Science and Technology/Engineering (STE) Grades 5, 8, and High School

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Features of Science and Technology/Engineering (STE)

- **Core idea** is based on the discipline. (e.g., **Energy**, Physical Science)
- Encourages a **range of instructional approaches** for each core idea.
- Allows educators to teach and assess a cohesive **unit of science instruction**, rather than assessing single skills in isolation.
- Encourages assessment of **multiple entry points (or access skills) in a single-strand**
- Promotes **cross-curriculum** opportunities.
- Includes the use of **8 science practices** that promote engagement in scientific inquiry and engineering design skills

These 8 science practices promote engagement in scientific investigations

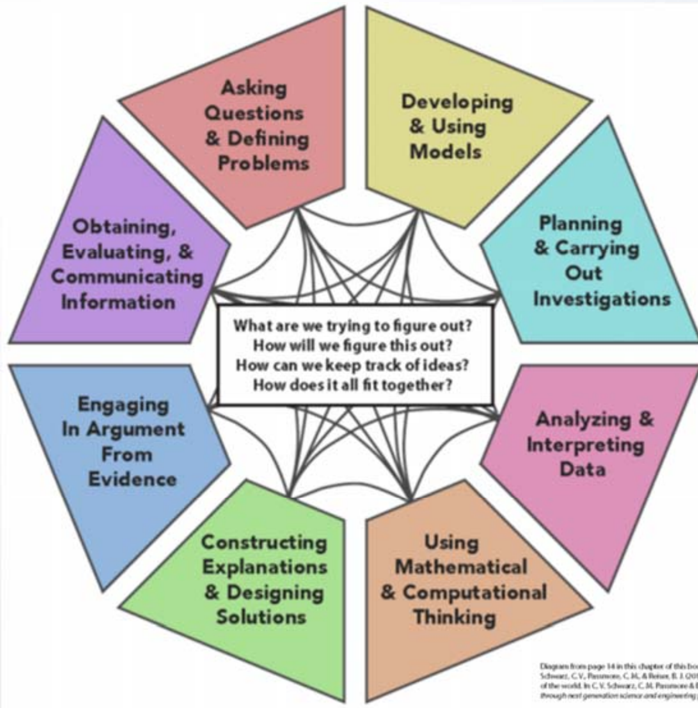
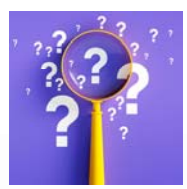


Diagram from page 14 in this chapter of this book:
Schwarz, C.V., Passmore, C.M., & Reiser, B. J. (2017). *Moving beyond "knowing" science to making sense of the world.* In C.V. Schwarz, C.M. Passmore & B. J. Reiser (Eds.), *Helping students make sense of the world through next generation science and engineering practices* (pp. 3-21). Arlington, VA: NSTA Press.

nextgenstorylines.org

The 8 Science Practices



Investigating and Questioning Group:

1. ***Asking (Scientific) Questions and Defining Problems***
2. ***Planning and Carrying Out Investigations*** to gather data and perform experiments to answer a scientific question

Mathematics and Data Group:

3. ***Using Mathematical and Computational Thinking*** to answer scientific questions
4. ***Analyzing and Interpreting Data*** to recognize patterns and analyze and organize data

Science Practices (cont'd)

Evidence, Modeling, and Reasoning Group:

5. ***Developing and Using Models*** to think about and make sense of an experience, and make predictions, using tangible tools, displays, and illustrations
6. ***Constructing Explanations and Designing Solutions*** to explain phenomena and use evidence to support explanations
7. ***Engaging in Argument from Evidence*** to support a claim and critique competing arguments
8. ***Obtaining, Evaluating, and Communicating Information*** to evaluate and present information from scientific texts from multiple sources

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Requirements for STE MCAS-Alt

For STE (grades 5, 8, and high school), each MCAS-Alt strand must include:

- One **MCAS-Alt Skills Survey** for all STE (all 8 practices)
- A total of **three entry points/access skills** for *each* core idea
  - Each entry point/access skill reflects a *different* Science Practice (a total of **3** different Science Practices).
  - Each activity from the entry point/access skill must be documented on an STE Summary Sheet (a total of **3** STE Summary Sheets).
  - Each activity must reflect the science practice listed in the entry point. (**3** pieces of evidence with the corresponding STE Summary Sheets)

STE data and evidence may be collected during the current and the previous school year.

