

NGSS



**Review and Digital
Navigation Guide**

Welcome to STEMscopes NGSS 3D!

STEMscopes NGSS 3D shifts the paradigm of traditional science instruction to student-centered, phenomena-based STEM learning. Based on the 5E instructional model and designed for the Next Generation Science Standards, STEMscopes NGSS 3D supports diverse learners. Embedded language supports, dedicated interventions and acceleration modules, and in-depth breakdowns in each lesson meet the needs of all students. Be more than a science teacher: be a STEM teacher.

Don't miss out! Log in to explore everything you need to teach STEMscopes NGSS 3D, including our Teacher Toolbox, program instructions, standards alignment, and more.

Visit <https://www.acceleratelearning.com/science/> and request a preview!

The image shows a laptop displaying the STEMscopes NGSS 3D website. The website's navigation bar includes 'AccelerateLEARNING' and various menu items: Home, Planner, Bundles, Scopes, Streaming, Coding, Standards, Students, More, and a search icon for 'ngsteacher'. Below the navigation bar, there are tabs for 'All', 'Recently Viewed', 'Bookmarks', and 'My Notes'. A 'FILTER' sidebar on the left allows users to filter by 'None', 'Grades', and 'Domains', with a 'Save filter' button and a search bar. The main content area shows a grid of lesson cards for 'High School Biology - 3D', including 'Cell Division and Complex Organisms', 'DNA to Proteins', and 'Inheritance of Traits'. A 'STEMscopes Streaming' section is also visible. The laptop is overlaid on a background featuring a blue molecular model on the left and two hot air balloons (one yellow and orange, one smaller yellow) in a field at the bottom.

Table of Contents

Meet STEMscopes NGSS 3D

- Who We Are, page 4

Storylines and Pacing

- Biology, page 5
- Chemistry, page 5
- Physics, page 6
- Earth and Space, page 6

Program Overview

- Instructional Scope (Chapter) Overview, page 7
- Sample Scope, page 8
- Digital Teacher Resources, page 9
- 5E Instructional Resources, page 10

Navigating STEMscopes NGSS 3D

- Navigating the Digital Curriculum, page 11

Print Materials

- Print Resources, page 16

Product Offerings

- STEMscopes Streaming and STEMscopes Assessment Package, page 17
- Professional Learning, page 18

MEET STEMSCOPES NGSS 3D

WHO WE ARE

Accelerate Learning, Inc. produces STEMscopes™, a comprehensive suite of results-oriented STEM curriculum and professional development solutions used by more than **9 million students** and **600,000 teachers** across all **50 states**. Created by educators for educators, STEMscopes is highly adaptable and affordable, and supports instruction in any kind of learning environment.

MORE THAN DIGITAL

The Accelerate Learning, Inc. team created STEMscopes NGSS 3D to serve teachers and students regardless of their classroom setup or access to technology.

STEMscopes NGSS 3D is a phenomena-driven, comprehensive STEM solution, fully aligned to the Next Generation Science Standards (NGSS). We provide educators with blended, adaptable resources that empower hands-on science learning around meaningful, real-world phenomena. Built by teachers for teachers, our research-based curriculum evolved out of an initiative at Rice University, a nationally recognized institution, to develop and support STEM initiatives for advanced STEM education.

OUR SOLUTION

- Hands-on, collaborative experiences using the 5E+IA lesson model
- A wealth of applicable real-world phenomena using SEPs, DCIs, and CCCs
- Adaptations for any teaching style, whether you're a new or veteran teacher
- Resources in both English and Spanish to support multilingual learners

ACCOLADES & CONNECTIONS

Accelerate Learning's STEM solutions earned awards in three categories of the 2022 Educators Pick Best of STEM Awards. The Educators Pick Best of STEM Awards is the only program created for educators and judged by a qualified panel of STEM educators.

The 21st annual American Business Awards honored Accelerate Learning, Inc. with two Stevie Awards in the Education category group. STEMscopes Science captured the top prize, the Gold Stevie Award, in the Science Instructional Solution category. Judges in ABA's Science Instructional Solution category stated,

“STEMscopes Science shows a commitment to effective learning and continuous improvement and has amazing efficacy results and improvement in passing rates.”

BIOLOGY

STORYLINES

SCOPES	PEs
CELL DIVISION AND COMPLEX ORGANISMS	LS1-4
DNA TO PROTEINS	LS1-1
INHERITANCE OF TRAITS	LS3-1
VARIATIONS IN TRAITS	LS3-2 LS3-3
ORGANIZATION OF SYSTEMS	LS1-2
FEEDBACK AND HOMEOSTASIS	LS1-3
BIOENERGETICS	LS2-3
FLOW OF MATTER IN ECOSYSTEMS	LS2-4
CARBON FLOW IN ECOSYSTEMS	LS2-5
CARRYING CAPACITY	LS2-1
BIODIVERSITY AND CHANGES IN ECOSYSTEMS	LS2-2 L S2-6
MINIMIZING HUMAN IMPACT ON THE EARTH	LS2-7 LS4-6 ETS1-3 ETS1-4
EVIDENCE OF COMMON ANCESTRY	LS4-1
FACTORS OF EVOLUTION	LS4-2
RESULTS OF NATURAL SELECTION	LS4-3 LS4-4
ENVIRONMENTAL IMPACT ON SPECIES	LS4-5
ANIMAL BEHAVIOR AND SURVIVAL	LS2-8

CHEMISTRY

STORYLINES

SCOPES	PEs
MOLECULES OF LIFE	LS1-6
CELLULAR ENERGY	LS1-5 LS1-7
PERIODIC TABLE AND ELEMENT STRUCTURE	PS1-1
ELEMENTS, COMPOUNDS AND REACTIONS	PS1-2 PS1-7
STRUCTURE AND PROPERTIES OF MATTER	PS1-3 PS2-6
REACTION EQUILIBRIUM	PS1-6 ETS1-2
REACTIONS AND ENERGY	PS1-4 PS1-5
ENERGY APPLICATIONS	PS3-3 ETS1-1
THERMODYNAMICS	PS3-4

