TAKE SCIENCE TO THE NEXT LEVEL
The Next Level of Inquiry and Wonder

Motivate every student to reach higher and go further. *Elevate Science* is a complete 6–8 science program that elevates thinking, learning, and teaching. This blended print and digital curriculum prepares students for the challenges of tomorrow!

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**TAKE SCIENCE TO THE NEXT LEVEL**

- Real-world, relevant, and interesting topics introduce the core ideas.
- Student-centered investigations utilize the science/engineering practices.
- Problem-based learning promotes application and student understanding.

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PRINT, DIGITAL, OR BLENDED LEARNING
Promote Investigation, Critical Thinking, and Analysis

- Phenomena-based Quests
- STEM and engineering activities
- Interdisciplinary connections

Foster Three-dimensional Learning

- Encourages innovation, collaboration, and creativity
- Promotes understanding, application, and synthesis
- Fosters the use of claims, evidence, and reasoning

Transform Learning and Manage Changing Classrooms

- Scaffolded questions guide discussions and promote thinking
- ELD and Differentiated Instruction strategies
- Supports the 5E Learning Model
Promote Investigation, Critical Thinking, and Reasoning

Exploration is the heart of science. The Quest problem-based activity anchors each topic. Students “figure out” the problem’s solution as they navigate the topic’s lessons. It’s real science with engaging phenomena. Students apply their knowledge and skills to master new science standards.

Phenomena-Based Learning

IQ What do you think is causing the pond to turn green?

In 2016, stipid Amoeba turned bodies of water green and killed fish in Florida, Utah, California, and many other states. These amoebas put photosynthesis in action. Scientists then studied freshwater and other natural bodies of water, known as lentic systems, to see what was causing such blooms. In this problem-based Quest activity, students will investigate factors influencing algae blooms in their local ecosystem. They will apply what they have learned to help them create solutions to solve the mystery. With enough evidence, they will be able to identify what they believe is the cause of the Algal Bloom and present a solution in the Findings activity.

In Lesson 1: What are some possible sources of the algal bloom in the pond? Evaluate data to identify possible explanations for the problem at hand.

In Lesson 2: How do the water's current and the water temperature affect the organisms in the pond?

In Lesson 3: How are fluctuations in water temperature and water quality affected by environmental changes? Explain the cycling of matter and the flow of energy among organisms in a pond.

IN LESSON 4: How are human activities affecting the environment? Consider how people can stop uncontrolled changes in an ecosystem in such a pond.

**QUEST FOR IDEAS, ANSWERS, AND EVIDENCE**

Ick! What turned this pond green? In this Quest, students investigate factors influencing algae blooms.
**FINDINGS**

Which group of forest organisms contains the most total energy?
- F oak, maple, and hemlock trees
- G mushrooms and bacteria
- H herbivorous mammals and birds
- I black bears and foxes

A large bull shark has several smaller fish called cobia following it, just behind its dorsal fin. The bull shark bites a barracuda in half. The cobia swallow small scraps that float past the shark’s head. How would you describe the relationship between the cobia and the bull shark?
- A commensalism
- B parasitism
- C mutualism
- D predator-prey

A mule is the young of a male donkey and a female horse, but the mules cannot reproduce and are not considered a species. Which statement best explains why?
- F Most species can reproduce.
- G The mule is a separate species.
- H The young of a species must be able to reproduce.
- I A species is considered to be organisms that are alike.

**Reflections on a Pond**

Complete the Quest!
Write a news story stating your findings. Identify what you believe is the cause of the algal bloom at Pleasant Pond and describe the impact it has had on the populations of organisms that inhabit this ecosystem. Include a proposal on how to restore Pleasant Pond back to its pristine state using evidence from your investigation.

**Cause and Effect** What is the connection between the water in Pleasant Pond—an abiotic factor—and the biotic factors?

**QUEST CHECK-INS**
What materials are needed to solve the Quest? Check-Ins ask students to reflect on the problem as they design their solutions.

