

MAEF's Mobile Science Labs

Food, Fiber and You Lab Choices

Mobile Science Lab Investigations and Curriculum Connections

The investigations on the Mobile Science Labs are aligned with the NGSS, Environmental Literacy, and Common Core State Standards.

The investigations also allow students to explore the NGSS Science and Engineering Practices as they work as scientists to investigate real world problems. All investigations address one or more of these practices. To assist in deciding which practices are best addressed in each investigation, the following designation follows each lab choice description – Practices of Science (1,2,3,6,7) would indicate that the investigation was strongest in those practices of science, adding 5 to the list would indicate there is also a math component in the that investigation.

Due to time constraints, NGSS Practice of Science #8, “evaluating and communicating information”, will need to be completed back in the classroom as a follow-up activity. Questions for each 50-minute lab lesson are provided to the teacher for each investigation to assist with this.

There are many other opportunities for the classroom teacher to expand on the investigation by connecting reading and writing skills based on the mobile lab investigation.

NGSS Science and Engineering Practices

1. *Asking questions and defining problems*
2. *Developing and using models*
3. *Planning and carrying out investigations*
4. *Analyzing and interpreting data*
5. *Using mathematics and computational thinking*
6. *Constructing explanations and designing solutions*
7. *Engaging in argument from back evidence*
8. *Obtaining, evaluating, and communicating information*

Food, Fiber and You Lab Choices

50-Minute Lessons

Look Beneath Your Feet (LBYF)* (Grades 2-4)



This lesson involves students sifting through soil samples to determine the various things that make up productive soil – water, air, organic, and non-organic matter. The role worms play in healthy soil is emphasized. Lesson ends with a water bead charm take-a-long as a reminder of healthy soil components.

This lesson supports the following practices and standards:

NGSS Scientific and Engineering Practices: (1,2,3,4,7)

NGSS Disciplinary Core Ideas:

- **PS1.A Structure and Properties of Matter:** Different kinds of matter exist and many of them can be either solid or liquid, depending of temperature. Matter can be described and classified by its observable properties.
- **LS1.B Organization for Matter and Energy Flow in Organisms:** All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.
- **LS2.A Interdependent Relationships in Ecosystems:** The food of almost any kind of animal can be traced back to plants. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life.

Environmental Literacy Connections:

- **Standard 4 Topic A Indicator 1:** Explain how organisms are linked by the transfer and transformation of matter and energy at the ecosystem level.

Common Core Standards Connections (ELA/Literacy):

- **Grade 2:** RI.2.1, RI.2.2, RI.2.3
- **Grade 3:** RI.3.1, RI.3.2, RI.3.3
- **Grade 4:** RI.4.1, RI.4.2, RI.4.3
- **Grade 5:** RI.5.1, RI.5.3

Farmers Protect the Environment (Env Pri)* (Grades 2-3)



This lesson supports the Environmental Literacy standards as students discover three ways (manure pits, fencing, buffers) farmers protect the environment and Chesapeake Bay. Teams design an environmentally friendly farm.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,6,7)

NGSS Disciplinary Core Idea:

- **ESS3.C Human impacts on Earth systems:** Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and

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environments.

Environmental Literacy Connections:

- **Standard 5 Topic A Indicator 1:** Analyze the effects of human activities on earth's natural processes.
- **Standard 5 Topic A Indicator 2:** Analyze the effects of human activities that deliberately or inadvertently alter the equilibrium of natural processes.

Common Core Standards Connections (ELA/Literacy):

- **Grade 2:** RI.2.1, RI.2.3, RI.2.7
- **Grade 3:** RI.3.1, RI.3.3, RI.3.7

Maryland Social Studies Standards Connections:

- **MSDE 3.0.D.1 (Geography) Grades 2 and 3:** Explain how people modify, protect, and adapt to their environment.

The Science of Chocolate (Chocolate)* (Grades 3-5)

Students act as food scientists as they discover the properties of chocolate and explore the production of chocolate.



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,3,4,5,6,7)

NGSS Disciplinary Core Idea:

- **PS1.B Chemical Reactions:** When two or more different substances are mixed, a new substance with different properties may be formed.
- **LS1.A Structure and Function:** All organisms have external parts. Plants have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.4, RI.3.7
- **Grade 4:** RI.4.1, RI.4.3, RI.4.4, RI.4.7
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4, RI.5.7

Maryland Social Studies Standards Connections:

- **MDSE 4.0.A.2 (Grade 3):** Explain the production process.
- **MSDE 4.0.A.2 (Grade 4):** Explain how economic resources are used to produce goods and services to satisfy economic wants in Maryland.