PHYSICS STORYLINES

SCOPES	PEs
NUCLEAR CHEMISTRY	PS1-8
NEWTON'S SECOND LAW OF MOTION	PS2-1
MOMENTUM	PS2-2 PS2-3 ETS1-1 ETS1-2
INTERACTION OF FORCES	PS2-5 PS3-5
GRAVITATIONAL AND ELECTROSTATIC FORCES	PS2-4
ENERGY	PS3-2
CONSERVATION OF ENERGY	PS3-1
WAVE MODELS	PS4-3
WAVES IN MATTER	PS4-4
WAVES USED IN TECHNOLOGY	PS4-2 PS4-5

EARTH & SPACE STORYLINES

SCOPES	PEs
THE SUN	ESS1-1
THE BIG BANG THEORY	ESS1-2
STARS AND ELEMENTS	ESS1-3
KEPLER'S LAWS	ESS1-4
PLATE TECTONICS	ESS1-5
EARTH'S EARLY HISTORY	ESS1-6
EARTH'S FORMATIONS	ESS2-1
ENERGY AND EARTH'S SYSTEMS	ESS2-3
EARTH'S FEEDBACK SYSTEMS	ESS2-2
ENERGY AND CLIMATE	ESS2-4
IMPACT OF CLIMATE CHANGE	ESS3-5
WATER'S ROLE ON EARTH	ESS2-5
CARBON AND EARTH'S PROCESSES	ESS2-6
INTERACTION OF ORGANISMS AND EARTH'S SYSTEMS	ESS2-7
HUMAN DEPENDENCE ON EARTH	ESS3-1
RESOURCES, SUSTAINABILITY AND BIODIVERSITY	ESS3-2 ESS3-3 ETS1-3
HUMAN IMPACTS ON EARTH SYSTEMS	ESS3-6
ENVIRONMENTAL SOLUTIONS	ESS3-4 ETS1-3

Instructional Scope (Chapter) Overview

SCOPE (CHAPTER)

Each scope takes 1-3 weeks to complete.

ENGAGE

Introduce the scope's **Investigative Phenomena**.

Engage students with the hands-on Hook activity, where they can access prior knowledge (APK) and establish connections to the Investigative Phenomena.



EXPLORE/EXPLAIN: (1-5/scope)

Students dive into the scope's content through hands-on learning (Explore activities), where they use **SEPs** and to address the Everyday Phenomena's connections to target **DCIs**.

Use the resources and strategies found in Explain (guided questions, student discourse, nonfiction text, and content connections media) to scaffold learning as students explore the Everyday Phenomena and identify connections to the Investigative Phenomena.



ELABORATE

Integrate cross-curricular connections (e.g., math and ELA) throughout the scope.

Challenge students to use higher-order thinking skills and apply new concepts to engaging, real-world scenarios.

Help students refine their knowledge of the Investigative Phenomena and apply their learning through real-world connections.

EVALUATE: FORMATIVE

Ask probing questions and use embedded formative assessments and rubrics to monitor student progress and differentiate instruction.

SEP and CCC scoring rubrics are provided for each scope to monitor student progress in real time.



DIFFERENTIATION

Provide struggling students with scaffolded support through embedded features (leveled reading and ELL strategies) and Intervention resources.

Elaborate and Acceleration resources provide advanced students with challenging opportunities to explore concepts in depth, while promoting creativity and independent practice.

EVALUATE: SUMMATIVE

Evaluate offers multiple choice, open-ended response, and claim-evidence-reasoning (CER) assessments. Use these summative assessments and rubrics to monitor student progress toward mastery of the target standards.

Sample Scopes

HANDS-ON EXPLORATION Each scope embodies a 5E lesson sequence in which students build an understanding of the Investigative Phenomena by exploring relevant everyday phenomena during the scope's Explore activities. Students are referred back to the Investigative Phenomena after each Explore activity to apply their learning and revise and record their thinking.



SCOPE 1 CARRYING CAPACITY What prevents organisms from reproducing an unlimited number of offspring?

PERFORMANCE EXPECTATIONS

HS-LS2-1: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

HOOK ACTIVITY Students simulate how many factors can impact the ability of an organism to survive, while playing a game of Survivor.

EXPLORE LESSON 1 Activity - Factors Affecting Carrying Capacity

Students make predictions of whether various factors would increase or decrease the carrying capacity of an ecosystem.

EXPLORE LESSON 2 Tuva - Hare and Lynx Populations

Students analyze data to explain the predator-and-prey relationship between the hare and the lynx, identify the carrying capacity, and explain how changes in factors would affect the population graph and carrying capacity.

EXPLORE LESSON 3 Activity - To Build or Not to Build

Students read a scenario about the construction of a luxury, master-planned community and write a scientific explanation that includes a claim, evidence, and reasoning (CER) to answer the question, Would the carrying capacity of the state's ecosystem be impacted by the construction of this master-planned community?



SCOPE 2 REACTIONS AND ENERGY How can a glow stick be made brighter or to last longer?

PERFORMANCE EXPECTATIONS

HS-PS1-4: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

HS-PS1-5: Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-7: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

HOOK ACTIVITY Students investigate how concentration affects reaction rate by comparing the rate at which differing concentrations of hydrogen peroxide decompose into water and oxygen.

EXPLORE LESSON 1 Scientific Investigation - Heavy Metal Reaction

EVERYDAY PHENOMENA What is the relationship between mole and mass?

Students conduct an investigation to determine the relationship between mole and mass for elements and compounds by reacting copper with silver nitrate and using mathematical formulas to determine the moles of the reactants and products based on masses measured in the lab.

EXPLORE LESSON 2 Activity - Energy in Molecules

EVERYDAY PHENOMENA How is energy absorbed and released during chemical reactions?

Students use role-play to model the exothermic reaction between methane and oxygen in order to explore the role of activation energy in a chemical reaction, as well as the conversion and flow of energy, and movement of atoms, as bonds break and reform to make new products.

EXPLORE LESSON 3 Inquiry Investigation - Temperature and Reaction Rates

EVERYDAY PHENOMENA How do temperature and concentration affect reaction rates?

