



PLTW Launch & NGSS

**Project Lead The Way Networking Conference
Worcester Polytechnic Institute
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Ginger Teague, PhD

Senior Director of Professional Development

Project Lead The Way



Agenda

- Consider exciting changes in the works for the PLTW Launch program
- Explore how NGSS performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts are addressed in the PLTW Launch modules—new and current modules
- Examine how the changes will impact your current program

PLTW Launch – expanding access for all



Chromebooks

- Easy access
- Organized materials
- All curriculum
- Teacher resources



Available in Spanish

- Curriculum
- Teacher Guides
- Intro Stories
- Vocabulary Cards
- Launch Logs
- Digital Media
- more...

PLTW Launch is expanding...

- Addition of **12 modules** to serve the needs of even more schools and to help them meet their state's standards
- New modules will be **available beginning next school year**
- Addition of these modules provides **full coverage of Next Generation Science Standards**
- Additional modules will offer the same hands-on, collaborative experience and scaffolded student learning through the **same APB approach** found in all other PLTW Launch modules

New PLTW Launch Modules for 2020-21

Grade Level	# Current Modules	# New Modules
PreK	4	-
K	4	2
1	4	1
2	4	1
3	4	3
4	4	4
5	4	4

- New modules designed to address NGSS
 - Incorporate three dimensional learning
 - Provide full coverage of NGSS performance expectations across the PLTW Launch program
- Pathway designations TBD
- Released to the network in 2020-2021 school year



