Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.1 Carry out simple scientific investigations to answer questions about familiar objects and events.

Taxonomy Level: 3.1-A Apply Factual Knowledge

Previous/Future knowledge: In 1st grade (1-1.3), students carried out simple scientific investigations when given clear directions. In 3rd grade (3-1.3), students will generate questions such as "what if?" or "how?" about objects, organisms, and events in the environment and use those questions to conduct a simple scientific investigation. In 5th grade (5-1.3), students will plan and conduct controlled scientific investigations, manipulating one variable at a time.

It is essential for students to answer questions about familiar objects and events through performing simple scientific investigations. Clear directions for a scientific investigation may include instructions to:

- Ask a question to be investigated
- Make a prediction (possible answer to the question)
- Decide what materials are needed for the investigation
- List steps to follow to carry out the investigation
- Record observations
- Communicate the results (for example through verbal discussion, pictures, diagrams, note-booking, etc.)

To make a *prediction*:

- Make observations and think about what is known about the object or event.
- Tell what will happen next.

NOTE TO TEACHER: The directions should be presented visually or orally in a manner that is suited to the students' levels of development.

It is not essential for students to devise the steps to carry out a scientific investigation or know the terms manipulated and responding variable.

Assessment Guidelines:

The objective of this indicator is to *carry out* simple scientific investigations to answer questions about familiar objects and events; therefore, the primary focus of assessment should be to follow the steps for completing a simple investigation when provided with the steps. However, appropriate assessments should also require students to *recall* that a scientific investigation begins with a question.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.2 Use tools (including thermometers, rain gauges, balances, and measuring cups) safely, accurately, and appropriately when gathering specific data in US customary (English) and metric units of measurement.
Taxonomy Level: 3.2-B Apply Factual Knowledge

Previous/Future knowledge: In previous grades, students used magnifiers and eyedroppers (K-1.2) and rulers (1-1.2) safely, accurately, and appropriately. In future grades, students will continue to use these tools, when appropriate, as well as use new tools when collecting scientific data. A complete list of tools can be found in Appendix A of the Academic Standards.

It is essential for students to know that every simple scientific investigation provides information. This information is called *data*. Data can be simple observations or measurements (in US customary/English and metric units).

It is essential for students to know that different tools are needed to collect different kinds of data.

- A *thermometer* is a tool that measures temperature.
  - When using a thermometer, make sure not to place the bulb of the thermometer on the bottom or sides of the container or touch the bulb when taking air temperature.
  - When reading the temperature on a thermometer, it should be vertical and at eye level with the top of the liquid in the glass tube.
  - A thermometer measures temperature in degrees Fahrenheit (^{o}F) and Celsius (^{o}C) to the nearest degree.

NOTE TO TEACHER: Fahrenheit will be used to measure weather data only. All other temperature readings will be taken using the Celsius scale.

- A *rain gauge* is a tool that measures the amount of rainfall.
  - To collect rainfall accurately, the rain gauge must be in an open area.
  - To read the rain gauge, hold it at eye level.
  - A rain gauge measures the amount of rainfall in inches (in).
- A *balance* is a tool that measures the mass of an object compared to a known mass. *Mass* is the amount of *matter*, or material, in an object.
  - When using a *pan* or *bucket* balance, be sure the balance pointer begins at zero (is level).
  - Place the object being measured on one side.
  - Place the known masses on the opposite side until the balance is level and the pointer is again at zero.
  - When the balance is level, the mass of the object is equal to the total of the known masses.
  - A balance measures the mass of an object in grams (g).
- A *measuring cup* is a tool that measures volume.
  - To read the measuring cup, place the cup on a level surface.
  - When using the measuring cup to measure volume of a solid, be sure the top surface of the solid is level.
  - A measuring cup measures volume in fluid ounces (oz), parts of a cup (c), milliliters (mL), or liters (L).

It is essential for students to use care when handling these tools when gathering data.

- Care should be taken not to break the thermometers, rain gauges, or measuring cups.
- Use only thermometers with colored alcohol in them (such as red or blue), NEVER mercury thermometers (silver liquid in them).
- Remove all objects and known masses from the balance when measuring is completed.

It is also essential for students to use tools from previous grade levels that are appropriate to the content of this grade level such as eyedroppers, magnifiers, or rulers (measuring to centimeters), to gather data.

NOTE TO TEACHER: See previous grade information regarding how to use each tool.

It is not essential for students to use a beam balance, beakers, or graduated cylinders. Students do not need to measure in pints, quarts, or gallons. Students do not need to convert measurements from English to metric or metric to English.