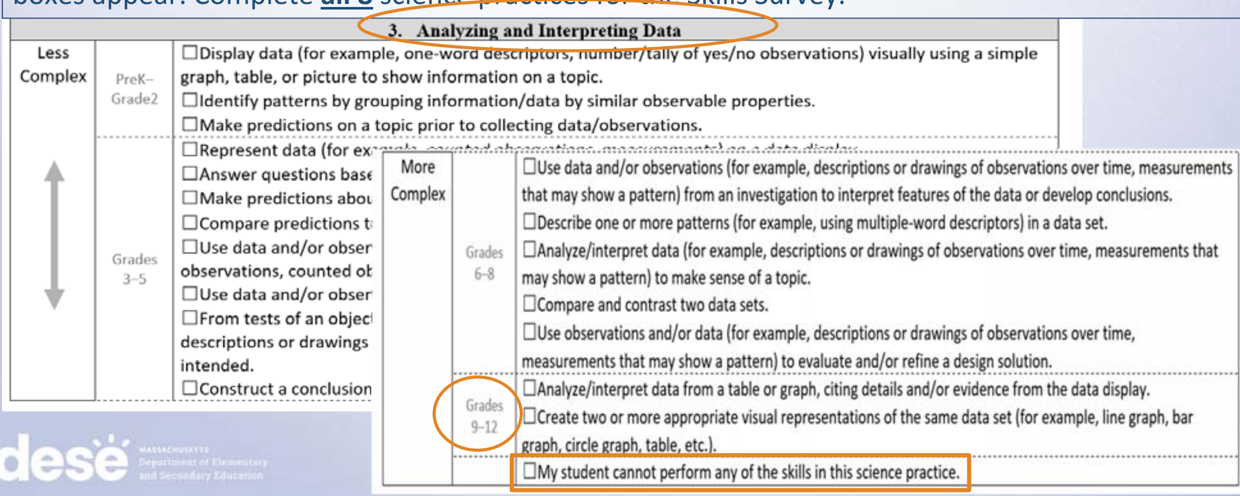
MCAS-Alt STE Skills Survey

1. STE Skills Survey is completed once for each student in all eight science practices.
2. Teachers should check boxes to see if a student can perform the practice independently, at least sometimes.
3. Then, the teacher will select entry points for assessment in the science practice at the highest grade span in which the checked boxes appear.
4. Entry points may be selected from different grade spans for each science practice, as determined by the results of the Skills Survey.

Teachers working with students at the access skill level will check the box, "*My student cannot perform any skills in science practice.*"

MCAS-Alt STE SKILLS SURVEY
Example: Science Practice #3

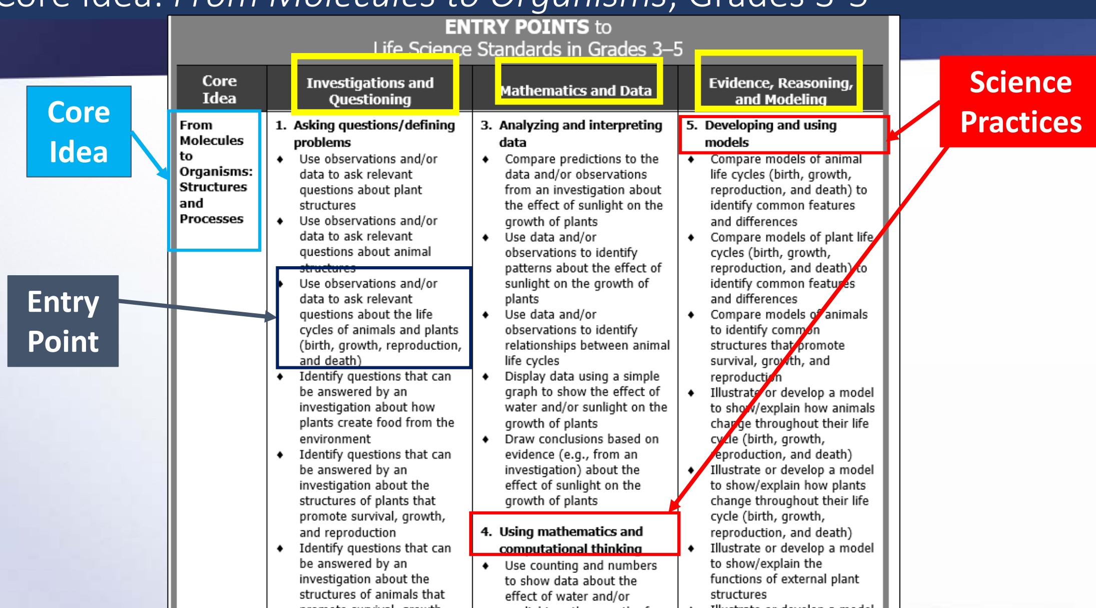
Directions: Check the boxes below for each task that the student can perform independently, at least some of the time. Then, select an entry point from the highest-grade span in which checked boxes appear. Complete **all 8** science practices for the Skills Survey.



MCAS-Alt STE Resource Guide

- The *STE Resource Guide and Forms and Graphs online* lists entry points in grade spans **PreK–2**, **3–5**, **6–8,** and **High School**.
- Access skills have their own section at the beginning of each discipline.
- Each discipline has **core ideas**.
- Each core idea has a list of related topics.