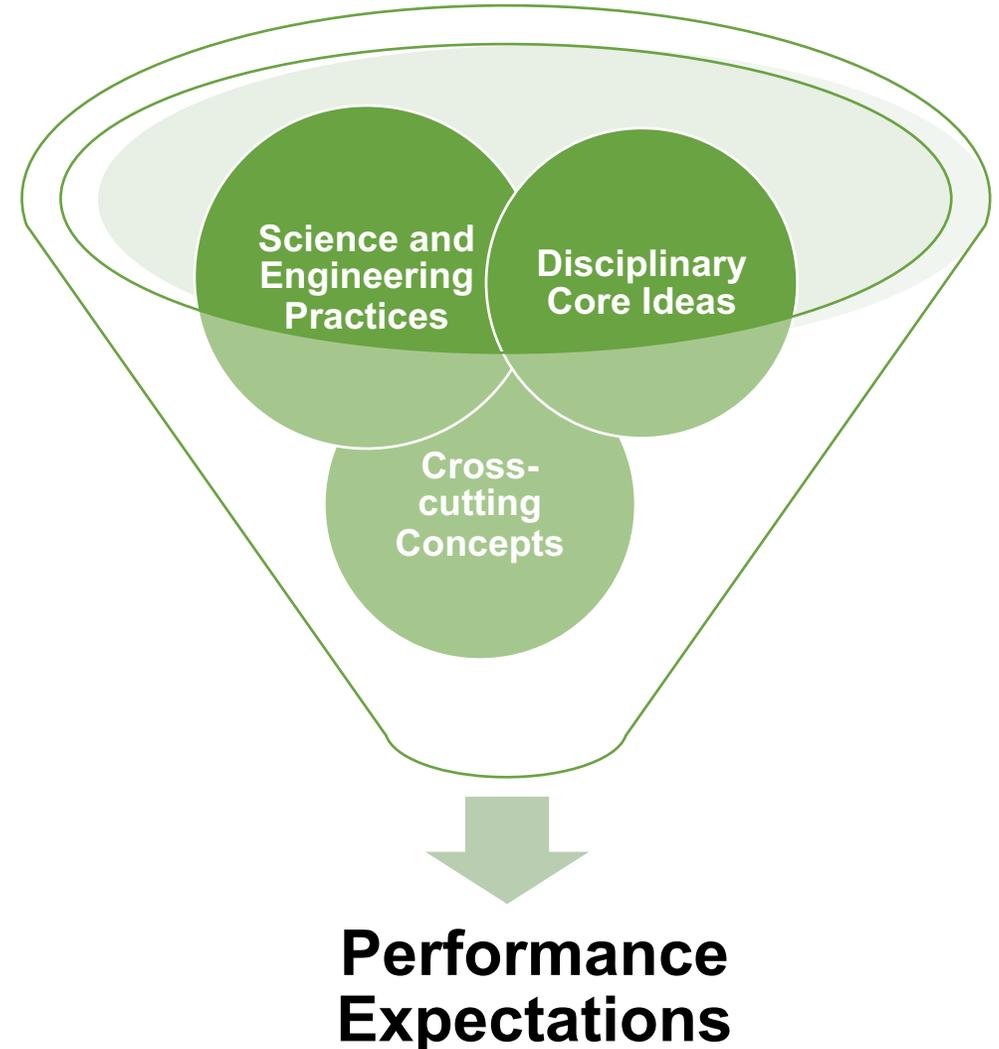
Full Coverage of NGSS

What does that mean?

NGSS Performance Expectations

Rather than standards or objectives to be checked off...

- PEs set the learning goals for students, but they do not describe how the student gets there.
- PEs are expectations of what students should be able to do to demonstrate/apply learning by the end of instruction.



Next Generation Science Standards

NGSS calls for **three dimensional learning** that is “designed to help realize a vision for education in the sciences and engineering in which students, over multiple years of school, actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields” (NRC, p. 11).



Dimension 1: Science and Engineering Practices (SEPs)

- Engage in practices of scientists and engineers
 - Scientists investigate the natural world.
 - Engineers do to design and build systems.

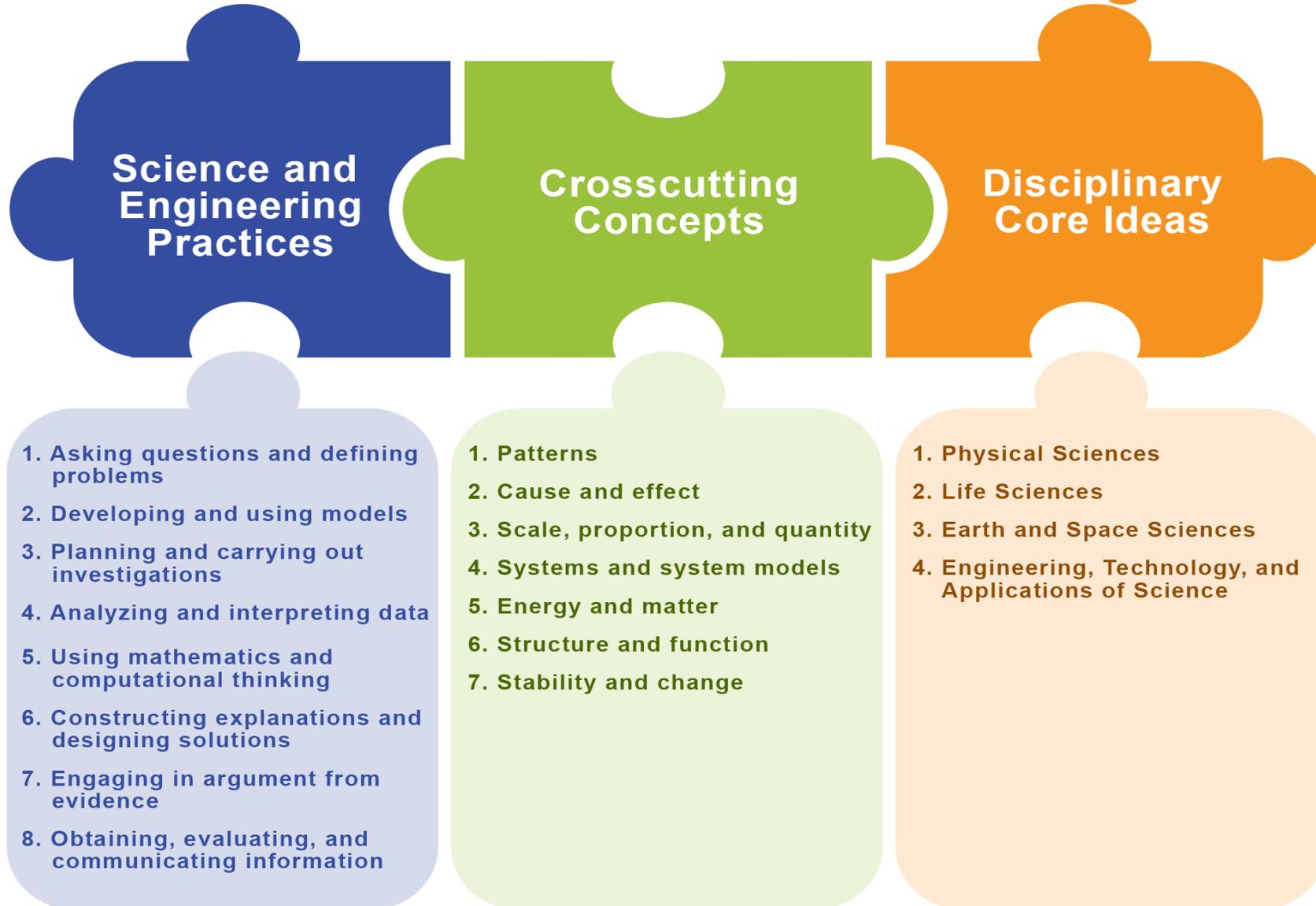
Dimension 2: Crosscutting Concepts (CCCs)