**CONNECTIONS**
Learning is structured and intentional. Students explore the topic phenomenon throughout the lessons.
Lessons 1
Living Things and the Energy Flow in Ecosystems

Lesson 2
Investigate Lab: Engineer It!
Decomposition

Lesson 4
Ecosystems Dynamic and Resilient

Observing Keeping Clean with Decomposers

Ecosystems and How They Change
Competition and secondary

Figure 2

Decomposers

For example, after adult salmon swim upstream and reproduce, they die and decompose, returning the raw materials to the ecosystem. Other decomposers, such as bacteria and fungi, break down complex organic materials into simpler molecules useful for other organisms. This process releases energy that can be used by decomposers, supporting their own needs. These organisms also return materials, such as carbon and nitrogen, to the environment, making them available for new cycles and other organisms. How do nutrients affect organisms in an aquatic environment?

Mystery at Pleasant Pond

In each lesson, you will use evidence to identify what you believe is the cause of the algal bloom and present a solution in the Findings activity.

Hands-on Lab
Explore how communities change in response to natural disasters.

Hands-on Lab
Observe how decomposers get energy.

Hands-on Lab
Model how space can be a limiting factor.

Hands-on Lab
Investigate

Mystery at Pleasant Pond

What do you think is causing Pleasant Pond to turn green?

How are cycles of matter and energy affected by changes in the environment?

Video

After watching the above Quest Kickoff video, think about the water supply might have on your community. Record your ideas below.

Reading Check

Determining Cause and Effect
 }

Limited Space

Figure 5
In the image of Limited Space, look for the gannets. Do you see how limited space could be a limiting factor for these gannets?

Video

Climate and Weather

Changes in climate are one environmental factor that can affect a population of organisms.

Hands-on Lab

Explore the cycling of matter and energy among organisms.

Model how space can be a limiting factor.
**STEM CONNECTIONS**

STEM Connections help students think critically about real-world problems.

**ENGINEER IT! LAB**

Students engage in engineering practices to design, build, and apply core ideas to new situations.

**ENGINEERING DESIGN NOTEBOOK**

A recording journal allows students to ideate, design, prototype, build, and improve their inventions.

**ENGINEERING CONNECTION**

Integrate science and engineering practices throughout the curriculum.
Focus on the NEW Standards and the Science/Engineering Practices

The new science standards emphasize the practice of scientific inquiry and analysis. *Elevate Science* provides a variety of student interactions that shift the cognitive expectation from simple answers to higher-level, critical-thought responses. Explicit strategies guide the learner while hands-on investigations focus on open-ended inquiry.

**CONNECT IT!**
Students engage with the phenomena and connect it to the disciplinary core idea.

**PLAN IT!**
Students develop procedures to test their ideas.

**MODEL IT!**
Students logically think through their ideas to explain and apply concepts.

**DESIGN IT!**
Ample space for students to sketch out ideas to test their solutions.

**QUESTION IT!**
Students demonstrate their understanding and application of the key concepts.
Inspire inventors! Students can make programmable robots, vehicles, and machines using simple, modular electronics.

Virtual science simulations engage digital learners. Plus nothing gets broken!

Organized equipment kits provide the materials to support all of the program labs.

Encourage creative building and tinkering. These crates contain materials to support and extend the uEngineer It! Labs.

Materials are packaged to facilitate easy and efficient set-up.
The Next Level of Integration

Raise the bar on ELD/Literacy and Mathematics Standards. *Elevate Science* helps students think about, read about, write about, and talk about science. By integrating crucial skills, you’ll “elevate” results in all disciplines.

Focus on ELD/Literacy Standards

Making Proteins

Proteins are made from building blocks called amino acids. There are only 20 amino acids in the human body. But your body can combine them in thousands of ways to make many different types of proteins needed to carry out cell processes.

Inside the cell, amino acids link to form proteins through a process called *protein synthesis*. Once the protein is made, the cell will express the trait or perform a function.