Assessment Guidelines:
The objective of this indicator is to *use* tools safely, accurately, and appropriately when gathering data; therefore, the primary focus of assessment should be to apply correct procedures to the use of thermometers, rain gauges, balances and measuring cups and other tools essential to the grade level that would be needed to conduct a science investigation. However, appropriate assessments should also require students to *identify* appropriate uses for magnifiers and eyedroppers; *illustrate* the appropriate tool for an investigation using pictures, diagrams, or words; *recall* how to accurately determine the measurement from the tool; or *recognize* ways to use science tools safely, accurately, and appropriately.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.3 Represent and communicate simple data and explanations through drawings, tables, pictographs, bar graphs, and oral and written language.
Taxonomy Level: 2.1-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten students gave explanations based on observations made or previous experiences. This is the first time students will represent or communicate simple data in drawings, tables, and graphs, and give explanations based on the represented data. In 3rd grade (3-1.6), students will infer meaning from data communicated in graphs, tables, and diagrams. In 4th grade (4-1.6), students will construct and interpret diagrams, tables, and graphs made from recorded measurements and observations. In 5th grade, students will communicate the results of a simple technological design by using descriptions, models, and drawings (5-1.7) and communicate the findings of an evaluation in oral or written form (5-1.8).

It is essential for students to know that the data collected in simple scientific investigations should be organized in a way that represents and communicates simple data and explanations through drawings, tables, pictographs, bar graphs, and oral and written language. All drawings, tables, pictographs, and bar graphs need to be clearly labeled.

- *Drawings* may be pictures or diagrams used to represent an observation.
- *Tables* organize and represent information collected or presented.

NOTE TO TEACHER: Tables are made of columns and rows. Categories are listed in the first (left) column and data collected are listed in columns to the right of the category column.

- *Pictographs* use pictures or symbols to represent numerical data.
- *Bar graphs* show numerical data for a specific category (such as animals in the zoo or the amount of rainfall in different seasons).

NOTE TO TEACHER: The numbers are represented by the lengths of the bars. The members of the category are labeled on the side-to-side line at the bottom of the graph (horizontal axis); the numbers are marked on the up-and-down line (vertical axis).

- *Oral and written language* can be used to describe observations, share data, or explain results.

It is not essential for students to draw line or pie/circle graphs.

Assessment Guidelines:
The objective of this indicator is to *represent* and communicate simple data and explanations through drawings, tables, pictographs, bar graphs, and oral and written language; therefore, the primary focus of assessment should be to show and describe observations or data using forms listed in the indicator. However, appropriate assessments should also require students to *recall* how drawings, tables, pictographs, and bar graphs should be labeled.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.4 Infer explanations regarding scientific observations and experiences.
Taxonomy Level: 2.5-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-1.3), students predicted and explained information or events based on observations or previous experiences. In 3rd grade, students will infer meaning from data communicated in graphs, tables, and diagrams (3-1.6) and explain why similar investigations might produce different results (3-1.7). In 4th grade (4-1.4), students will distinguish among observations, predictions, and inferences. In 7th grade (7-1.6), students will critique a conclusion drawn from a scientific investigation.

It is essential for students to give a logical explanation based on scientific observations, evidence, or knowledge gained from past experiences.

Scientific observations are made by using the senses or taking measurements. Making *observations* is a way of learning about the world around us.

- A *scientific observation* is one that anyone can make and the result will always be the same. For example, the animal is black, has four legs, and feels soft.
- An *unscientific observation*, or an opinion, is one that not everyone may agree on. For example, the dog is happy.
- Observing does not mean just looking at something. It involves the use of several or all of the five senses (seeing, hearing, smelling, touching, and tasting) using appropriate observation methods for each sense, such as wafting an odor so that its smell can be described or gently touching the edges of seashells to determine their textures.
- Tasting in science should only be done with the permission of the teacher under controlled conditions.
- Observing helps to find out about objects (their characteristics, properties, differences, similarities) and events (what comes first or last, or what is happening at a particular moment).

To make an *inference*,

- Observe an object or event
- Think about what was observed, considering past experiences
- Give an explanation for what was observed
- Make more observations of the object or event
- Think and explain again

It is not essential for students to distinguish between an observation and an inference.

Assessment Guidelines:
The objective of this indicator is to *infer* explanations regarding scientific observations and experiences; therefore, the primary focus of assessment should be to give reasonable explanations from observations or experiences. However, appropriate assessments should also require students to *recognize* a scientific observation; or *match* explanations and observations.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.5 Use appropriate safety procedures when conducting investigations.
Taxonomy Level: 3.2-C Apply Procedural Knowledge

Previous/Future knowledge: In all grades students use appropriate safety procedures when conducting investigations that are appropriate to their grade, tools, and type of investigations.

It is essential for students to know that care should be taken when conducting a science investigation to make sure that everyone stays safe.