- Explore connections across the four domains of science

Dimension 3: Disciplinary Core Ideas (DCIs)

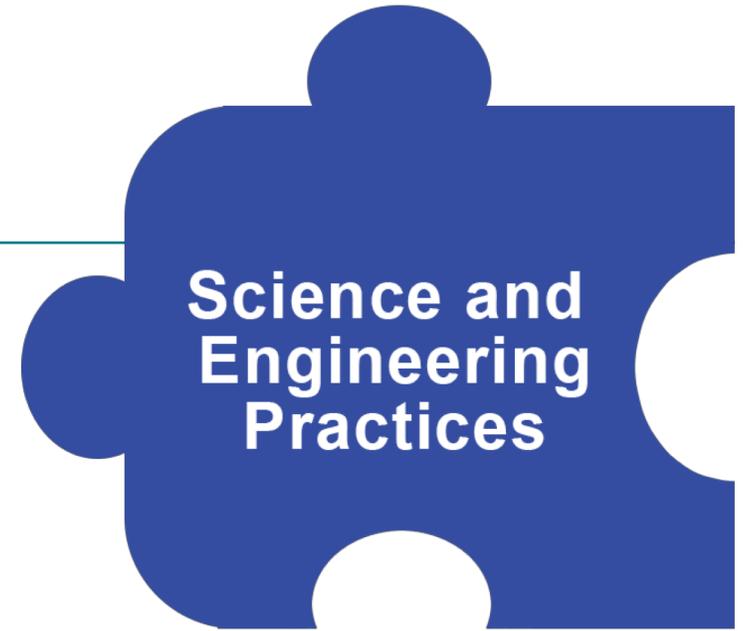
- Experience the key ideas in science that have broad importance within or across multiple science or engineering disciplines

Three Dimensional Learning



Science and Engineering Practices

- Asking Questions and Defining Problems
- Developing and Using Models
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Using Mathematics and Computational Thinking
- Constructing Explanations and Designing Solutions
- Engaging in Argument From Evidence
- Obtaining, Evaluating, and Communicating Information

