a cactus? What is special about the skin of a cactus? How has a cactus adapted to survive?**

SPEAKING DOMAIN

As students answer the questions in the "Listening Domain" task, record their use of academic vocabulary and ability to summarize the key details.

Assess Conversation

Use the chart to gauge students' progress as they participate in collaborative conversations. Model conversation exchanges to support students' growth.

Bridging 4	Students engage in 5 or more exchanges. They support their ideas with evidence and sufficiently synthesize ideas.
Expanding 3	Students engage in 3-4 exchanges. They ask and answer questions, agree and disagree, and build on each other's ideas.
Early Expanding 2	Students engage in 1 exchange, using only a sentence or two. Sometimes the conversation is extended.
Emerging 1	Students offer 1 short answer. The exchange is often highly structured.
0	Students are silent during the conversation.

CA SCIENCE TEST



Twig Science K-6

59 assessments



Twig Science K–5 CAST Practice (Education4Equity)

3 assessments

NEW



CA SCIENCE TEST (CAST)

- The CAST Science test is administered in grades 5, 8, and one year in high school (either grades 10, 11, or 12)
- The 5th grade science test covers content material from grades 3-5, and the science and engineering practices and cross cutting concepts introduced in grades K-5.

Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Student Survey
Discrete Items	Discrete Items	Discrete Items or Performance Task	Performance Task	Performance Task	Performance Task	3-4 questions
G5: 13 items G8: 14 items HS: 16 items	G5: 13 items G8: 14 items HS: 16 items		4-6 items	4-6 items	4-6 items	
						

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CA SCIENCE TEST (CAST)

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☰

GUEST | Last Saved: 2:58 PM

A student observed that a cactus has long, sharp spines that are painful to touch.

Which claim is **best** supported by the observation?

Ⓐ The spines attract helpful insects to the cactus.

Ⓑ The spines keep cold wind away from the cactus.

Ⓒ The spines make it hard for animals to eat the cactus.

Ⓓ The spines store water that can be used by the cactus.

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CA SCIENCE TEST (CAST)

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GUEST

Long-eared hedgehogs are small mammals that are kept as pets. Adults can have body lengths that range from 120 to 270 millimeters (mm). This table shows the body lengths of a family of hedgehogs.

Hedgehog	Adult Body Length (mm)
Mother	152
Father	138
Offspring 1	145
Offspring 2	140
Offspring 3	148

Based on this data, select the word or phrase that **best** completes the statement.

The offspring of these two parent hedgehogs have body lengths that are their parents because variation for this trait among members of the same family.

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CA SCIENCE TEST

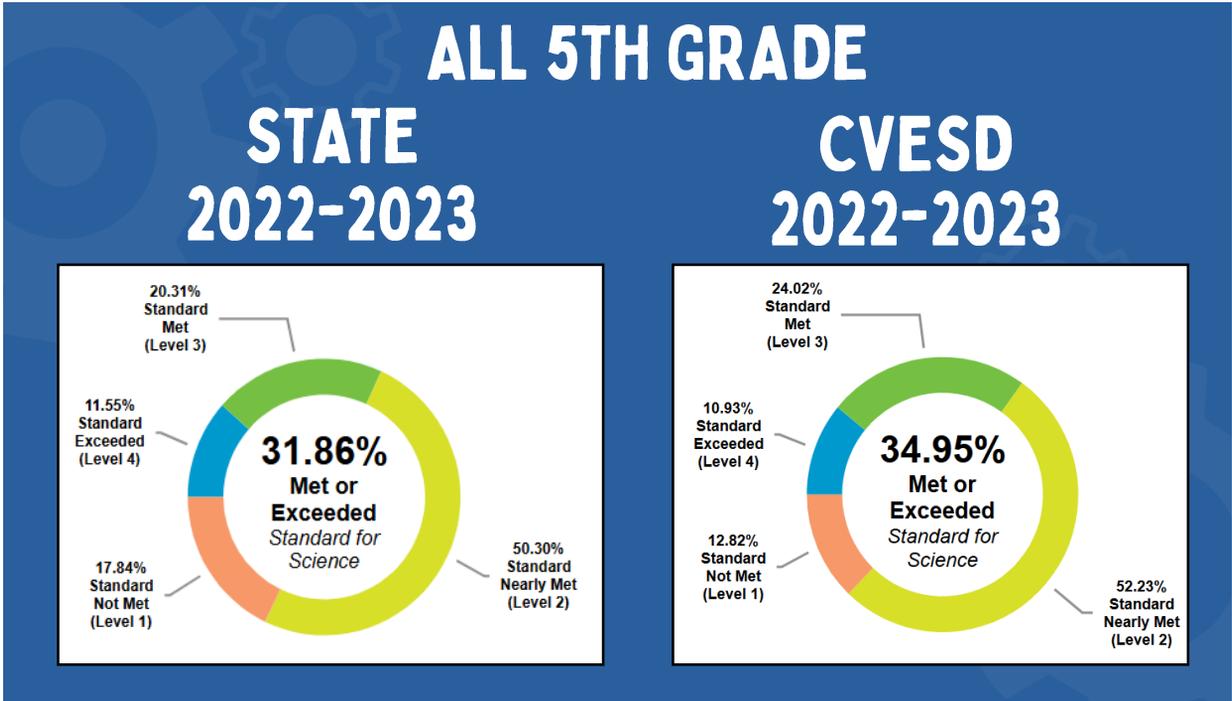
A scientific explanation...