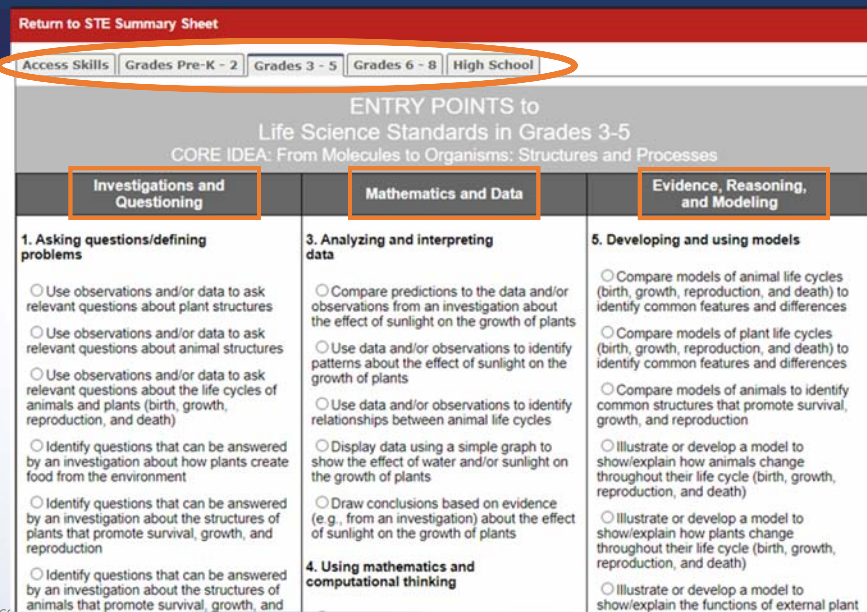
Excerpt from *STE Resource Guide*: Life Science Core Idea: *From Molecules to Organisms*, Grades 3-5



ENTRY POINTS to
Life Science Standards in Grades 3–5

Core Idea	Investigations and Questioning	Mathematics and Data	Evidence, Reasoning, and Modeling
From Molecules to Organisms: Structures and Processes	**1. Asking questions/defining problems** ♦ Use observations and/or data to ask relevant questions about plant structures ♦ Use observations and/or data to ask relevant questions about animal structures ♦ Use observations and/or data to ask relevant questions about the life cycles of animals and plants (birth, growth, reproduction, and death) ♦ Identify questions that can be answered by an investigation about how plants create food from the environment ♦ Identify questions that can be answered by an investigation about the structures of plants that promote survival, growth, and reproduction ♦ Identify questions that can be answered by an investigation about the structures of animals that promote survival, growth,	**3. Analyzing and interpreting data** ♦ Compare predictions to the data and/or observations from an investigation about the effect of sunlight on the growth of plants ♦ Use data and/or observations to identify patterns about the effect of sunlight on the growth of plants ♦ Use data and/or observations to identify relationships between animal life cycles ♦ Display data using a simple graph to show the effect of water and/or sunlight on the growth of plants ♦ Draw conclusions based on evidence (e.g., from an investigation) about the effect of sunlight on the growth of plants **4. Using mathematics and computational thinking** ♦ Use counting and numbers to show data about the effect of water and/or sunlight on the growth of	**5. Developing and using models** ♦ Compare models of animal life cycles (birth, growth, reproduction, and death) to identify common features and differences ♦ Compare models of plant life cycles (birth, growth, reproduction, and death) to identify common features and differences ♦ Compare models of animals to identify common structures that promote survival, growth, and reproduction ♦ Illustrate or develop a model to show/explain how animals change throughout their life cycle (birth, growth, reproduction, and death) ♦ Illustrate or develop a model to show/explain how plants change throughout their life cycle (birth, growth, reproduction, and death) ♦ Illustrate or develop a model to show/explain the functions of external plant structures ♦ Illustrate or develop a model

Forms and Graphs


Return to STE Summary Sheet

Access Skills | Grades Pre-K - 2 | Grades 3 - 5 | Grades 6 - 8 | High School

ENTRY POINTS to
Life Science Standards in Grades 3-5
CORE IDEA: From Molecules to Organisms: Structures and Processes

Investigations and Questioning	Mathematics and Data	Evidence, Reasoning, and Modeling
1. Asking questions/defining problems	3. Analyzing and interpreting data	5. Developing and using models
○ Use observations and/or data to ask relevant questions about plant structures	○ Compare predictions to the data and/or observations from an investigation about the effect of sunlight on the growth of plants	○ Compare models of animal life cycles (birth, growth, reproduction, and death) to identify common features and differences
○ Use observations and/or data to ask relevant questions about animal structures	○ Use data and/or observations to identify patterns about the effect of sunlight on the growth of plants	○ Compare models of plant life cycles (birth, growth, reproduction, and death) to identify common features and differences
○ Use observations and/or data to ask relevant questions about the life cycles of animals and plants (birth, growth, reproduction, and death)	○ Use data and/or observations to identify relationships between animal life cycles	○ Compare models of animals to identify common structures that promote survival, growth, and reproduction
○ Identify questions that can be answered by an investigation about how plants create food from the environment	○ Display data using a simple graph to show the effect of water and/or sunlight on the growth of plants	○ Illustrate or develop a model to show/explain how animals change throughout their life cycle (birth, growth, reproduction, and death)
○ Identify questions that can be answered by an investigation about the structures of plants that promote survival, growth, and reproduction	○ Draw conclusions based on evidence (e.g., from an investigation) about the effect of sunlight on the growth of plants	○ Illustrate or develop a model to show/explain how plants change throughout their life cycle (birth, growth, reproduction, and death)
○ Identify questions that can be answered by an investigation about the structures of animals that promote survival, growth, and	4. Using mathematics and computational thinking	○ Illustrate or develop a model to show/explain the functions of external plant