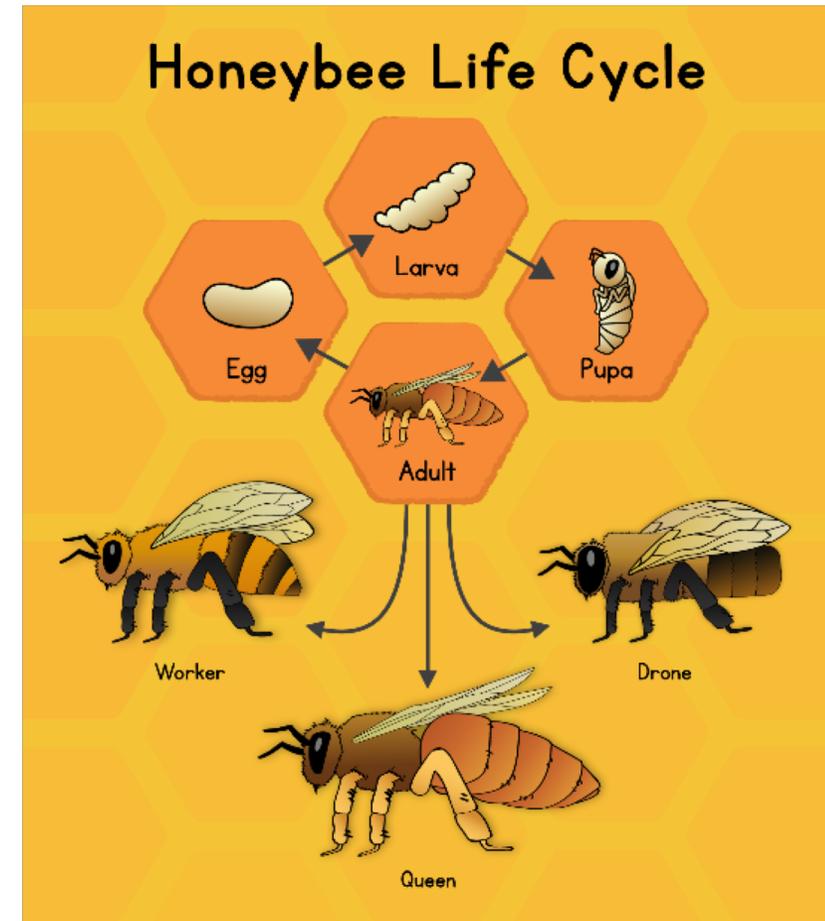


What does this look like in PLTW Launch?

- **Life Cycles and Survival**

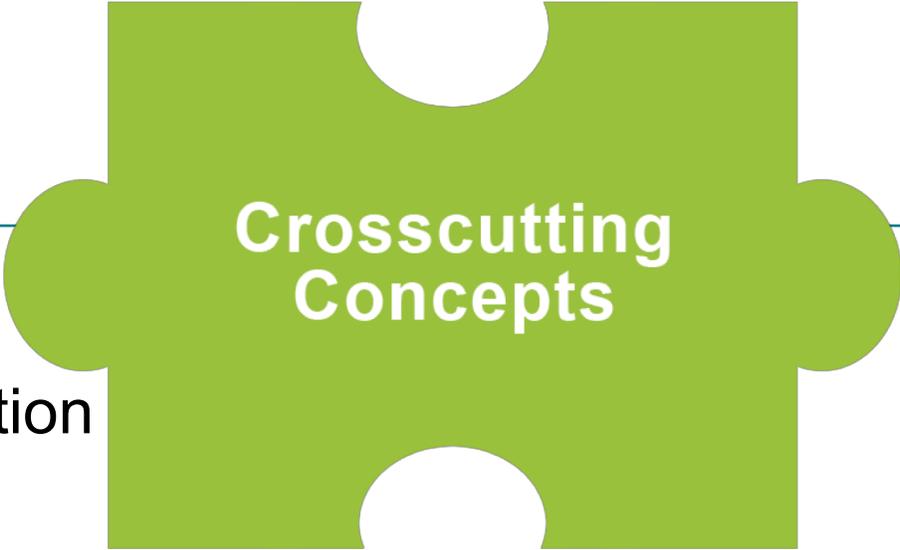
- Developing and Using Models

- Students learn about the life cycles of several different animals. They record the life cycle models in their Launch Logs.
- Problem: How can we design a bee habitat model that promotes bee survival and meets the needs of bees?



Crosscutting Concepts

- Patterns
- Cause and Effect: Mechanism and Explanation
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter: Flows, Cycles, and Conservation
- Structure and Function
- Stability and Change



Crosscutting
Concepts

What does this look like in PLTW Launch?

- **Environmental Changes**
 - **Systems and System Models** A system can be described in terms of its components and their interactions.
 - **Scale, Proportion, and Quantity** Observable phenomena exist from very short to very long time periods.
 - **Patterns** Patterns of change can be used to make predictions.
 - **Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.