twig

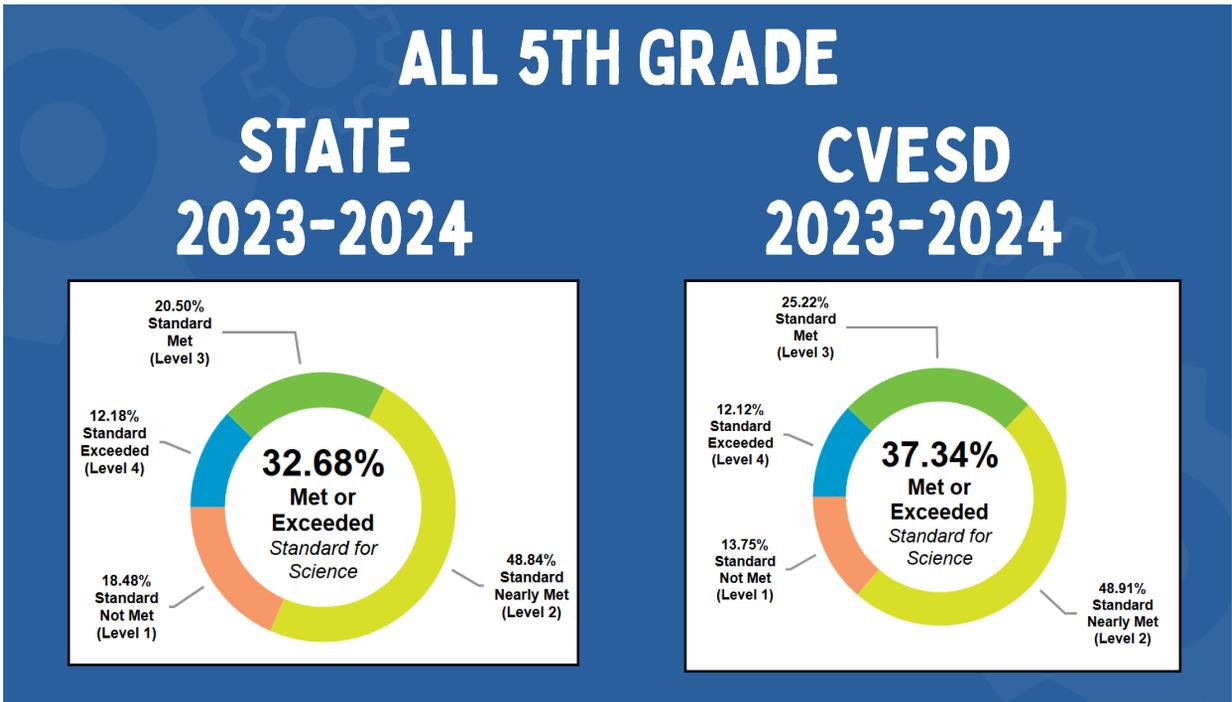
- Is about how or why something happens
- Introduces a topic
- Supports ideas with evidence such as facts, definitions, and quotations related to the topic
- Uses scientific language
- Links ideas within and across categories of information using words, phrases, and clauses
- Addresses an audience
- Provides a concluding statement or section related to the information or explanation presented.



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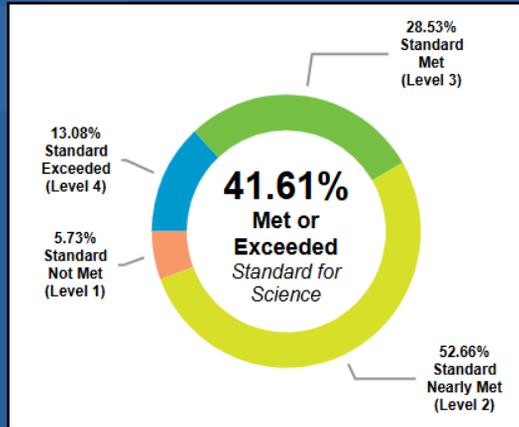


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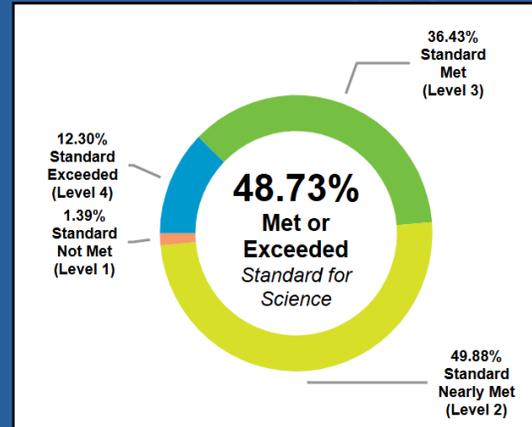


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STATE R-FEP 2023-2024



CVESD R-FEP 2023-2024



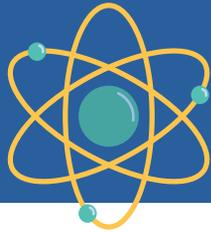
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TWIG NEXT STEPS



- **CAST Optional After School Professional Learning Sessions for 5th Grade Teachers**
 - Focus on data & graphs
 - Focus on short-constructed responses (CER)
- **Curriculum Support for School Sites**
 - Collaboration
 - Staff Professional Learning
- **Use of Twig Science CAST Assessment Practice**
- **Use of CA Science Interim Assessments**

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