The Art of Making Cheese (Cheese)* (Grades 3-5)

Milk is used to make familiar products that we eat such as ice cream, yogurt, and cheese. In this experiment, students make cottage cheese using a process that causes the casein in milk to curdle. **(With the classroom teacher's permission, students may be allowed to taste a sample of the cottage cheese they make.)**



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,3,6)

NGSS Disciplinary Core Idea:

- **PS1.B Chemical Reactions:** When two or more different substances are mixed, a new substance

with different properties may be formed.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.4
- **Grade 4:** RI.4.1, RI.4.3, RI.4.4
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4

Maryland Social Studies Standards Connections:

- **MDSE 4.0.A.2 (Grade 3):** Explain the production process.
- **MSDE 4.0.A.2 (Grade 4):** Explain how economic resources are used to produce goods and services to satisfy economic wants in Maryland.

Strawberry DNA (DNA)* (Grades 4-5)

Please schedule a full 15 minutes between this lesson for clean-up and set -up.

Students put their scientific skills to work as they create strawberry slurry and extract the DNA from the strawberry to understand how biotechnology enables scientists to change characteristics in food products.



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,3)

NGSS Disciplinary Core Idea:

- **PS1.B Chemical Reactions:** When two or more different substances are mixed, a new substance with different properties may be formed.

Environmental Literacy Connections:

- **Standard 5 Topic A Indicator 1:** Analyze the effects of human activities on earth's natural processes.

Common Core Standards Connections (ELA/Literacy):

- **Grade 4:** RI.4.1, RI.4.3, RI.4.4, RI.4.7
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4, RI.5.7

Fiber Up for a Clean Sweep (Fiber)* (Grades 3-5)

Nutrition and the fiber content of favorite foods are explored in this scientific investigation as students act as food nutritionists and test 6 different foods in order to determine if fiber is present.



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,3,4,5,6,7)

NGSS Disciplinary Core Idea:

- **PS1.B Chemical Reactions:** When two or more different substances are mixed, a new substance with different properties may be formed.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.4
- **Grade 4:** RI.4.1, RI.4.3, RI.4.4
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4



Snack Attack (Snack)* (Grades 3-5)



Students discover the nutritional content of some of their favorite foods as they experiment to discover which ones contain fat. The lesson ends with learning how to read nutrition labels and hopefully selecting snacks that are good for you!

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3,4,6,7)

NGSS Disciplinary Core Idea:

- **PS1.A Structure of Matter:** Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.5
- **Grade 4:** RI.4.1, RI.4.3, RI.4.7
- **Grade 5:** RI.5.1, RI.5.3, RI.5.7



Sugar Sheriffs (Sugar)* (Grades 3-5)

Please schedule a full 15 minutes between this lesson for clean-up and set-up.



Students discover the nutritional content of some of their favorite beverages as they experiment with density. The lesson ends with learning how to read nutrition labels on beverages and hopefully selecting drinks that will be good for you.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,3,4,5,6,7)

NGSS Disciplinary Core Idea:

- **PS1.A Structure of Matter:** Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.4, RI.3.5
- **Grade 4:** RI.4.1, RI.4.3, RI.4.4, RI.4.7
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4, RI.5.7

How Well Do You Wash? (Wash)* (Grades 3-5)



Students apply “germs (glitterbug lotion)” to their hands and then perform several hand washing tests to determine which method most effectively removes the “germs”. A special light source helps to detect the “germs” remaining. (Knowledge of percentages is beneficial.)

This lesson supports the following practices and standards:

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NGSS Science and Engineering Practices: (1,3,4,5,6,7)

NGSS Disciplinary Core Idea:

- **PS1.A Structure of Matter:** Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3
- **Grade 4:** RI.4.1, RI.4.3
- **Grade 5:** RI.5.1, RI.5.3

Maryland Social Studies Standards Connections:

- **MDSE 4.0.A.3 (Grade 3):** Explain how technology affects the way people live, work, and play.