RNA

The process of protein synthesis starts in the nucleus, where the DNA contains the code for the protein. However, the actual assembly of the protein occurs at an organelle called the ribosome. Before a ribosome can assemble a protein, it needs to receive the blueprint to assemble the right protein from the nucleus.

The blueprint is transferred from the nucleus to the ribosome by a different nucleic acid called RNA (ribonucleic acid). Even though both RNA and DNA are nucleic acids, they have some differences. One difference is that RNA contains the sugar ribose instead of deoxyribose.

**Figure 4**

**Differences between DNA and RNA**

![Diagram of DNA and RNA structures](image)

**Structure of DNA and RNA**

Figure 4 Differences between DNA and RNA are apparent when comparing their structure. Use the diagram to identify two differences between a DNA molecule and an RNA molecule.

- RNA has the nitrogen base uracil, while DNA has thymine.
- RNA is a single strand, while DNA is a double strand.

**HANDS-ON LAB**

Make a model of the process of protein synthesis.

**Literacy Connection**

**Draw Comparative Inferences** Identify locations in both the diagram and the text that describe the similarities and differences between DNA and RNA.

**Literacy Connection**

**Cite Textual Evidence** Underline two sentences that tell how changes to genes in body cells differ from changes to genes in sex cells.

**Literacy Connection**

Every topic targets a critical literacy skill, such as using evidence from texts to make well-defended claims.

Environmental Factors

Organisms interact with their environment on a regular basis. **Figure 8** shows some of the ways you interact with your environment. You may spend time with friends, breathe fresh air, exercise, and enjoy a sunny day. Unfortunately, some of these interactions may change the way a gene is expressed. Gene expression determines how inherited traits appear. The environment can lead to changes in gene expression in several ways. Certain chemicals in tobacco smoke or exposure to the sun’s harmful ultraviolet (UV) radiation may cause changes in the way certain genes behave. These changes alter the way an organism functions and may produce different traits than would normally have been expressed. Though not a guarantee, these changes may cause cancer and other diseases.

Not all changes in genes caused by environmental factors get passed on to offspring. For example, too much UV radiation can damage the DNA in skin cells to the point of causing cancer. These damaged genes, however, do not get passed to the next generation. In order to pass on genes that were changed by the environment, the change must occur in one of the sex cells—egg or sperm—that formed the offspring. Because the genes that were changed were most likely in the body cells, or cells other than sex cells, then the changed genes would not be passed on to you, and would instead affect only the individual with the changed genes.

**Literacy Connection**

**List three acquired behaviors that people have learned to protect themselves from ultraviolet light.**

Sample: wearing long sleeves, wearing pants, using sunscreen, wearing sunglasses, wearing a hat.
Mathematics Standards

**MATH TOOLBOX**

Bring math relevance and depth to science! Integrated math practices apply concepts to real situations.

**Graphing Population Changes**

Changes in a population over time, such as white-tailed deer in Ohio, can be displayed in a graph.

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<th>Year</th>
<th>Population (estimated)</th>
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<tr>
<td>2005</td>
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</tr>
</tbody>
</table>

1. **Represent Relationships**
   - Use the data table to complete a graph of the changes in the deer population. Then describe the trend in the graph.

2. **Cause and Effect**
   - What factors do you think might be responsible for the changes in the deer population?

**READING CHECK**

Summarize Text: How do birth and death rates affect a population’s size?

Formative assessment opportunities help you provide feedback to improve students’ learning.

**Math Toolbox**

- **Construct Graphs**
  - Guide students as they complete the math activity.
  - As a class, fill in the x-axis with increments of 10 and the y-axis on the right side with increments of 200.
  - Ask: How is this graph different from most? (There are two y-axes to show two data sets with very different ranges. We will plot the two data sets using different colors to make it easier to tell them apart.)
  - Have students describe how to plot the first two data points on each set. Then, have students work in pairs to complete the rest of the graph.