Safety procedures to use when conducting science investigations may be
- Be careful with sharp objects and glass. Only the teacher should clean up when something breaks.
- Follow all directions for completing the science investigation.
- Follow proper handling of animals in the classroom.
- Keep objects away from the face unless instructed by the teacher.
- Keep workplace neat. Clean up after an activity.
- Practice all of the safety procedures associated with the activities or investigations conducted.
- Tell the teacher about accidents or spills right away.
- Wash hands after each activity.
- Wear goggles or aprons when appropriate.

It is essential for students to use tools safely and accurately when conducting investigations, including thermometers, rain gauges, balances, and measuring cups.

NOTE TO TEACHER (safety while working with students):
- Teacher materials have lists of "Safety Procedures" appropriate for the suggested activities. Students should be able to describe and practice all of the safety procedures associated with the activities they conduct.
- Most simple investigations will not have any risks, as long as proper safety procedures are followed. Proper planning will help identify any potential risks and therefore eliminate any chance for student injury or harm.
- Teachers should review the safety procedures before doing an activity.
- Lab safety rules may be posted in the classroom and/or laboratory where students can view them. Students should be expected to follow these rules.
- A lab safety contract is recommended to notify parents/guardians that classroom science investigations will be hands-on and proper safety procedures will be expected. These contracts should be signed by the student and the parents or guardians and kept on file to protect the student, teacher, school, and school district.
- In the event of a laboratory safety violation or accident, documentation in the form of a written report should be generated. The report should be dated, kept on file, include a signed witness statement (if possible) and be submitted to an administrator.
- Materials Safety Data Sheets (MSDS) will be found in kits if necessary.
- For further training in safety guidelines, you can obtain the SC Lab Safety CD or see the Lab Safety flip-chart (CD with training or flip-chart available from the SC Department of Education).

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

It is not essential for students to go beyond safety procedures appropriate to the kinds of investigations that are conducted in a second grade classroom.

Assessment Guidelines:
The objective of this indicator is to *use* appropriate safety procedures when conducting investigations; therefore, the primary focus of assessment should be to apply correct safety procedures while conducting an investigation. However, appropriate assessments should also require students to *identify* safety procedures that are needed while conducting an investigation; or *recognize* when appropriate safety procedures are being used.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.1 Carry out simple scientific investigations to answer questions about familiar objects and events.

Taxonomy Level: 3.1-A Apply Factual Knowledge

Previous/Future knowledge: In 1st grade (1-1.3), students carried out simple scientific investigations when given clear directions. In 3rd grade (3-1.3), students will generate questions such as "what if?" or "how?" about objects, organisms, and events in the environment and use those questions to conduct a simple scientific investigation. In 5th grade (5-1.3), students will plan and conduct controlled scientific investigations, manipulating one variable at a time.

It is essential for students to answer questions about familiar objects and events through performing simple scientific investigations. Clear directions for a scientific investigation may include instructions to:

- Ask a question to be investigated
- Make a prediction (possible answer to the question)
- Decide what materials are needed for the investigation
- List steps to follow to carry out the investigation
- Record observations
- Communicate the results (for example through verbal discussion, pictures, diagrams, note-booking, etc.)

To make a *prediction*:

- Make observations and think about what is known about the object or event.
- Tell what will happen next.

NOTE TO TEACHER: The directions should be presented visually or orally in a manner that is suited to the students' levels of development.

It is not essential for students to devise the steps to carry out a scientific investigation or know the terms manipulated and responding variable.

Assessment Guidelines:

The objective of this indicator is to *carry out* simple scientific investigations to answer questions about familiar objects and events; therefore, the primary focus of assessment should be to follow the steps for completing a simple investigation when provided with the steps. However, appropriate assessments should also require students to *recall* that a scientific investigation begins with a question.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.2 Use tools (including thermometers, rain gauges, balances, and measuring cups) safely, accurately, and appropriately when gathering specific data in US customary (English) and metric units of measurement.
Taxonomy Level: 3.2-B Apply Factual Knowledge

Previous/Future knowledge: In previous grades, students used magnifiers and eyedroppers (K-1.2) and rulers (1-1.2) safely, accurately, and appropriately. In future grades, students will continue to use these tools, when appropriate, as well as use new tools when collecting scientific data. A complete list of tools can be found in Appendix A of the Academic Standards.

It is essential for students to know that every simple scientific investigation provides information. This information is called *data*. Data can be simple observations or measurements (in US customary/English and metric units).

It is essential for students to know that different tools are needed to collect different kinds of data.

- A *thermometer* is a tool that measures temperature.
  - When using a thermometer, make sure not to place the bulb of the thermometer on the bottom or sides of the container or touch the bulb when taking air temperature.
  - When reading the temperature on a thermometer, it should be vertical and at eye level with the top of the liquid in the glass tube.
  - A thermometer measures temperature in degrees Fahrenheit (^{o}F) and Celsius (^{o}C) to the nearest degree.