Disciplinary Core Ideas



Physical Sciences

- Matter and Its Interactions
- Motion and Stability: Forces and Interactions
- Energy
- Waves and Their Applications in Technologies for Information Transfer

Life Sciences

- From Molecules to Organisms: Structures and Processes
- Ecosystems: Interactions, Energy, and Dynamics
- Heredity: Inheritance and Variation of Traits
- Biological Evolution: Unity and Diversity

Earth and Space Sciences

- Earth's Place in the Universe
- Earth's Systems
- Earth and Human Activity

Engineering, Technology, and Applications of Science

- Engineering Design
- Links Among Engineering, Technology, Science, and Society

What does this look like in PLTW Launch?

- **Variation of Traits**

- LS3.A Inheritance of Traits**

- Many characteristics of organisms are inherited from their parents. Other characteristics result from individuals' interactions with the environment, which range from diet to learning. Many characteristics involve both inheritance and environment.

- LS3.B Variation of Traits.**

- Different organisms vary in how they look and function because they have different inherited information. The environment also affects the traits that an organism develops.

- LS4.B Natural Selection.**

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.



Why is Launch “connected” to NGSS instead of “aligned”?

- NGSS uses Achieve, an independent, nonpartisan, nonprofit education reform organization, to verify high-quality science units.
- Achieve does not use the term “aligned”. This term has come to represent a practice that is insufficient to address the innovations in NGSS. They use the term “designed for” because it reflects the degree to which the innovations represented by the standards are a foundational aspect of both the organization and content of the instructional materials.

What about the current PLTW Launch modules?



- All modules built using the APB instructional approach
- Modules designed to address standards including NGSS, CCSS (ELA & Math), and CSTA K-12 Computer Science Standards
- Modules can be implemented flexibly to meet the needs of school programs



How will the changes impact our PLTW Launch program?

How does the expansion impact implementation flexibility?

Schools continue to have flexibility to implement PLTW Launch modules in the way that best meets the needs of their students.



Equipment and Supplies

- Equipment and supplies for new module to implement the new modules will be listed—with total estimated pricing for kits—in the Store in myPLTW in January 2020.
- For planning purposes, participating schools can anticipate that their initial investment in kits per module (30-student classroom) will range from \$250-\$350, which is similar to the cost of other PLTW Launch modules.

What does this mean for professional development?

- For teachers already credentialed in PLTW Launch, there will be **no** additional professional development investment required to implement the new modules.
- New classroom teachers will have the option to participate PLTW Launch Classroom Teacher Training to obtain a PLTW Launch Classroom Teacher credential.
- Teachers will have access to a library of asynchronous module-specific professional development resources designed to prepare teachers for each module.

The image displays three overlapping professional development resources from PLTW:

- Computational Thinking:** A slide titled "Computational Thinking" under the heading "Professional Development - Teacher Resources". It defines computational thinking as a problem-solving process with characteristics like formulating applications, logical organization, representation, automation, and efficient analysis. It lists supported dimensions: confidence with complexity, persistence in difficult problems, recovery from failure, and the ability to formulate open-ended questions.
- Developing Spatial Thinking in the Early Years:** A slide explaining that children are naturally curious and develop spatial language early. It notes that children aged 3-6 are ready to develop skills in expressing directions and understanding relative positions. It describes the PLTW Launch scaffolded approach using conversational games and maps.
- DEVELOPING SPATIAL THINKING IN THE EARLY YEARS:** An infographic with "BIG IDEAS" and "ACTIVITIES TO BUILD SPATIAL THINKING".
 - BIG IDEAS:**
 1. Ask students questions about the positions and spatial locations of objects.
 2. Model how to use spatial words correctly when you're speaking to students.
 3. Know where your students are in their spatial development so you can provide appropriate instruction.
 - ACTIVITIES TO BUILD SPATIAL THINKING:**
 - Model the use of simple maps
 - Use simple maps for simple tasks
 - Make literature connections and use literature that refers to spatial relations and spatial language
 - Code and interactive robotic device to maneuver through a grid with obstacles.
 - Draw a map of a familiar place
 - Puzzles
 - Mazes
 - Tanagrams
 - Blocks and other construction materials
 - Movement games
 - Songs

Questions



How can I learn more?

<https://www.pltw.org/fall-2020-release>



Contact Information

PLTW Solution Center

Our friendly PLTW Solution Center Team Members are here to answer all your questions.

For live, one-on-one support seven days a week, contact the PLTW Solution Center.