- **Represent Relationships**
  - Guide students in completing the Math Toolbox activity.
  - Ask students to write down what they notice about the data in the chart.
  - Project the graph and have volunteers identify each data point on the graph. Connect the points with a line.
  - Ask: What might have caused the change in population?
In a differentiated classroom, all learners have a better chance of mastering the new science standards. *Elevate Science* helps teachers make strong connections between assessment and differentiated instruction.

**Assessment for Three-Dimensional Learning**

**LESSON CHECK**
Formative assessment in every lesson helps you monitor and support student progress.

**EVIDENCE-BASED ASSESSMENT**
Put students on the path to success with practice aligned towards demonstrating their mastery of science concepts.

**PERFORMANCE-BASED ASSESSMENT**
End-of-topic performance assessments allow students to demonstrate mastery of the new science standards.
The stages of primary succession. Integrate Information to ecosystems can be considered part of a natural cycle. All ecosystems change over time. Most changes are gradual, in Frame 3.

Determine Central Ideas highlight the central idea of the text. Note how this idea plant life that is more developed than relationships. [Image -281x-16 to 613x1086]

Differential Instruction provides strategies for supporting struggling students and advanced learners.

Hands-on Lab: 4/17/17 5:48 AM

Go Online to download...

Investigate Lab - 4/19/17 11:06 AM

Observing Decomposers - 

Class Time - 

Group Size - pairs

Materials (per group) - 2-lter plastic bottle, potting soil, kitchen waste, garden waste, plastic wrap, spray water bottle, toothpick (1), pair of scissors (1), rubber band (1), earthworms (5)

Focus on Mastery - 4/19/17 11:07 AM

Connect/Construct Explanations - Organize students into smaller groups. Before they begin the activity, have them discuss the following questions:

• What does a decomposer do? (it breaks down organic material)

• What decomposers do have hairs? they find small pieces. They are not made up of air, they are made up of air, they do not move. They do not eat, they do not move.)

• What decomposers do have feathers? They do not move. They are not made up of air, they do not move.)

Most students will identify moss, soil, and water as needed things. (If the photo of the watering hole happens to help them identify air and gas, great! What needs a thing in the photo cannot be seen, smelled, or touched? Air.)

Guiding Inquiry - 4/19/17 11:06 AM

Find useful procedures to guide inquiry when more support is needed.

Focus on Mastery - 4/19/17 11:07 AM

Help students achieve mastery by focusing on the Science and Engineering Practices.
Transform Learning and Manage Changing Classrooms

Feel confident teaching science! *Elevate Science* helps teachers create a learning culture that’s nimble, personalized, and student-centered. The curriculum includes all needed resources to implement the new science standards identified at point of use.

**Focused on Inquiry-Based Teaching**

*Elevate Science* integrates 5E learning in a new CISD Instructional Model (Connect, Investigate, Synthesize, Demonstrate) and provides an instructional plan designed for today’s blended learning environment. Students expand their current thinking as they investigate real problems, synthesize their knowledge in new situations, and demonstrate their understanding of core ideas.

**5E Learning Intersects with 21st Century Competencies**

- **CONNECT**
  - **ENGAGE** the mind with phenomena, linking what students know to their own personal experiences.

- **INVESTIGATE**
  - **EXPLORE** concepts and ideas while constructing knowledge and building meaning.

- **SYNTHESIZE**
  - **EXPLAIN** and **ELABORATE** understanding by formulating ideas, arguments, and solutions using evidence.

- **DEMONSTRATE**
  - **ELABORATE** and **EVALUATE** arguments by applying newly formed understandings and transferring knowledge to new situations.
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MAKE IT YOUR OWN
Add Google docs and OpenEd resources! Modify content and assignments. Easily integrate your class rosters.

WORK OFFLINE OR ONLINE
The Realize™ Reader eText lets students work offline. Everything stays in sync when reconnected to the web.

For a full description of our online resources, visit PearsonSchool.com/ElevateSci