NOTE TO TEACHER: Fahrenheit will be used to measure weather data only. All other temperature readings will be taken using the Celsius scale.

- A *rain gauge* is a tool that measures the amount of rainfall.
  - To collect rainfall accurately, the rain gauge must be in an open area.
  - To read the rain gauge, hold it at eye level.
  - A rain gauge measures the amount of rainfall in inches (in).
- A *balance* is a tool that measures the mass of an object compared to a known mass. *Mass* is the amount of *matter*, or material, in an object.
  - When using a *pan* or *bucket* balance, be sure the balance pointer begins at zero (is level).
  - Place the object being measured on one side.
  - Place the known masses on the opposite side until the balance is level and the pointer is again at zero.
  - When the balance is level, the mass of the object is equal to the total of the known masses.
  - A balance measures the mass of an object in grams (g).
- A *measuring cup* is a tool that measures volume.
  - To read the measuring cup, place the cup on a level surface.
  - When using the measuring cup to measure volume of a solid, be sure the top surface of the solid is level.
  - A measuring cup measures volume in fluid ounces (oz), parts of a cup (c), milliliters (mL), or liters (L).

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

It is essential for students to use care when handling these tools when gathering data.

- Care should be taken not to break the thermometers, rain gauges, or measuring cups.
- Use only thermometers with colored alcohol in them (such as red or blue), NEVER mercury thermometers (silver liquid in them).
- Remove all objects and known masses from the balance when measuring is completed.

It is also essential for students to use tools from previous grade levels that are appropriate to the content of this grade level such as eyedroppers, magnifiers, or rulers (measuring to centimeters), to gather data.

NOTE TO TEACHER: See previous grade information regarding how to use each tool.

It is not essential for students to use a beam balance, beakers, or graduated cylinders. Students do not need to measure in pints, quarts, or gallons. Students do not need to convert measurements from English to metric or metric to English.

Assessment Guidelines:
The objective of this indicator is to *use* tools safely, accurately, and appropriately when gathering data; therefore, the primary focus of assessment should be to apply correct procedures to the use of thermometers, rain gauges, balances and measuring cups and other tools essential to the grade level that would be needed to conduct a science investigation. However, appropriate assessments should also require students to *identify* appropriate uses for magnifiers and eyedroppers; *illustrate* the appropriate tool for an investigation using pictures, diagrams, or words; *recall* how to accurately determine the measurement from the tool; or *recognize* ways to use science tools safely, accurately, and appropriately.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.3 Represent and communicate simple data and explanations through drawings, tables, pictographs, bar graphs, and oral and written language.
Taxonomy Level: 2.1-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten students gave explanations based on observations made or previous experiences. This is the first time students will represent or communicate simple data in drawings, tables, and graphs, and give explanations based on the represented data. In 3rd grade (3-1.6), students will infer meaning from data communicated in graphs, tables, and diagrams. In 4th grade (4-1.6), students will construct and interpret diagrams, tables, and graphs made from recorded measurements and observations. In 5th grade, students will communicate the results of a simple technological design by using descriptions, models, and drawings (5-1.7) and communicate the findings of an evaluation in oral or written form (5-1.8).

It is essential for students to know that the data collected in simple scientific investigations should be organized in a way that represents and communicates simple data and explanations through drawings, tables, pictographs, bar graphs, and oral and written language. All drawings, tables, pictographs, and bar graphs need to be clearly labeled.

- *Drawings* may be pictures or diagrams used to represent an observation.
- *Tables* organize and represent information collected or presented.

NOTE TO TEACHER: Tables are made of columns and rows. Categories are listed in the first (left) column and data collected are listed in columns to the right of the category column.

- *Pictographs* use pictures or symbols to represent numerical data.
- *Bar graphs* show numerical data for a specific category (such as animals in the zoo or the amount of rainfall in different seasons).

NOTE TO TEACHER: The numbers are represented by the lengths of the bars. The members of the category are labeled on the side-to-side line at the bottom of the graph (horizontal axis); the numbers are marked on the up-and-down line (vertical axis).

- *Oral and written language* can be used to describe observations, share data, or explain results.

It is not essential for students to draw line or pie/circle graphs.

Assessment Guidelines:
The objective of this indicator is to *represent* and communicate simple data and explanations through drawings, tables, pictographs, bar graphs, and oral and written language; therefore, the primary focus of assessment should be to show and describe observations or data using forms listed in the indicator. However, appropriate assessments should also require students to *recall* how drawings, tables, pictographs, and bar graphs should be labeled.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.4 Infer explanations regarding scientific observations and experiences.
Taxonomy Level: 2.5-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-1.3), students predicted and explained information or events based on observations or previous experiences. In 3rd grade, students will infer meaning from data communicated in graphs, tables, and diagrams (3-1.6) and explain why similar investigations might produce different results (3-1.7). In 4th grade (4-1.4), students will distinguish among observations, predictions, and inferences. In 7th grade (7-1.6), students will critique a conclusion drawn from a scientific investigation.