Sticky Bean (Sticky)* (Grades 3-5)



Isolated soy protein and calcium hydroxide are used to produce a vegetable-based glue made from soybeans. The glue because of its long polymer chains makes a good adhesive. Students test the strength of their glue against Elmer's glue using a peel test, tensile strength test, and shear strength test.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3,4,6,7)

NGSS Disciplinary Core Idea:

- **PS1.B Chemical Reactions:** When two or more different substances are mixed, a new substance with different properties may be formed.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.4
- **Grade 4:** RI.4.1, RI.4.3, RI.4.4
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4



Yeast Action (Yeast)* (Grades 3-5)

Fungi organisms called yeast are used in bread making. Students set up an experiment to observe the conditions that create the best environment for yeast to grow.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,3,4,6,7)

NGSS Disciplinary Core Idea:

- **PS1.B Chemical Reactions:** When two or more different substances are mixed, a new substance with different properties may be formed.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.4
- **Grade 4:** RI.4.1, RI.4.3, RI.4.4
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4

Using Genetics to Improve Agriculture (Genetics)* (Grades 3-5)

Hands-on activities introduce students to the fundamentals of genetics as they develop a basic understanding of the role of chromosomes and how genes are inherited from parent to offspring.



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3,4,6,7)

NGSS Disciplinary Core Idea:

- **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.

Common Core Standards Connections (ELA/Literacy):

- **Grade 3:** RI.3.1, RI.3.3, RI.3.4, RI.3.5
- **Grade 4:** RI.4.1, RI.4.3, RI.4.4, RI.4.7
- **Grade 5:** RI.5.1, RI.5.3, RI.5.4, RI.5.7

Important Scheduling Information

- When planning a schedule, allow a minimum of 50-60 minutes for each lesson.
- Allow **10 minutes between classes** for clean-up and set up of the same lesson.
- Please allow **15-20 minutes between Strawberry DNA and Sugar Sheriffs** for clean-up and set-up if the same lesson is back to back.
- If the need arises to change entirely from one lesson to a different lesson, **an additional 20-30-minute break must be allotted** for the change-over.
- Please limit lesson changes to no more than 2 per day. This helps maximize your students' time in the lab.
- A **30-minute lunch break for the lab teacher must be included**. The teacher's lunch can NOT be used for a lesson change-over.
- For emergency and safety reasons, classroom teachers must stay with their classes when in the lab.
- A **parent/volunteer** is needed all day, each day on the lab to assist the lab teacher. This is in addition to the classroom teacher. You can have different volunteers during the day, but we ask for no more than one at a time on the lab.
- Prior to coming out to the lab, please divide your class into 12 equal teams for each of the 12 work stations inside the lab.

When listing your selections on the class schedule, use the shortened (Title)* for the lab choice. Our teachers have the option of changing a lab selection when it seems not to be age appropriate.

Food, Fiber and You Lab Choices

25-Minute Mini-Lessons

The Cow in Patrick O'Shanahan's Kitchen (K-4)

After enjoying a delightful, realistic fiction tale, students discover some amazing cow facts and make & taste real butter.



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

NGSS Disciplinary Core Ideas:

- **PS1.A Structure of Matter (K-2):** Matter exists as different substances that have observable different properties.
- **PS1.A Structure of Matter (3-4):** Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear.

Common Core Standards Connections (ELA/Literacy):

- **Kindergarten:** RL.K.1, RL.K.7
- **Grade 1:** RL.1.1, RL.1.7
- **Grade 2:** RL.2.1, RL.2.7
- **Grade 3:** RL.3.1, RL.3.7
- **Grade 4:** RL.4.1

Maryland Social Studies Standards Connections:

- **MSDE 4.0.A.2 (Grade K):** Identify that resources are used to make products.
- **MDSE 4.0.A.2 (Grades 1-3):** Explain and examine the production process.

Football and Agriculture (Foot)* (Grades K-5)

Students learn how football and agriculture are connected and make their own Football Charm. Super Bowl Ravens' gear is connected to the farm! (Offered September through the 1st week in February)



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

Environmental Literacy Connections:

- **Standard 4 Topic C Indicator 1:** Explain how the interrelationships and interdependencies of organisms and populations contribute to the dynamics of communities and ecosystems.

Common Core Standards Connections (ELA/Literacy):

- **Kindergarten:** RI.K.7
- **Grade 1:** RI.1.7
- **Grade 2:** RI.2.7
- **Grade 3:** RI.3.7

Maryland Social Studies Standards Connections:

- **MSDE 4.0.A.2 (Grade K):** Identify that resources are used to make products.
- **MDSE 4.0.A.2 (Grades 1-3):** Explain and examine the production process.
- **MSDE 4.0.A.2 (Grade 4):** Explain how economic resources are used to produce goods and services to satisfy economic wants in Maryland.

Take Me Out to the Ball Game (Ball)* (Grades K-5)

Students learn how the world of baseball and agriculture are connected and make a Baseball Charm to take home. (Offered 2nd week in February through June)



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

Environmental Literacy Connections:

- **Standard 4 Topic C Indicator 1:** Explain how the interrelationships and interdependencies of organisms and populations contribute to the dynamics of communities and ecosystems.