Students apply what they have learned to plan and conduct their own investigation to find out how temperature and concentration affect the reaction rate of $\text{Ca}(\text{H}_2\text{PO}_4)_2$ and NaHCO_3 (the ingredients in an effervescent tablet).

Digital Teacher Resources

Scope

Access resources to implement a 5E lesson for each bundle of Performance Expectations, with comprehensive differentiation to meet the needs of every student.

Use the Planner tool to drag and drop lesson components directly onto your instructional calendar. You can easily organize your plans, make notes, and share them with your colleagues.

How to access the Teacher Planner and calendar feature:

- Create your classroom by selecting the Students tab on the blue navigation bar.
- Click “Add Selection” on the right and name your classroom.
- Click “Create this teacher section”.
- Click the Planner tab on the blue bar and choose from the list of grades and scopes on the right-hand side of the page.
- Expand each section to drag and drop your selected scope onto the calendar, then save your changes.

5E Instructional Resources

STEMscopes NGSS 3D scopes (lessons) contain over 25 instructional resources per scope that you can use based on your students' needs and interests. These resources provide opportunities for differentiation, student choice, and content deep-dives, and encourage students to express understanding while making learning interesting, relevant, and fun.

ENGAGE

Engage students through relevant phenomena, prior knowledge, and a hook activity.

Investigative Phenomena, APK, Hook

EXPLORE

Students gain foundational experience that drives discussion and promotes discovery.

Hands-on Activities, Scientific Investigations, Engineering Design Challenges, Research Projects, Tuva Sets (Analysis of Real-Life Data Sets)

Scopes have varying numbers of Explore activities. Explores are scaffolded and doing all Explores is recommended.

EXPLAIN

Focus on key terms and concepts that connect to experiences in the Explore activities.

Picture Vocabulary, Content Connection Videos, Linking Literacy, STEMscopedia

Linking Literacy provides ELA support for reading science nonfiction text.

ELABORATE

Incorporate optional enrichment activities for differentiated learning (teacher's choice).

Leveled Math, Science Articles, Scientist Spotlight, Career Connections, Simulations

EVALUATE

Students express their understanding of the essential question and provide evidence that supports their thinking.

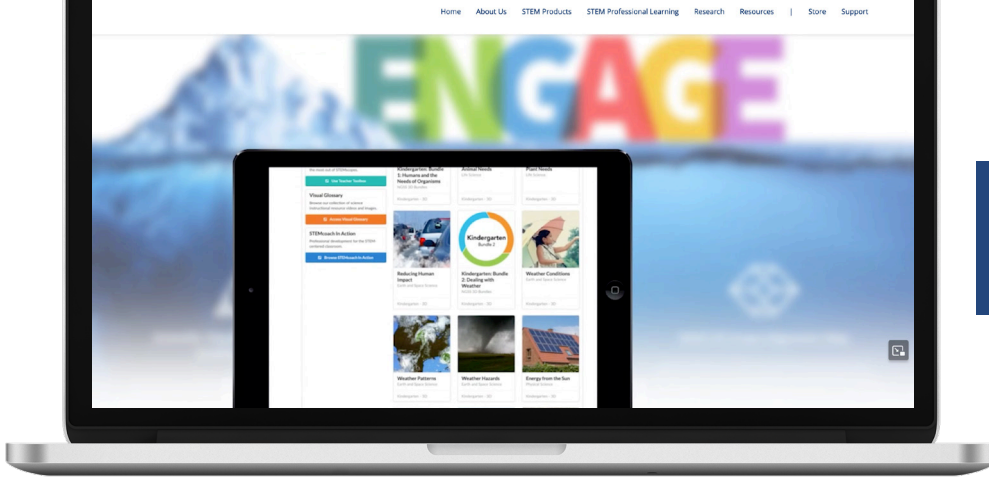
Open-Ended, Multiple Choice, Claim-Evidence-Reasoning (CER)

Leading The Way For A New Learning Experience

Not only do we keep our curricula up to date, but we also ensure a seamless user experience with continuous improvements to the digital platform. Here are just a few helpful features you can utilize within STEMscopes:

- Online/offline mode
- Save-as-you-go processing
- Google Classroom integration
- Responsive design on all devices
- Grade passback with widely used LMSs and SISs
- WCAG A-AA-compliant platforms





Walk through our curriculum with this instructional video.

Navigating the Digital Curriculum

Main Navigation Bar

HOME

View upcoming lessons and customized bookmarks on your dashboard.

PLANNER

Create lesson plans and collaborate with fellow STEMscopes teachers.

SCOPES (START HERE!)

Access all lesson content and teacher supports.

STANDARDS

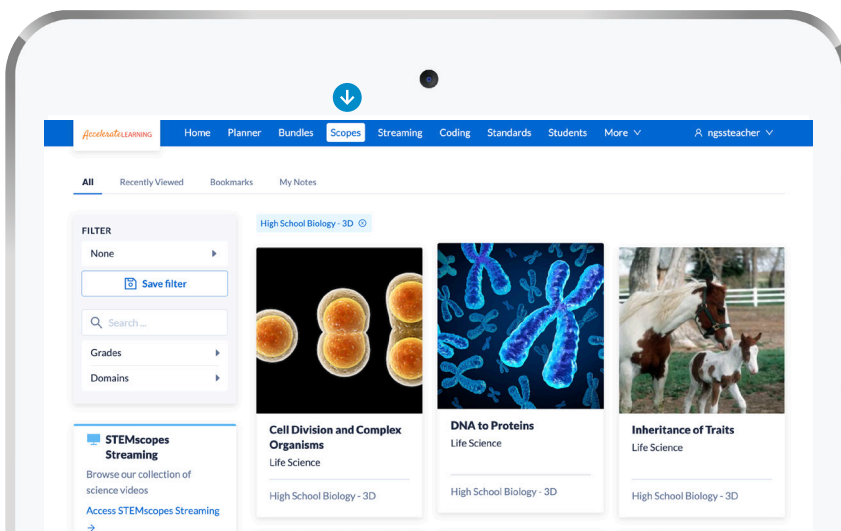
View a breakdown of the NGSS & Skills.