Email: solutioncenter@pltw.org

Phone: 1-877-335-PLTW (7589)



Ginger M. Teague, PhD
gteague@pltw.org
@GingerTeague

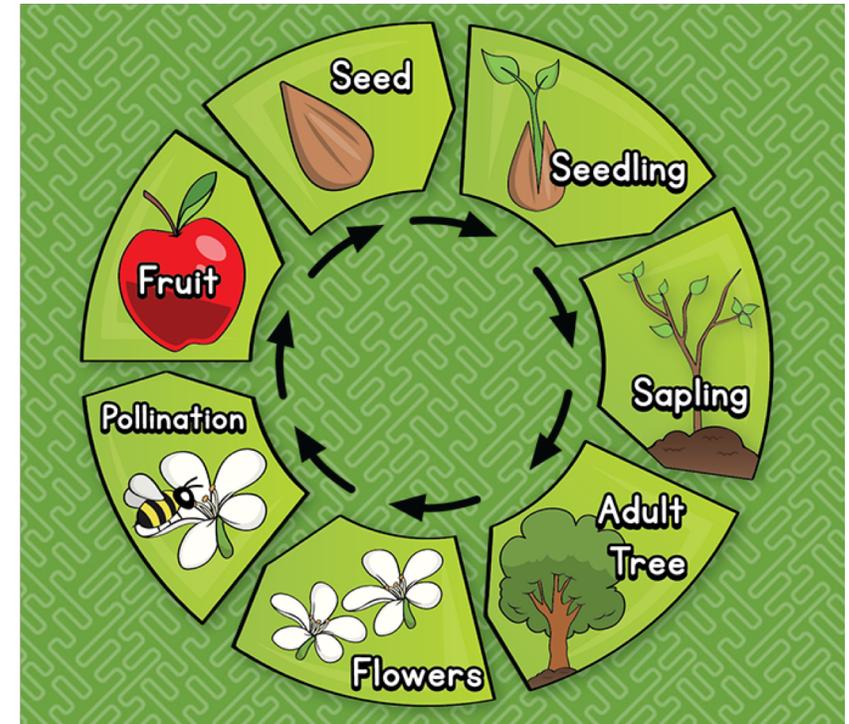
3rd Grade Beta Module—Environmental Changes

- In this module, students learn about Earth's habitats and how these habitats support life. Students examine fossils and investigate what fossils reveal about how organisms and habitats adapt and change over time. Students identify factors that cause environmental changes and simulate the effect the environmental changes have on living things.
- After students establish an understanding of environmental change and possible consequences to habitats and organisms, they take a deeper look at specific examples of environmental changes in their own habitat. Students use the design process to explore one problem caused by environmental change and develop an action plan to reduce or stop future damage.



3rd Grade Beta Module—Life Cycles and Survival

- In this module, students are introduced to life cycles. Students compare and contrast different animal life cycles to identify common features and specific differences. Students deepen their understanding of life cycles as they investigate the life cycle of honeybees. They learn that worker bees have an important relationship with flowering plants that connects their life cycles.
- Students analyze the benefits and disadvantages of solitary animal life versus group life. They investigate whether living in a group makes honeybees more or less susceptible to decline. Applying skills and knowledge learned from the activities and project, students design a bee habitat that promotes the survival of bees. They create a public service campaign to share their designs to raise awareness of the importance of bees.



3rd Grade Beta Module—Weather: Factors and Hazards

In this module, students explore, collect, and classify data related to three factors that affect weather: precipitation, temperature, and wind. They contrast weather and climate, relying on the three factors in their descriptions. Students explore different types of weather hazards, including those in their region. They design a solution that reduces the impact of a weather-related hazard.



3rd Grade Beta Module—Variation of Traits

- In this module, students investigate the differences between genetic traits that are inherited and traits that are influenced by the environment. Students learn about dominant and recessive alleles, as they explore the phenomenon that offspring may express different traits than parents. Students apply this knowledge as they use a Punnett square to document possible genotypes and phenotypes of offspring.
- In the problem, students select four inherited traits for two fictitious parent animals. Students follow the design process to explore, sketch, build, and evaluate an offspring of the parent animals that's able to survive in a specific environment. Students use data to support their explanation of the inherited traits passed from the parents to the offspring.