Common Core Standards Connections (ELA/Literacy):

- **Kindergarten:** RI.K.7
- **Grade 1:** RI.1.7
- **Grade 2:** RI.2.7
- **Grade 3:** RI.3.7

Maryland Social Studies Standards Connections:

- **MSDE 4.0.A.2 (Grade K):** Identify that resources are used to make products.
- **MDSE 4.0.A.2 (Grades 1-3):** Explain and examine the production process.
- **MSDE 4.0.A.2 (Grade 4):** Explain how economic resources are used to produce goods and services to satisfy economic wants in Maryland.

Forest & Me (F&M)* (Grades 2-5)

Through interaction with a story, pictures, text and discussion, students will realize the many benefits trees provide. The lesson closes with students making a bracelet to remind them of these benefits.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

NGSS Disciplinary Core Ideas:

- **LS1.A Structure and Function:** All organisms have external parts. Plants have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

Environmental Literacy Connections:

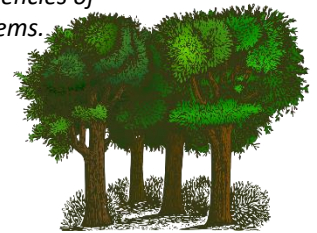
- **Standard 4 Topic C Indicator 1:** Explain how the interrelationships and interdependencies of organisms and populations contribute to the dynamics of communities and ecosystems.

Common Core Standards Connections (ELA/Literacy):

- **Grade 2:** RL.2.1, RI.2.3
- **Grade 3:** RL.3.1, RI.3.3
- **Grade 4:** RL.4.1, RI.4.3
- **Grade 5:** RI.5.3

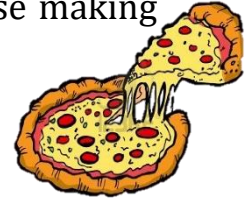
Maryland Social Studies Standards Connections:

- **MSDE 3.0.D.1 (Geography) Grades 2 and 3:** Explain how people modify, protect, and adapt to their environment.
- **MSDE 3.0.D.1 (Geography) Grade 4:** Describe how people adapt to, modify and impact the natural environment.
- **MSDE 3.0.D.1 (Geography) Grade 5:** Describe why and how people adapt to and modify the natural environment and the impact of those modifications.



Extra Cheese Please (ExCh)* (Grades 2-5)

This story line shares mozzarella's journey from calf to pizza and explains how cheese is produced. Session includes a cheese making demonstration and a sequencing activity.



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

NGSS Disciplinary Core Ideas:

- **PS1.A Structure of Matter:** Matter exists as different substances that have observable different properties.

Environmental Literacy Connections:

- **Standard 4 Topic C Indicator 1:** Explain how the interrelationships and interdependencies of organisms and populations contribute to the dynamics of communities and ecosystems.

Common Core Standards Connections (ELA/Literacy):

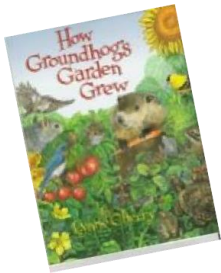
- **Grade 2:** RI.2.3
- **Grade 3:** RI.3.3
- **Grade 4:** RI.4.3
- **Grade 5:** RI.5.3

Maryland Social Studies Standards Connections:

- **MDSE 4.0.A.2 (Grades 2-3):** Explain and examine the production process.
- **MSDE 4.0.A.2 (Grade 4):** Explain how economic resources are used to produce goods and services to satisfy economic wants in Maryland.

How Groundhog's Garden Grew (GGG)* (Grades K-3)

Students participate in telling a story using props and puppets and culminate the activity as they recall story elements and make a "healthy hand" reminding them to eat more fruits and vegetables each day.



This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

NGSS Disciplinary Core Ideas:

- **LS1.C Structure of Matter (K-2):** Animals obtain food they need from plants or other animals. Plants need water and light.
- **LS1.C Structure of Matter (3):** Food provides animals with the materials and energy they need for body repair, growth, warmth, and motion.

Common Core Standards Connections (ELA/Literacy):

- **Kindergarten:** RL.K.1
- **Grade 1:** RL.1.1
- **Grade 2:** RL.2.1
- **Grade 3:** RL.3.1

Maryland Social Studies Standards Connections:

- **MSDE 3.0.D.1 (Geography) Grades 2 and 3:** Explain how people modify, protect, and adapt to their environment.