STUDENTS

Manage student accounts, create class groups, and monitor assignment progress and grades.

MORE

Select from a wide variety of assessments, access eBooks, or get help.

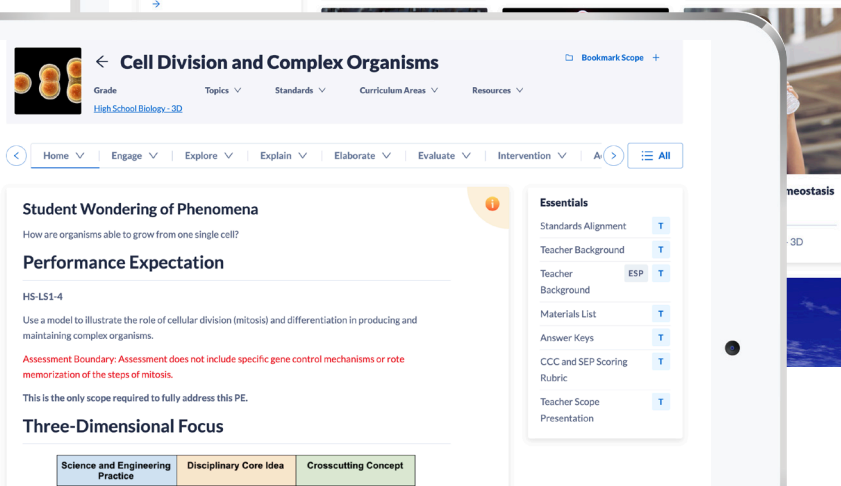


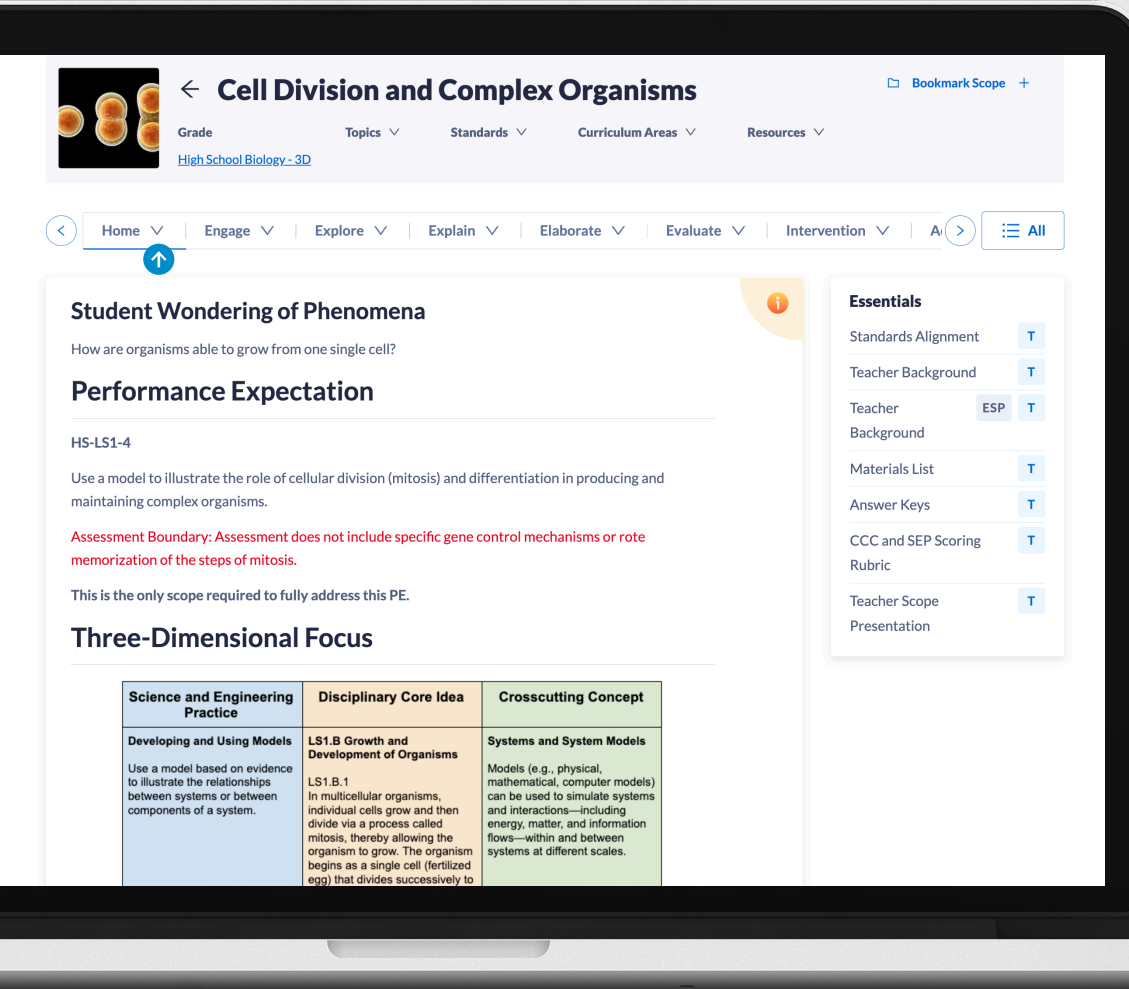
Scopes

STEMscopes NGSS 3D is organized into units (bundles), chapters (scopes), and lessons (hands-on Explores) that build upon each other. Filter by grade, domain, or keyword to find a specific Scope.

A LOOK INSIDE A SCOPE →

After selecting a Scope (chapter), review the planning and instructional resources. The white toolbar at the top can help you access all the features and benefits of STEMscopes NGSS 3D.