It is essential for students to give a logical explanation based on scientific observations, evidence, or knowledge gained from past experiences.

Scientific observations are made by using the senses or taking measurements. Making *observations* is a way of learning about the world around us.

- A *scientific observation* is one that anyone can make and the result will always be the same. For example, the animal is black, has four legs, and feels soft.
- An *unscientific observation*, or an opinion, is one that not everyone may agree on. For example, the dog is happy.
- Observing does not mean just looking at something. It involves the use of several or all of the five senses (seeing, hearing, smelling, touching, and tasting) using appropriate observation methods for each sense, such as wafting an odor so that its smell can be described or gently touching the edges of seashells to determine their textures.
- Tasting in science should only be done with the permission of the teacher under controlled conditions.
- Observing helps to find out about objects (their characteristics, properties, differences, similarities) and events (what comes first or last, or what is happening at a particular moment).

To make an *inference*,

- Observe an object or event
- Think about what was observed, considering past experiences
- Give an explanation for what was observed
- Make more observations of the object or event
- Think and explain again

It is not essential for students to distinguish between an observation and an inference.

Assessment Guidelines:
The objective of this indicator is to *infer* explanations regarding scientific observations and experiences; therefore, the primary focus of assessment should be to give reasonable explanations from observations or experiences. However, appropriate assessments should also require students to *recognize* a scientific observation; or *match* explanations and observations.

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

2-1.5 Use appropriate safety procedures when conducting investigations.
Taxonomy Level: 3.2-C Apply Procedural Knowledge

Previous/Future knowledge: In all grades students use appropriate safety procedures when conducting investigations that are appropriate to their grade, tools, and type of investigations.

It is essential for students to know that care should be taken when conducting a science investigation to make sure that everyone stays safe.

Safety procedures to use when conducting science investigations may be
- Be careful with sharp objects and glass. Only the teacher should clean up when something breaks.
- Follow all directions for completing the science investigation.
- Follow proper handling of animals in the classroom.
- Keep objects away from the face unless instructed by the teacher.
- Keep workplace neat. Clean up after an activity.
- Practice all of the safety procedures associated with the activities or investigations conducted.
- Tell the teacher about accidents or spills right away.
- Wash hands after each activity.
- Wear goggles or aprons when appropriate.

It is essential for students to use tools safely and accurately when conducting investigations, including thermometers, rain gauges, balances, and measuring cups.

NOTE TO TEACHER (safety while working with students):
- Teacher materials have lists of "Safety Procedures" appropriate for the suggested activities. Students should be able to describe and practice all of the safety procedures associated with the activities they conduct.
- Most simple investigations will not have any risks, as long as proper safety procedures are followed. Proper planning will help identify any potential risks and therefore eliminate any chance for student injury or harm.
- Teachers should review the safety procedures before doing an activity.
- Lab safety rules may be posted in the classroom and/or laboratory where students can view them. Students should be expected to follow these rules.
- A lab safety contract is recommended to notify parents/guardians that classroom science investigations will be hands-on and proper safety procedures will be expected. These contracts should be signed by the student and the parents or guardians and kept on file to protect the student, teacher, school, and school district.
- In the event of a laboratory safety violation or accident, documentation in the form of a written report should be generated. The report should be dated, kept on file, include a signed witness statement (if possible) and be submitted to an administrator.
- Materials Safety Data Sheets (MSDS) will be found in kits if necessary.
- For further training in safety guidelines, you can obtain the SC Lab Safety CD or see the Lab Safety flip-chart (CD with training or flip-chart available from the SC Department of Education).

Scientific Inquiry

2-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

It is not essential for students to go beyond safety procedures appropriate to the kinds of investigations that are conducted in a second grade classroom.

Assessment Guidelines:
The objective of this indicator is to *use* appropriate safety procedures when conducting investigations; therefore, the primary focus of assessment should be to apply correct safety procedures while conducting an investigation. However, appropriate assessments should also require students to *identify* safety procedures that are needed while conducting an investigation; or *recognize* when appropriate safety procedures are being used.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.1 Recall the basic needs of animals (including air, water, food, and shelter) for energy, growth, and protection.
Taxonomy level: 1.2-A Remember Factual Knowledge

Previous/Future knowledge: In kindergarten (K-2.1), students recognized that organisms needed certain things to stay alive (including air, water, food, and shelter). This will be further explored in 3rd grade (3-2) when students will demonstrate an understanding of the characteristics and patterns of behavior that allow organisms to survive in their own distinct environments.