- Each tab reveals grade spans from which to choose entry points
- Entry points are embedded in each science practice
- Science practices are listed under each grouping.
- Access Skills has a separate tab.

Educator's Manual, pp. 35-39

Requirements for Grades 5 and 8 STE

Complete one MCAS-Alt Skills Survey. (One survey for all eight practices)

Select <u>three</u> of the four disciplines to assess:

- **Earth and Space,**
- **Physical Science,**
- **Life Science,**
- **Technology/Engineering**

Step-by-Step Requirements for Grades 5 and 8 STE

One Core Idea per discipline.

- For *each* discipline review the list of related topics *before* selecting **a core idea.**

(1) Student's Name: **Sample Student**

(2) Student's grade as reported in the Student Information Management System (SIMS): **05**

(3) STE Discipline: **LIFE SCIENCE**

View topics based on Life Science Core Ideas

(4) Core Idea: Select | **Use this Core Idea**

Learning Standard: | **Use this Standard** | **Resource Guide**

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Educator's Manual, pp. 35-39

Related Topics for Core Ideas:

Topics for Core Ideas in Life Science

From Molecules to Organisms

- Plants and animals' structure and parts
- The senses FOR ALL ANIMALS
- Life cycles of plants and animals (including reproduction)
- Plants and animals' necessities for living
- Cells and cell structures (including unicellular vs multicellular)
- Photosynthesis
- Plant and animal cells
- Food molecules
- Carbohydrate, protein, fat and nucleic acid (organic molecules)
- Body systems
- Transcription & Translation
- Homeostasis
- Cell cycle
- Cellular Respiration

Educator's Manual, pp. 35-39

Step-by-Step Requirements for Grades 5 and 8 STE

Select three (3) entry points/access skills aligned with the core idea. Preferably one from each group:

- Investigations and Questioning,
- Mathematics and Data,
- Evidence, Reasoning, and Modeling

Choose 3 pieces of primary evidence based on the entry point/access skill you chose. Each piece of evidence must reflect a different science practice (#1-8) and complete an STE Summary Sheet to accompany the evidence. (similar to a work description)

- Access skills must be addressed during a standard-based activity.
- Include examples of self-evaluation.

Step-by-Step Requirements for Grades 5 and 8

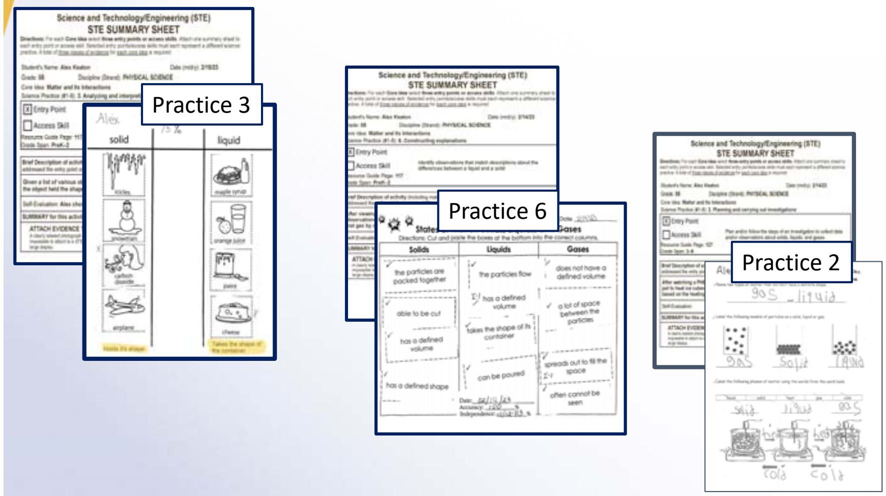
Select three (3) entry points/access skills aligned with the core idea. Preferably one from each group:

- Investigations and Questioning,
- Mathematics and Data,
- Evidence, Reasoning, and Modeling

Choose 3 pieces of primary evidence based on the entry point/access skill you chose. Each piece of evidence must reflect a different science practice (#1-8) and have a corresponding completed STE Summary Sheet. (similar to a work sample description)

- Access skills must be addressed during a standard-based activity.
    - Include examples of self-evaluation.