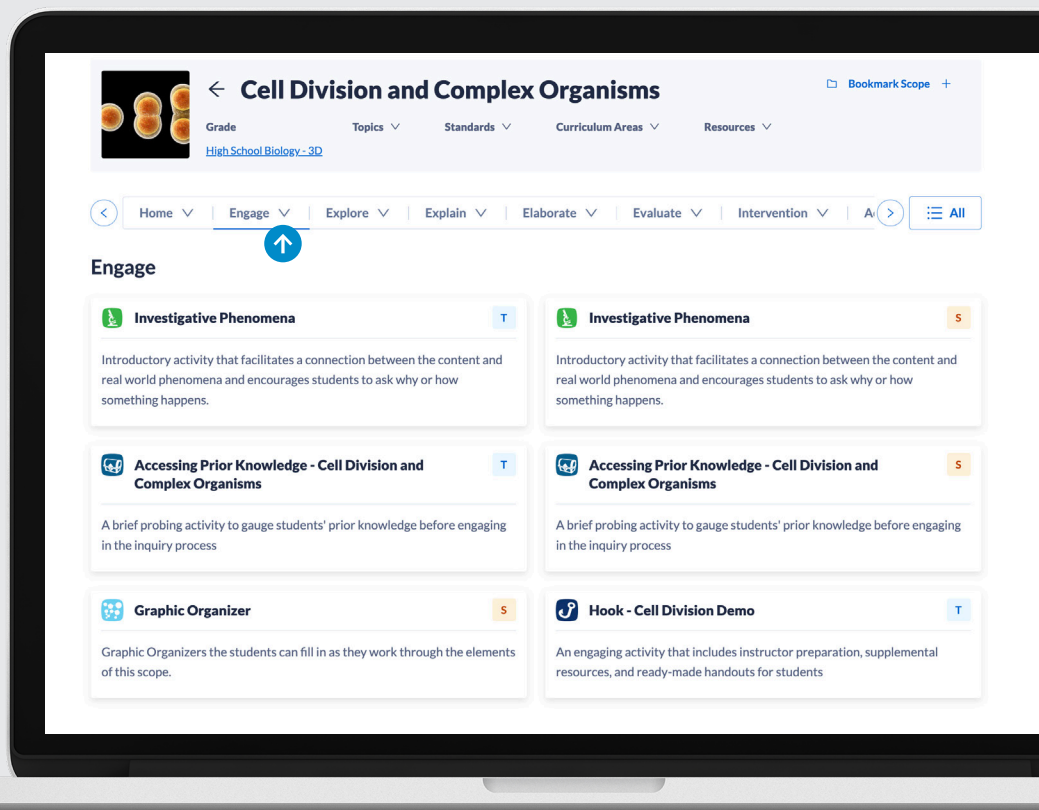


HOME

Click the **Home** button to access key materials that will help you prepare for the scope activities. These include standards and materials lists, a background explanation for new science teachers or teachers in need of a refresher, and CCC and SEP rubrics that track student progress.

ENGAGE

Engage marks the start of 5E learning. First, introduce your students to the Investigative Phenomena, which guides student learning and gives students the opportunity to question what they don't yet understand. Your students revisit the Investigative Phenomena throughout the scope to record ideas and revise their thinking. Next, allow your students to reflect on what they already know using the Accessing Prior Knowledge activity. This will help you identify students' background knowledge. Finally, "hook" student interest with relevant everyday phenomena and a fun, hands-on activity.



The screenshot shows the 'Explore' section of the 'Cell Division and Complex Organisms' scope. The page title is 'Cell Division and Complex Organisms' with a 'Bookmark Scope' button. Below the title are navigation options: Grade, Topics, Standards, Curriculum Areas, and Resources. A secondary navigation bar includes Home, Engage, Explore (selected), Explain, Elaborate, Evaluate, Intervention, and All. The 'Explore' section contains six activity cards:

- Explore 1: Activity - The Life of a Cell** (T/S): First task in which students complete a rigorous, hands-on activity. Teachers will highlight how students interact with everyday phenomena that relate the investigative or anchoring phenomena to personally experienced situations.
- Explore 2: Activity - When is the Cell Dividing?** (T/S): Second task in which students complete a rigorous, hands-on activity. Teachers will highlight how students interact with everyday phenomena that relate the investigative or anchoring phenomena to personally experienced situations.
- Explore 3: Research - Why does a Cell Divide?** (T/S): Research activity.

→ EXPLORE

Explore is where you continue hands-on learning with exciting activities. Your students unpack a problem and determine the solution themselves. Whether they're designing a model, conducting an investigation, or gathering data, your students are now in control of their own learning, and that's where real science takes place.

Typically, a teacher will begin with an Explore activity and use Explain's resources to support students in making sense of their hands-on investigation. It is ideal to repeat this cycle, alternating between Explore and Explain.

→ EXPLAIN

With **Explain**, your students dive even deeper into the scope's scientific concepts and phenomena, reinforcing what they've learned and discovered during their hands-on Explore activities. Students discover additional, detailed answers to their questions and expand their learning through differentiation based on their individual needs. Also during **Explain**, your students can connect their experiences with literacy through the STEMscopedia informational text and Picture Vocabulary.

The screenshot shows the 'Explain' section of the 'Cell Division and Complex Organisms' scope. The page title is 'Cell Division and Complex Organisms' with a 'Bookmark Scope' button. Below the title are navigation options: Grade, Topics, Standards, Curriculum Areas, and Resources. A secondary navigation bar includes Home, Engage, Explore, Explain (selected), Elaborate, Evaluate, Intervention, and All. The 'Explain' section contains ten resource cards:

- Picture Vocabulary** (S): A slide presentation of important vocabulary terms along with a picture and definition.
- STEMscopedia** (S): Reference materials that includes parent connections, career connections, technology, and science news.
- Linking Literacy** (S): Strategies to help students comprehend difficult informational text.
- Content Connections Video - Cell Cycle** (S): Video resource.
- Content Connections Video - Ciclo de la célula** (ESP, S): Spanish video resource.
- Communicate Science - Creative Design** (T): A class activity in which students use different forms of communication to discuss scientific topics connected to the content of this scope.
- Linking Literacy** (T): Strategies to help students comprehend difficult informational text.
- Concept Review Game** (S): An interactive game that can be played with a class or individually to help students review the science concepts in the module.
- Content Connections Video - Types of Cell Reproduction** (S): Video resource.
- Content Connections Video - Tipos de reproducción celular** (ESP, S): Spanish video resource.