It is essential for students to know that animals have basic needs required for survival. Some of these needs provide for energy, growth, and protection of the animal.

Energy
- Energy gives the animal the ability to move and grow.
- They get energy from the food they eat and the air they breathe.

Growth
- Growth means to get bigger.
- In order for an animal to grow it must have food and water.

Protection
- Protection is a special way an animal takes care of itself.
- Animals have different ways to protect themselves from being hurt or from changes in their environment; for example rain or a change in the temperature.
- Shelter is the basic need that provides this protection.

It is not essential for students to know terms of protection such as camouflage at this grade level.

Assessment Guidelines:
The objective of this indicator is to *recall* needs of animals for energy, growth, or protection; therefore, the primary focus of assessment should be to remember which needs of animals provide energy, growth, and protection. However, appropriate assessments should also require students to *identify* what is needed for an animal to survive; or *recognize* the need as providing energy, growth, or protection.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.2 Classify animals (including mammals, birds, amphibians, reptiles, fish, and insects) according to their physical characteristics.
Taxonomy level: 2.3-A Understand Factual Knowledge

Previous/Future knowledge: This is the first time that students have studied specific examples of animals. This concept will be further developed in 4th grade (4-2.1) when the concepts of vertebrates and invertebrates will be introduced.

It is essential for students to know that there are many different ways that animals can be classified. One way to classify animals is by their physical characteristics. A *physical characteristic* is one that can be observed using the senses. Groups that animals can be classified into are:

Mammals
- Mammals have fur or hair, usually give birth to live young, and can nurse their young with milk.
- Mammals usually look like their parents and will be able to reproduce.
- Some examples of mammals are humans, dogs, or cows.

Birds
- Birds have bills or beaks, feathers, wings and lay eggs.
- Some examples of birds are parrots, ostriches, or penguins.

Amphibians
- Amphibians live both on land and in water.
- Amphibians have moist skins and no scales.
- Most amphibians lay eggs in water and the young breathe with gills before developing lungs and breathing air as adults.
- Some examples of amphibians are salamanders, frogs, or toads.

Reptiles
- Reptiles have scales or rough, dry skin.
- Some examples of reptiles are snakes, lizards, and turtles.

Fish
- Fish have fins, live in water, and breathe through gills.
- Some examples of fish are goldfish, guppies, or sharks.

Insects
- Insects have antennae, three body parts, and six legs and usually have wings.
- Examples of insects are ants, butterflies, or bees.
- Spiders are not insects.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

It is not essential for students to identify a large number of examples in each of the above categories or the difference between an invertebrate and a vertebrate.

Assessment Guidelines:
The objective of this indicator is to *classify* animals according to their physical characteristics; therefore, the primary focus of assessment should be to determine that an animal belongs into a particular group based on its physical characteristics. However, appropriate assessments should also require students to *recognize* an animal as being a mammal, bird, amphibian, reptile, fish or insect based on its physical characteristics; or *summarize* that the animals belong to a certain category based on their physical characteristics.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.3 Explain how distinct environments throughout the world support the life of different types of animals.
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st grade (1-2.5, 1-2.6) students explained how distinct environments in the world supported different types of plants. In 4th grade (4-2.2) students will explain how distinct environments (including swamps, rivers and streams, tropical rainforests, deserts and polar regions) influence the variety of animals that live there.

It is essential for students to know that animals require air, water, food, and shelter and can only survive in environments where these needs can be met. There are distinct environments in the world (for example salt and freshwater, deserts, grasslands, forests, polar lands) that support the life of different types of animals.

It is not essential for students to study all of the distinct environments (biomes) in the world or all the animals but a study of more than one distinct environment is needed to completely cover the indicator.

Assessment Guidelines:
The objective of this indicator is to *explain* how distinct environments allow certain animals to live there; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various environments and how they support different animals. However, appropriate assessments should also require students to *recall* the way a distinct environment support the types of animals that live there; *summarize* the conditions within an environment that support the life of an animal that lives there; or *identify* an animal that would live in a distinct environment.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.4 Summarize the interdependence between animals and plants as sources of food and shelter.
Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st grade (1-2), students illustrated the characteristics of plants and how these characteristics helped them survive in their own distinct environments. This is the first time that students have been introduced to the idea that animals and plants rely on each other for food and shelter. Students will develop this concept further in 3rd grade (3-2.5) when they study simple food chains.

It is essential for students to know that animals cannot survive without plants and many plants depend on animals.

- Plants are sources of food for many animals and can provide shelter for other animals. For example, cows eat grass for food and some insects eat leaves; or for shelter, some trees serve as homes for small animals, such as squirrels, birds, or insects.
- Some animals can be a source of nutrients for plants. For example, animal waste (such as manure from cows and chickens, or guano from bats) can become fertilizer for plants.