Sample of Requirements for *one* Core Idea



- **3 STE Summary Sheets**
- **3 corresponding pieces of evidence**
- **3 different science practices**
- **All based on ONE core idea**

Complete One STE Summary Sheet for Each Entry Point or Access Skill

Name, Date, Grade, Discipline, Core Idea, Science Practice #

Summarize students' percentage of accuracy and independence on responses for the attached work sample.

Science and Technology/Engineering (STE)
STE SUMMARY SHEET

Directions: Complete and submit **one summary sheet for each selected entry point or access skill** in the core idea (total of 3 summary sheets are required for each core idea). Document at least **three different science practices** amo the three summary sheets. Attach **three pieces of primary evidence**, each to its corresponding STE Summary Sheet.

Student's Name: ____________________ **Date (m/d/y):**__________

Grade: ________ **Discipline (Strand):** ____________________

Core Idea: ____________________**Science Practice (#1–8):** ______

☐ **Entry Point**
☐ **Access Skill**
esource Guide, Page: ______
rade Span: ____________

List the Entry Point or Access Skill here:

Entry Point or Access Skill

escription of Activity (including materials, instructional approach, and how the student addressed the entry oint or access skill):

Activity description

Self-Evaluation:

Self-evaluation is a text box

SUMMARY for this activity: **Accuracy:** _______% **Independence:** _______%

EVIDENCE must be ATTACHED

Three pieces of evidence must be attached to its corresponding STE Summary Sheet.

A clearly labeled photograph with a detailed description may be substituted for evidence that may be difficult or impossible to attach to a STE Summary Sheet, including large, fragile, or temporary products, such as a model or a large display.

STE Strand Cover Sheet: One for Each Core Idea

Check the Strand Cover Sheet:

- ✓ 3 Summary Sheets
- ✓ 3 Different Practices
- ✓ 3 Pieces of Evidence
- ✓ 2 Self-Evaluations

Science and Technology/Engineering (STE)
STE STRAND COVER SHEET

(A completed STE Strand Cover Sheet must be included at the beginning of each STE discipline.)

1) Student's Name: ______________________________
2) Student's grade as reported in the Student Information Management System (SIMS): _______
3) STE Discipline: ______________________________
4) Core Idea: ______________________________

List each STE Summary Sheet included in the STE MCAS-Alt (three are required):

Practice # (1–8)	Date	STE Summary Sheet Description	Self-Evaluation (Y/N)

(Add rows for additional STE Summary Sheets, if included in the strand.)

STE Requirements for High School

High School Science and Technology (STE)

Educator's Manual, p. 37

STEPS to COMPLETE a STRAND:

Step 1: Complete **one** Skills Survey (all eight science practices)

Step 2: Choose **one** discipline:

- **Biology OR Introductory Physics**

Step 3: Choose **3 *different* Core Ideas** from the chosen discipline.

Step 4: Select **three (3) entry points/access skills** for *each* core idea. Review the entry points in the eight different practices.

Each entry point/access skill must represent a *different* science practice.

(a total of 3)

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High School Science and Technology (STE)

Educator's Manual, p. 37

Step 5: Complete and submit one STE Summary Sheet for *each* entry point/access skill.

Include:

- Student's Name and Date of activity
- Core Idea
- Entry Point or Access Skill addressed in the activity
- 3 different Science Practices (1–8) documented in the evidence
- % Accuracy and % Independence for each task or response, plus overall percent
- Description of each activity

Step 6: Submit three pieces of primary evidence for each entry point/access skill. Attach to corresponding Summary Sheet and include in the binder.

- Work samples, photos, and/or videos may be submitted.
- Include any examples of self-evaluation.

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High School: Introductory Physics

Choose 3 of the 4 Core Ideas

Introductory Physics

Core Idea	Access Skills	High School
Matter and Its Interactions	Pages 107–109	Pages 200, 204
Motion and Stability: Forces and Interactions	Pages 110–111	Pages 200–201, 204–206
Energy	Pages 112–114	Pages 201–202, 206–208
Waves and Their Applications in Technologies for Information Transfer	Pages 114–116	Pages 203, 208–210

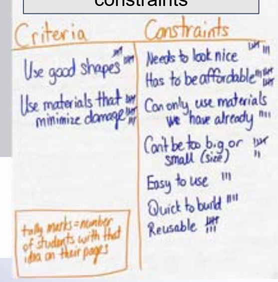
Introductory Physics: What it Could Look Like (Examples)

Core Idea: Motion and Stability

Science Practice #1: Asking Questions/Defining Problems

Entry Point	What it could look like…
Determine criteria and constraints to define a design problem about minimizing the force of an impact in a collision. (STE Resource Guide, p. 204)	Brainstorm a list of items that need protection from collisions. Select one together and scribe the student's ideas for criteria and constraints.