→ ELABORATE

Elaborate is designed for enrichment, application, and cross-curricular connection. This is where students further build upon their previous learning, connecting learned concepts to themselves and the world around them through math, reading, simulations, scientific careers, and other valuable activities. These resources help students tie both the investigative and everyday phenomena together with real-world scenarios and events.

The screenshot shows the 'Elaborate' section of the 'Cell Division and Complex Organisms' unit. The page title is 'Cell Division and Complex Organisms' with a 'Bookmark Scope' button. Below the title are navigation options: 'Grade', 'Topics', 'Standards', 'Curriculum Areas', and 'Resources'. A secondary navigation bar includes 'Home', 'Engage', 'Explore', 'Explain', 'Elaborate' (highlighted with a blue arrow), 'Evaluate', 'Intervention', and 'All'. The 'Elaborate' section contains six resource cards:

- Math Connections - Cell Division and Complex Organisms**: A practice that uses grade-level appropriate math activities to address the concept.
- Reading Science - Frogs and You**: A reading passage about the concept, which includes five to eight comprehension questions.
- Science Today - Watch It!**: Students will explore real world connections and applications of science content through interactions with an engaging video provided by Associated Press.
- Career Connections - Microbiologist**: STEM careers come to life with these leveled career exploration videos and student guides designed to take the learning further.
- Scientist Spotlight - Sara Josephine Baker (1873-1945)**
- Data Literacy - Trends in Cancer Death Rates**

The screenshot shows the 'Evaluate' section of the 'Cell Division and Complex Organisms' unit. The page title is 'Cell Division and Complex Organisms' with a 'Bookmark Scope' button. Below the title are navigation options: 'Grade', 'Topics', 'Standards', 'Curriculum Areas', and 'Resources'. A secondary navigation bar includes 'Home', 'Engage', 'Explore', 'Explain', 'Elaborate', 'Evaluate' (highlighted with a blue arrow), 'Intervention', and 'All'. The 'Evaluate' section contains three assessment cards:

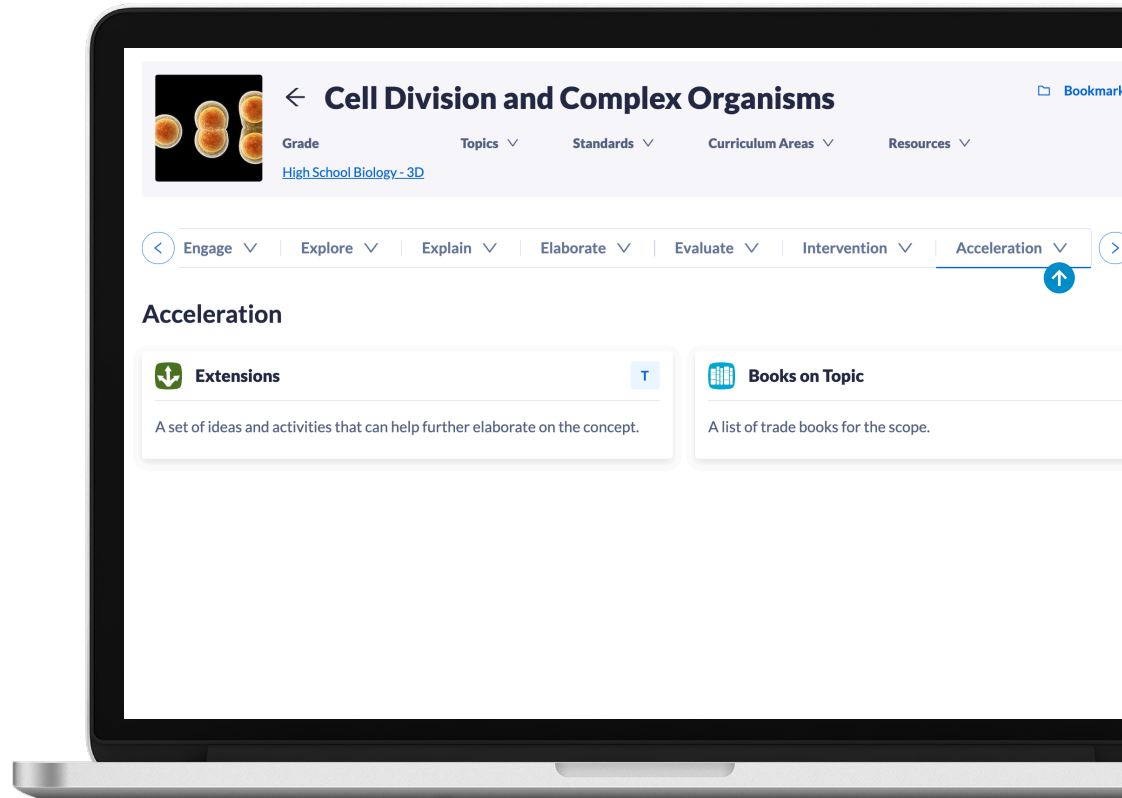
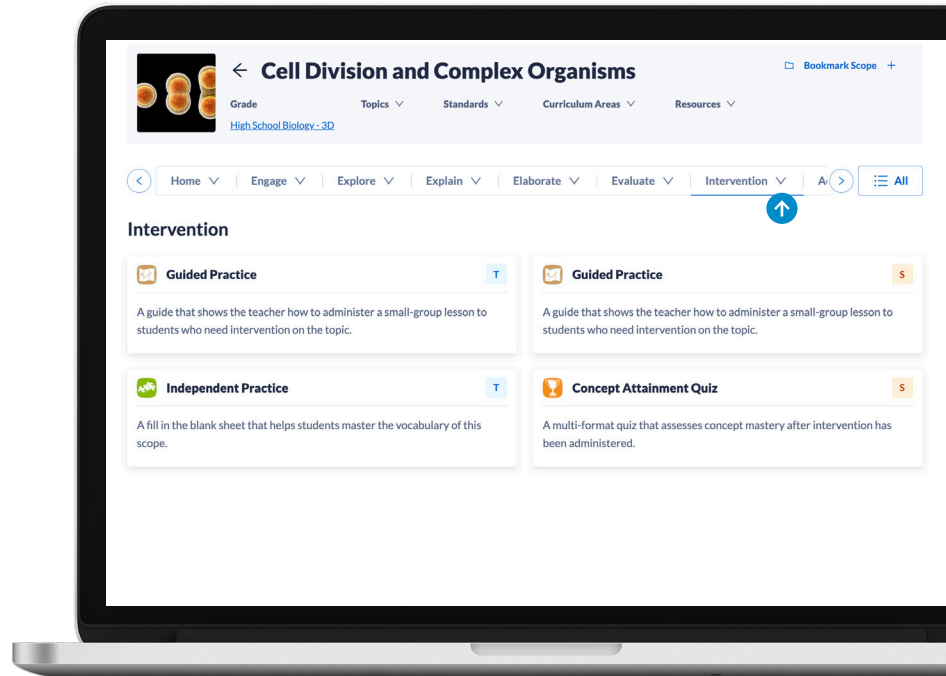
- Claim-Evidence-Reasoning**: An assessment in which students write a scientific explanation to show their understanding of the concept in a way that uses evidence.
- Open-Ended Response Assessment**: A short-answer and essay assessment to evaluate student mastery of the concept.
- Multiple Choice Assessment**: A standards-based assessment designed to gauge students' understanding of the science concept using their selections of the best possible answers from a list of choices.