It is not essential for students to illustrate these relationships with food chains or food webs.

Assessment Guidelines:
The objective of this indicator is to *summarize* the interdependence of plants and animals; therefore, the primary focus of assessment should be to generalize the main ways that animals and plants depend on each other to survive. However, appropriate assessments should also require students to *illustrate* how an animal uses a plant as a shelter or food.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.5 Illustrate the various life cycles of animals (including birth and stages of development).
Taxonomy Level: 2.2-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-2.3), students matched parents with their offspring. In 1st grade (1-2.4), students summarized the life cycle of plants. In 3rd grade (3-2.1), students will illustrate the life cycles of seed plants and various animals and summarize how the plants and animals grow and adapt to their environments.

It is essential for students to know that all animals go through a life cycle.

Life cycle
- The birth and stages of development organisms go through during their life span and ends with the organism dying

There are two ways that animals are born: live from the mother or hatched from eggs.
- Some examples of live births are humans, dogs, whales, or deer.
- Some examples of hatching from eggs are birds, fish, sea turtles, alligators, or butterflies.

Once the animals are born, their stages of development can be different.
- Some animals, for example chickens, are born looking like their parents, and continue to grow into adult chickens.
- Other animals, for example frogs and moths, are born looking different from their parents and go through different stages and change considerably at each stage.

NOTE TO TEACHER: Some animal species within a group may hatch from eggs or give live birth that is different from most of the species. For example some type of rattlesnakes, guppies, and sharks give live birth, while the duckbill platypus, a mammal, lays eggs.

It is not essential for students to experience many different types of life cycles, but they should have a few experiences at great depth to make the learning foundational.

Assessment Guidelines:
The objective of this indicator is to *illustrate* various life cycles of animals; therefore, the primary focus of assessment should be to find specific examples or illustrations of animal life cycles, including birth and stages of development. However, appropriate assessments should also require students to *classify* by sequencing the correct order of the stages of development of a particular animal; or *compare* the life cycles of various animals.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.1 Recall the basic needs of animals (including air, water, food, and shelter) for energy, growth, and protection.
Taxonomy level: 1.2-A Remember Factual Knowledge

Previous/Future knowledge: In kindergarten (K-2.1), students recognized that organisms needed certain things to stay alive (including air, water, food, and shelter). This will be further explored in 3rd grade (3-2) when students will demonstrate an understanding of the characteristics and patterns of behavior that allow organisms to survive in their own distinct environments.

It is essential for students to know that animals have basic needs required for survival. Some of these needs provide for energy, growth, and protection of the animal.

Energy
- Energy gives the animal the ability to move and grow.
- They get energy from the food they eat and the air they breathe.

Growth
- Growth means to get bigger.
- In order for an animal to grow it must have food and water.

Protection
- Protection is a special way an animal takes care of itself.
- Animals have different ways to protect themselves from being hurt or from changes in their environment; for example rain or a change in the temperature.
- Shelter is the basic need that provides this protection.

It is not essential for students to know terms of protection such as camouflage at this grade level.

Assessment Guidelines:
The objective of this indicator is to *recall* needs of animals for energy, growth, or protection; therefore, the primary focus of assessment should be to remember which needs of animals provide energy, growth, and protection. However, appropriate assessments should also require students to *identify* what is needed for an animal to survive; or *recognize* the need as providing energy, growth, or protection.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.2 Classify animals (including mammals, birds, amphibians, reptiles, fish, and insects) according to their physical characteristics.
Taxonomy level: 2.3-A Understand Factual Knowledge

Previous/Future knowledge: This is the first time that students have studied specific examples of animals. This concept will be further developed in 4th grade (4-2.1) when the concepts of vertebrates and invertebrates will be introduced.

It is essential for students to know that there are many different ways that animals can be classified. One way to classify animals is by their physical characteristics. A *physical characteristic* is one that can be observed using the senses. Groups that animals can be classified into are:

Mammals
- Mammals have fur or hair, usually give birth to live young, and can nurse their young with milk.
- Mammals usually look like their parents and will be able to reproduce.
- Some examples of mammals are humans, dogs, or cows.

Birds
- Birds have bills or beaks, feathers, wings and lay eggs.
- Some examples of birds are parrots, ostriches, or penguins.

Amphibians
- Amphibians live both on land and in water.
- Amphibians have moist skins and no scales.
- Most amphibians lay eggs in water and the young breathe with gills before developing lungs and breathing air as adults.
- Some examples of amphibians are salamanders, frogs, or toads.

Reptiles
- Reptiles have scales or rough, dry skin.
- Some examples of reptiles are snakes, lizards, and turtles.