Phone case criteria and constraints



Introductory Physics: What it Could Look Like (Examples cont'd)

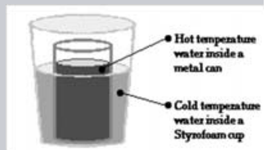
Core Idea: Energy

Science Practice #3: Analyzing and Interpreting Data

Entry Point	What it could look like…
Analyze data from a table or graph that includes the temperatures of two substances in thermal contact over time (STE Resource Guide, p. 207)	Students make observations of a system where a small cup of hot water is placed inside a larger cup of hot water. They measure the temperature at least twice. They describe what they see. Sentence frames/stems may be appropriate.

		0 min	5 min	Temp change
Inside	Hot	43.0	23.0	**-20.0**
Outside	Cold	8.0	23.0	**+15.0**

When the hot and cold cups are touching, the temperature of the hot water decreases, and the temperature of the cold water increases. After 5 minutes, both cups are at the same temperature.



Introductory Physics: What it Could Look Like (Examples cont'd)

Core Idea: Waves and Their Applications in Technologies for Information Transfer

Science Practice #5: Developing and Using Models

Entry Point	What it could look like…
Construct a model to explain the behavior of a wave (STE Resource Guide, p.208)	Students can use a slinky to demonstrate transverse wave resonance as well as longitudinal wave resonances.

Material:
- Slinky
- Two chairs
- About 10 feet of 20-pound test monofilament fishing line
- Masking tape

Optional: substitute for nylon line, a smooth tabletop

High School: Biology

Choose 3 of the 4 Core Ideas

Biology

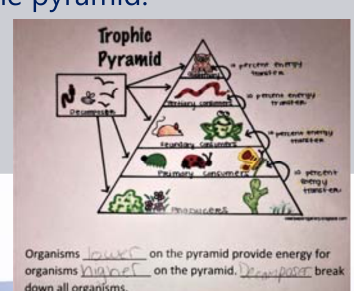
Core Idea	Access Skills	High School
From Molecules to Organisms: Structures and Processes	Pages 51–53	Pages 181–182, 186–189
Ecosystems: Interactions, Energy, and Dynamics	Pages 53–55	Pages 182–184, 189–192
Heredity: Inheritance and Variation of Traits	Pages 56–58	Pages 184–185, 193–195
Biological Evolution: Unity and Diversity	Pages 58–60	Pages 185, 195–198

Biology: What it Could Look Like

Core Idea: Ecosystems: Interactions, Energy, and Dynamics

Science Practice #6: Constructing Explanations and Designing Solutions

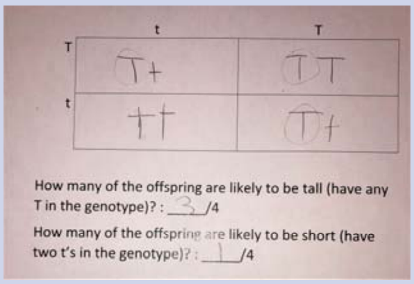
Entry Point	What it could look like...
Construct an explanation to describe the role of producers, consumers, and decomposers in an ecosystem, based on a variety of sources (e.g., model, research, investigation, simulation) (STE Resource Guide, p. 191)	Use an energy or trophic level pyramid to help explain the roles of producers, consumers, and decomposers by showing where they are located on the pyramid.



Biology: What it Could Look Like

Core Idea: Heredity: Inheritance and Variation of Traits

Science Practice #3: Analyzing and interpreting data

Entry Point	What it could look like…
Analyze data from a Punnett square or pedigree to determine the inheritance patterns of a particular trait (STE Resource Guide, p. 193) 	Use information about dominant and recessive forms of traits to create a Punnett square that predicts the genotypes and phenotypes of off-springs. For example: Height **T** is **dominant** for **tall** trait and **t** is **recessive** for **short** trait. If a short plant is crossed with a hybrid tall plant what is the likelihood that the offspring will be short?

	t	T
T	Tt	TT
t	tt	Tt

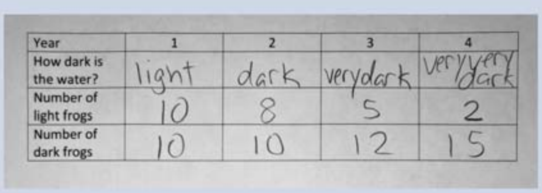
How many of the offspring are likely to be tall (have any T in the genotype)? : 3/4

How many of the offspring are likely to be short (have two t's in the genotype)? : 1/4

Biology: What it Could Look Like

Core Idea: Biological Evolution: Unity and Diversity

Science Practice #2: Planning and carrying out investigations

Entry Point	What it looks like…
Select and/or create the appropriate table or organizer to collect data from an investigation of natural selection (e.g., natural selection game) (STE Resource Guide, p. 196) 	Students watch a video about natural selection and create a data table showing the results. For example: an investigation involving populations of frogs living in a pond where the water gets darker each year over a period of 4 years. Student creates a table showing what happened to the number of light and dark colored frogs in the pond over time.