→ EVALUATE

Evaluate allows you to summatively assess student learning. We provide several tools for you to assess learning as students critically reflect on the scope's phenomena, including Claim-Evidence-Reasoning, open-ended response, and auto-graded multiple choice assessments.

→ INTERVENTION & ACCELERATION

We believe **Intervention** and **Acceleration** are critical to the modern classroom. In addition to providing everything you need to complete a 5E lesson sequence, STEMscopes provides even more options for differentiated instruction. Whether a student requires guided instruction or is ready to take learning to the next level, we make sure every student has the supports they need.



Print Resources

STEMscopes NGSS 3D digital curriculum includes everything educators need to plan and deliver comprehensive science instruction. Students can access all of the curriculum features digitally, or teachers can print the resources and modify them to meet specific student needs. Optional full-color consumable Student Notebooks and reusable STEMscopes are available for purchase in order to save on the cost of printing and distributing large numbers of colored handouts. Whether teachers prefer a fully digital curriculum, a paper-based curriculum, or a blended approach, STEMscopes NGSS 3D meets their needs.

Print

STUDENT STEMSCOPE DIA A hardback version of the curriculum’s digital textbook to help students figure out the everyday and investigative phenomena within each scope. Each section includes curated probing questions for formative assessment, as well as parent connection resources. (Recommended as a shared classroom set.)

BIOLOGY PRINT SAMPLE, STEMSCOPE DIA

Student Biology STEMscopedia page 106: Cellular Energy. Includes a table of contents for the 'Cellular Energy' section, listing topics like 'Cellular Energy', 'Energy and Matter', 'Photosynthesis', and 'Cellular Respiration'.

Student Biology STEMscopedia page 107: Addressing Misconceptions. A section titled 'Addressing Misconceptions' that discusses common student errors regarding energy flow and photosynthesis. It includes a diagram of a plant and a table of misconceptions.

Student Biology STEMscopedia page 108: Photosynthesis. A section titled 'Photosynthesis' that explains the process of photosynthesis. It includes a diagram of a chloroplast and a chemical equation: $6CO_2 + 6H_2O \xrightarrow{\text{light energy}} C_6H_{12}O_6 + 6O_2$.

Student Biology STEMscopedia page 109: Energy and Matter. A section titled 'Energy and Matter' that discusses the flow of energy and matter in ecosystems. It includes a diagram of energy flow and a table of energy and matter.

Student Biology STEMscopedia page 110: The Cycling of Matter and Energy. A section titled 'The Cycling of Matter and Energy' that discusses the cycling of matter and energy in ecosystems. It includes a diagram of the water cycle and a table of matter and energy.

Student Biology STEMscopedia page 111: Cellular Energy Review. A section titled 'Cellular Energy Review' that provides a review of cellular energy concepts. It includes a table of review questions and answers.

Student Biology STEMscopedia page 112: Cellular Energy Review. A section titled 'Cellular Energy Review' that provides a review of cellular energy concepts. It includes a diagram of cellular energy flow and a table of review questions and answers.

TEACHER GUIDE An overview of the curriculum for each segment (unit) of instruction, including suggested pacing guides, teacher facilitation points, and a summary of science content background knowledge.

Step Up Your STEM Instruction

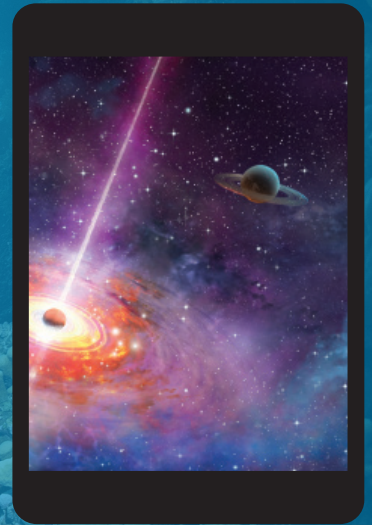


Stream media that reveals the wonder of STEM

Explore the world of phenomena in a whole new way! STEMscopes and BBC Learning have partnered to offer you a full library of world-class, dynamic videos, current events, behind-the-scenes photography, and integrated activities for the classroom.