Sheep Surprise (SS)* (Grades K-4)

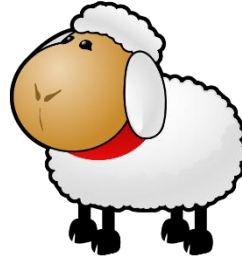
A delightful “wordless” tale about a sheep on his motorcycle that help students understand the production process from sheep to sweater. This session ends with students making a colorful sticker bookmark.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

Common Core Standards Connections (ELA/Literacy):

- **Kindergarten:** RI.K.3
- **Grade 1:** RI.1.3
- **Grade 2:** RI.2.3
- **Grade 3:** RI.3.3
- **Grade 4:** RI.4.3



Maryland Social Studies Standards Connections:

- **MSDE 4.0.A.2 (Grade K):** Identify that resources are used to make products.
- **MDSE 4.0.A.2 (Grades 1-3):** Explain and examine the production process.
- **MSDE 4.0.A.2 (Grade 4):** Explain how economic resources are used to produce goods and services to satisfy economic wants in Maryland.

Seeds, Seeds, Seeds (Seeds)* (Grades K-3)

Students use their keen observation skills to examine and identify different kinds of seeds. They then match foods we eat to the seeds that help make them.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

NGSS Disciplinary Core Ideas:

- **LS1.A Structure and Function:** All organisms have external parts. Plants have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

Common Core Standards Connections (ELA/Literacy):

- **Kindergarten:** RI.K.3
- **Grade 1:** RI.1.3
- **Grade 2:** RI.2.3
- **Grade 3:** RI.3.3

Maryland Social Studies Standards Connections:

- **MSDE 4.0.A.2 (Grade K):** Identify that resources are used to make products.
- **MDSE 4.0.A.2 (Grades 1-3):** Explain and examine the production process.



Beanie Baby (BB)* (Grades K-5)

Students plant soybean seeds in a new growing medium (soil moist) and watch for the first signs of growth.

This lesson supports the following practices and standards:

NGSS Science and Engineering Practices: (1,2,3)

NGSS Disciplinary Core Ideas:

- **LS1.A Structure and Function:** All organisms have external parts. Plants have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

Common Core Standards Connections (ELA/Literacy):

- **Kindergarten:** RI.K.3
- **Grade 1:** RI.1.3
- **Grade 2:** RI.2.3
- **Grade 3:** RI.3.3
- **Grade 4:** RI.4.3
- **Grade 5:** RI.5.3



Important Scheduling Information: Mini-Lessons

- When planning mini-lessons, allow **25-30 minutes** per class.
- Allow **10 minutes between classes** for clean-up and set up of the same lesson.
- **Any time you change to a different lesson or mini-lesson** you must allow 20-30 minutes in the schedule to set up the new lesson.
- Kindergarten classes may only visit the lab one time.
- Pre-school classes may “tour” the lab. Allow 15-20 minutes for a tour and chat about agriculture. They will not participate in a lesson.

When listing your selections on the class schedule, use the shortened (Title)* for the lab choice. Our teachers have the option of changing a lab selection when it seems not to be age appropriate.

Appendix

Below are the Common Core Standards addressed in our Food, Fiber, and You Mobile Lab. Please refer to the lesson descriptions above to see which standards are supported by the individual lessons.

Kindergarten

- **RI.K.3** With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.
- **RI.K.7** With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).

- **RL.K.1** With prompting and support, ask and answer questions about key details in a text.
- **RL.K.7** With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts).

Grade 1

- **RI.1.3** Describe the connection between two individuals, events, ideas, or pieces of information in a text.
- **RI.1.7** Use the illustrations and details in a text to describe its key ideas.

- **RL.1.1** Ask and answer questions about key details in a text.
- **RL.1.7** Use illustrations and details in a story to describe its characters, setting, or events.

Grade 2

- **RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- **RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
- **RI.2.7** Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.

- **RL.2.1** Ask and answer such questions as who, what, where, when, why, and how to determine understanding of key details in a text.
- **RL.2.7** Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.

Grade 3

- **RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- **RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
- **RI.3.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.
- **RI.3.7** Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

- **RL.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for answers.
- **RL.3.7** Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story.

Grade 4

- **RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- **RI.4.4** Determine the meaning of general academic and domain-specific words and phrases in a text- relevant to a grade 4 topic or subject area.
- **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- **RL.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- **W.4.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Grade 5

- **RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.5.3** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
- **RI.5.4** Determine the meaning of general academic and domain-specific words and phrases in a text- relevant to a grade 5 topic or subject area.
- **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
- **W.5.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.