Year	1	2	3	4
How dark is the water?	light	dark	verydark	veryvery dark
Number of light frogs	10	8	5	2
Number of dark frogs	10	10	12	15

Entry points increase in complexity from one grade span to another within each science practice (example)

(Core Idea—Biological Evolution: Unity and Diversity
(Practice #3, Analyzing and Interpreting Data)

- Analyze and interpret data to make sense of the process of natural selection in a plant or animal population.
  (Grades 6-8)
- Draw conclusions based on evidence (e.g., from an investigation) about features of animals that enable them to survive in their habitat (e.g., thick fur in a cold climate, webbed feet in frogs, protective coloration).
  (Grades 3-5)
- Display data using a simple graph or pictures to show living things in a local habitat (e.g., school yard).
  (Grades Pre-K-2)

Tools and Materials for Supporting the Development of a Cohesive STE Unit

STE Resources

- To support high-quality science experiences for *all* students, DESE encourages educators to use and adapt a high-quality science and technology unit.
- The high-quality unit supports the shifts in practice from pulling activities together from a variety of sources to a more coherent experience for students.
- A planning guide was developed to guide you through the *recommended* process.
- All resources can be found at www.mcas-alt.org/materials or in the Forms/Graphs online program.

Resources: High-Quality Curriculum Units Related to Topics

Topics for Core Ideas in Physical Science (3-8) and Introductory Physics (HS)

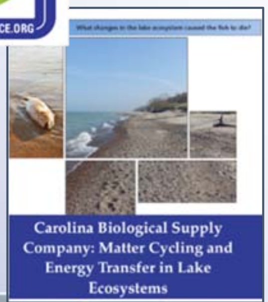
- **Matter and Its Interactions**
  - Solids, liquids, and gas (physical characteristics), particle models of substances and changes in particle motion
  - Man-made versus naturally occurring (properties of each)
  - Phase changes and conservation of mass
  - Observable properties of various materials
  - Atomic models of substances: molecules, compounds, mixtures
  - Chemical reactions (combining two or more substances)
  - Chemical vs physical changes
  - Exothermic/endothermic chemical reactions (thermal energy)
    - Including during fission, fusion and radioactive decay
  - Compare densities of different materials (using given formula)
  - Molecules and particle motion at different phases/temperatures
  - Pure substances
  - Density

Related units:

- SOLID Start “Engineering Toys” (Grade 2)
- SAIL “Garbage” (Grade 5)
- NGSS Storylines Where Does Our Clean Water Come From and Where Does It Go After We Make It Dirty? (Grade 5)
- Sprocket “Chemistry of Taste” (Grade 5)
- OpenSciEd “Thermal Energy”, “Chemical Reactions & Matter” (Grades 6-8)
- Why Do Some Things Get Colder (or Hotter) When They React? (High School)
- CREATE for STEM “Interactions Units 1&2” (High School)

All high-quality science units are anchored on a **scientific *phenomenon*** (observable event or driving question) related to the core idea.

They are designed to be coherent to students - the order makes sense to them, and each lesson builds on the last.



What Happens to Our Garbage?

SAIL Unit: Garbage
(Grade 5)

Choose how to introduce the phenomenon (driving question)

The method you use to introduce the unit to the students will get them engaged in the topic and inspire the rest of the unit.

Introduction of the phenomenon could look like this:

- Exploration of materials (Use of all senses)
- Videos and images
- Demonstrations (Create our own …)
- Readings or being read to (Informational texts)
- Guided investigations (Teacher facilitated)
- Notice and wonder protocol (Observations with guidance)

Units are *designed* for use over many class periods-educators can modify the duration, material, and student expectations for each lesson.

Lesson 2-1: *Do garbage materials change in a landfill?*

Students plan and set up an investigation using landfill bottles to answer the question, Do garbage materials change in a landfill bottle system? Some landfill bottles are set up as an open system and some as a closed system. Students record initial property and weight data that they will later use as evidence for observing changes in the properties of materials and for establishing conservation of matter. Students make predictions about what will happen to the properties of the materials and the weight of the landfill bottles over time. Initial models are developed.

3 class periods

Learning Performance

Students carry out an investigation to measure the changes in properties of materials over time in a landfill bottle system.

- Students argue that the patterns observed in the properties of materials serve as evidence that the type of material is the same even when the material changes appearance.
- Students argue that the patterns observed in the weight of materials serve as evidence that the amount of matter is the same even when the matter changes appearance.

Lesson 2-3: *How are solid and liquids the same and different?*

Groups investigate mixing sugar and water. Students develop an individual model of solids and liquids. Through class demonstration, students model that matter is made of particles. Groups develop Model: Solids and Liquids to represent that solids and liquids are made of particles too small to see.