Igniting Inquiry with World-Class STEM Content

- + An exciting new way to explore phenomena
- + Integrated discussion questions, writing prompts, and hands-on extensions
- + Supported communication, literacy, and lab investigations

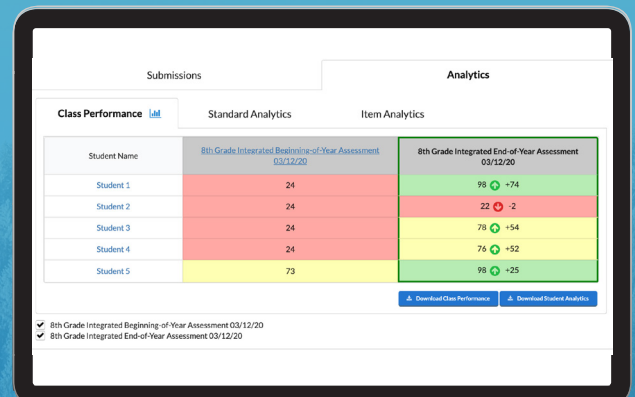


Identify and address student learning gaps

The Assessment Package expands the assessment tools and resources available in STEMscopes. Save time designing equitable test questions while accessing data analytics to quickly determine how to reteach, accelerate, and flexibly group your students.

What's included:

- + Beginning-of-Year and End-of-Year benchmark assessments that address all three dimensions of the NGSS
- + Expanded bank of assessment questions for use in building custom assessments
- + Integrated data analytics that indicate student mastery of each domain within each dimension of the NGSS, including all eight science and engineering practices and all seven crosscutting concepts



Professional Learning

Bite-sized morsels of professional learning are embedded and free throughout the STEMscopes curriculum. These teacher-friendly learning opportunities are within every Explore (lesson) and reinforce helpful strategies to promote the instructional fidelity of the NGSS and student achievement.

In-Lesson Facilitation Points, 3D Callouts, Instructional Strategies, Math Moments, and STEM Best Practices

Accelerate Learning Home Planner Bundles **Scopes** Streaming Coding Standards Students More ngssteacher

Cell Division and Complex Organisms

Grade: High School Biology - 3D

Home Engage **Explore** Explain Elaborate Evaluate Intervention All

Explore 1: Activity - The Life of a Cell

Setup Video

Editable Google Files
The Life of a Cell

Print Files
The Life of a Cell
The Life of a Cell Answer

Description

Students plant a variety of seeds in clear cups to observe their growth and development over time. You grow each seed type in a plastic bag without soil. Each student individually dissects a lima bean seed to observe the inside.

Materials

Printed Material

- 1 Wonders of Plants (per student)
- 1 Student CER (per student)

Reusable

- 1 Permanent marker (per teacher)
- 4 Small, clear plastic cups (per group)
- 4 Sandwich-size zip baggies (per class)

Consumable

- 1 Large bag of potting soil (per class)
- 4 Craft sticks (per group)
- 5 Pinto beans (per group)
- 5 Black beans (per group)
- 1 Pinch of rye grass seeds (per group)
- 5 Small lima beans (per group)
- 4 Paper towels (per teacher)
- 1 Large lima bean (per student)

ESTIMATED

30 min - 45 min

Procedure and Facilitation Points

Part I

30+

ESTIMATED DAYS

As students work through the activity, look for teachable moments. Try to point out examples of the terms as students are working so they can use them in their own work. Encourage students to use the following words as they work:

Existence: survival; continued living
Death: ending of life
Growth: increase in size, abundance, or complexity
Development: growth; improvement; innovation

- Distribute cups, five of each type of seed, craft sticks, and soil to each student.
- Each student plants their seeds (pinto bean, black bean, lima bean) in a clear plastic cup, but do not overwater.
- Seeds should be visible from the outside (planted against the side of the cup). Completely bury the seeds in the soil and the bottom of the cup. Be sure they are spaced out around the cup.
- Students will place the correctly labeled craft stick in the middle of their cup. Make sure the stick is not touching the soil.
- For demonstration purposes, take one of each seed, a wet paper towel, and a zip baggie.
- "Plant" the seeds inside the zip baggie using the paper towel on the first day of the investigation.
- Hang the four plastic bags in the classroom for 3 days (no access to sunlight).
- Do not expose the cups to light. Observe seeds daily. Water as needed. Draw what the seed looks like in your Student Journal: Wonders of Plants.
- After drawing seeds, place the cups in a window or outside for continued observation of growth.
- After day 3, the teacher hangs the four plastic bags in the window for continued observation.
- Each day the students observe their seeds in the cups and the teacher's seeds in the bags. Call out to students to record their observations in their Student Journal: Wonders of Plants, for examples of significant changes can be recorded.

Connection to the Investigative Phenomena

Once students have completed the activity, have them refer to the Investigative Phenomena question, anchor their learning, and revise their thinking.

Math Moment

Extend this research task by connecting it to math standard 3.NF Number and Operations - Fractions. There are 10 posters in this activity. Before beginning the activity, have students draw a number line to represent finishing three of the 10 posters.

Check out this module's Math Connections for further practice!

Language Acquisition Strategies

Think, Pair, Share

After the students have time to explore the investigation, group them with partners to discuss possible answers to questions including the following:

How do a lot of life cycles begin?

Allow the students to think, pair, and share with each other.

Sentence Stem: Most life cycles begin with the...

Other example questions: How do these life cycles compare to our life cycle? In what direction do life cycles go? Are all life cycles the same? What is an example of a life cycle?

Intervention Strategies

Roadblock: Difficulty Reading Text on a Screen

Some students may have difficulty reading from a computer screen during research in this activity. Modify the appearance of the screen by magnifying or changing the colors and contrast as needed. If modifications are not possible, allow students to work with a peer who can assist in reading material from the screen. Learn more strategies for students who have difficulty reading from a screen in the Intervention Toolbox.

Quality Instruction Matters

STEMscopes believes the most important strategy schools can use to significantly increase student learning is the quality of instruction. Students flourish when teachers deeply understand the content and make use of all available instructional resources.

We provide professional learning services that focus on evidence-based instructional strategies that strengthen student learning while simultaneously nurturing the attitudes and skills fundamental to implementing a successful STEM program.

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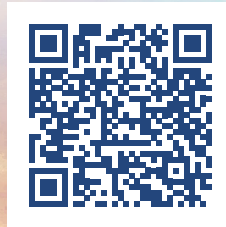


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