3 class periods

Learning Performances

- Students develop models of matter to describe that matter is made of particles too small to see.
- Students develop models of matter that matter is made of particles too small to see and use the models to describe and explain observed similarities and differences between solids

How can *my* student interact with the phenomenon?

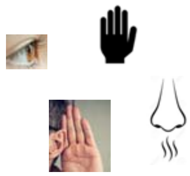
Given support and based on students' needs, they can interact by:

- Speaking or using their AAC device,
- Writing, keyboarding,
- Drawings, pointing to symbols or images,
- Teachers can create sentence stems: (e.g., I see… I wonder… This is like…),
- Use of media

Example of how your student can interact with phenomena,

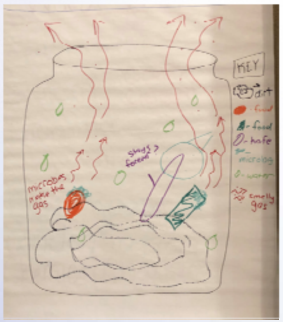
- Place garbage in a central location on a plastic tablecloth for all students to see.
- Ask students what they **notice**, **smell**, and **see**.
- Allow students to move the trash with tongs or gloves.

What is in our Garbage?

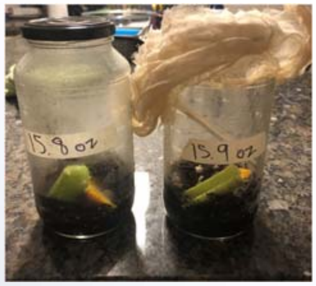
Notice	Wonder 
• I see… • It is… • I notice… • Looks like… 	Who, What, When, Where, How, Why

Example of Physical Science
Science Practice #5: Developing and Using Models

Evidence



Open System

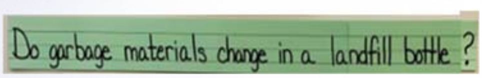


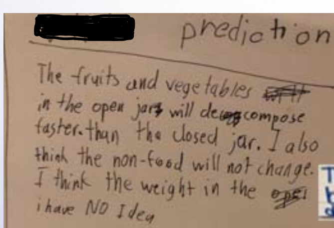
Measurable Outcome

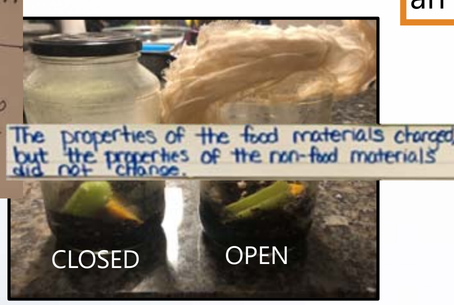
Illustrate or develop a model to show/explain phase changes between gases, liquids, and solids.

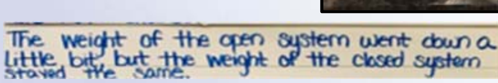
Example of Physical Science
Science Practice #3: Mathematics and Data

Evidence









Measurable Outcome

Compare predictions to the data and/or observations from an investigation

Example of Physical Science
Science Practice #7: Evidence, Reasoning, and Modeling

Evidence

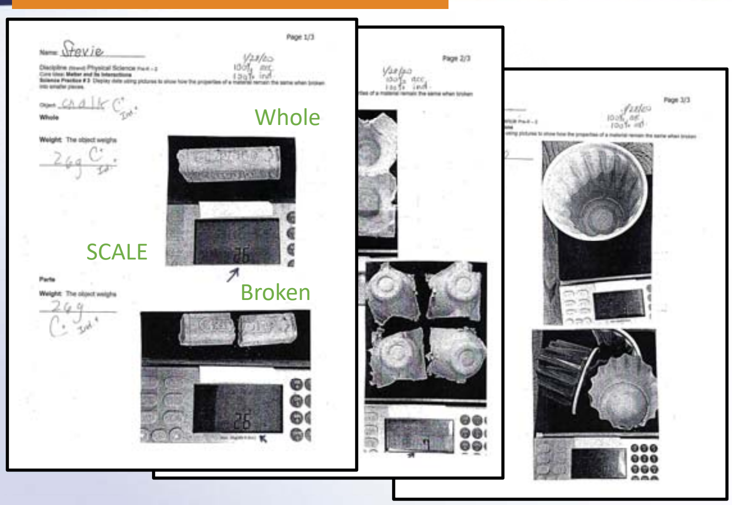
Question: When materials are crushed, do the **properties (color, texture reflectivity)** of the material change?	
Claim (topic sentence):	
Evidence:	**Why did you use this data?**
1.	
2.	
3.	
Reasoning (wrap up sentence):	


Measurable Outcome

Use scientific evidence in support of an argument about how the properties of the material remain the same when broken into smaller pieces.

Example of Physical Science
Science Practice #3: Analyzing and Interpreting Data

Science Practice #3



Measurable Outcome

Display data using pictures to show how the properties of the material remain the same when broken into smaller pieces.

THANK YOU

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