Fish
- Fish have fins, live in water, and breathe through gills.
- Some examples of fish are goldfish, guppies, or sharks.

Insects
- Insects have antennae, three body parts, and six legs and usually have wings.
- Examples of insects are ants, butterflies, or bees.
- Spiders are not insects.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

It is not essential for students to identify a large number of examples in each of the above categories or the difference between an invertebrate and a vertebrate.

Assessment Guidelines:
The objective of this indicator is to *classify* animals according to their physical characteristics; therefore, the primary focus of assessment should be to determine that an animal belongs into a particular group based on its physical characteristics. However, appropriate assessments should also require students to *recognize* an animal as being a mammal, bird, amphibian, reptile, fish or insect based on its physical characteristics; or *summarize* that the animals belong to a certain category based on their physical characteristics.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.3 Explain how distinct environments throughout the world support the life of different types of animals.
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st grade (1-2.5, 1-2.6) students explained how distinct environments in the world supported different types of plants. In 4th grade (4-2.2) students will explain how distinct environments (including swamps, rivers and streams, tropical rainforests, deserts and polar regions) influence the variety of animals that live there.

It is essential for students to know that animals require air, water, food, and shelter and can only survive in environments where these needs can be met. There are distinct environments in the world (for example salt and freshwater, deserts, grasslands, forests, polar lands) that support the life of different types of animals.

It is not essential for students to study all of the distinct environments (biomes) in the world or all the animals but a study of more than one distinct environment is needed to completely cover the indicator.

Assessment Guidelines:
The objective of this indicator is to *explain* how distinct environments allow certain animals to live there; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various environments and how they support different animals. However, appropriate assessments should also require students to *recall* the way a distinct environment support the types of animals that live there; *summarize* the conditions within an environment that support the life of an animal that lives there; or *identify* an animal that would live in a distinct environment.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.4 Summarize the interdependence between animals and plants as sources of food and shelter.
Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st grade (1-2), students illustrated the characteristics of plants and how these characteristics helped them survive in their own distinct environments. This is the first time that students have been introduced to the idea that animals and plants rely on each other for food and shelter. Students will develop this concept further in 3rd grade (3-2.5) when they study simple food chains.

It is essential for students to know that animals cannot survive without plants and many plants depend on animals.

- Plants are sources of food for many animals and can provide shelter for other animals. For example, cows eat grass for food and some insects eat leaves; or for shelter, some trees serve as homes for small animals, such as squirrels, birds, or insects.
- Some animals can be a source of nutrients for plants. For example, animal waste (such as manure from cows and chickens, or guano from bats) can become fertilizer for plants.

It is not essential for students to illustrate these relationships with food chains or food webs.

Assessment Guidelines:
The objective of this indicator is to *summarize* the interdependence of plants and animals; therefore, the primary focus of assessment should be to generalize the main ways that animals and plants depend on each other to survive. However, appropriate assessments should also require students to *illustrate* how an animal uses a plant as a shelter or food.

Animals

2-2 The student will demonstrate an understanding of the needs and characteristics of animals as they interact in their own distinct environments. (Life Science)

2-2.5 Illustrate the various life cycles of animals (including birth and stages of development).
Taxonomy Level: 2.2-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-2.3), students matched parents with their offspring. In 1st grade (1-2.4), students summarized the life cycle of plants. In 3rd grade (3-2.1), students will illustrate the life cycles of seed plants and various animals and summarize how the plants and animals grow and adapt to their environments.

It is essential for students to know that all animals go through a life cycle.

Life cycle
- The birth and stages of development organisms go through during their life span and ends with the organism dying

There are two ways that animals are born: live from the mother or hatched from eggs.
- Some examples of live births are humans, dogs, whales, or deer.
- Some examples of hatching from eggs are birds, fish, sea turtles, alligators, or butterflies.

Once the animals are born, their stages of development can be different.
- Some animals, for example chickens, are born looking like their parents, and continue to grow into adult chickens.
- Other animals, for example frogs and moths, are born looking different from their parents and go through different stages and change considerably at each stage.

NOTE TO TEACHER: Some animal species within a group may hatch from eggs or give live birth that is different from most of the species. For example some type of rattlesnakes, guppies, and sharks give live birth, while the duckbill platypus, a mammal, lays eggs.

It is not essential for students to experience many different types of life cycles, but they should have a few experiences at great depth to make the learning foundational.

Assessment Guidelines:
The objective of this indicator is to *illustrate* various life cycles of animals; therefore, the primary focus of assessment should be to find specific examples or illustrations of animal life cycles, including birth and stages of development. However, appropriate assessments should also require students to *classify* by sequencing the correct order of the stages of development of a particular animal; or *compare* the life cycles of various animals.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.1 Explain the effects of moving air as it interacts with objects.
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: This is the first time that students have investigated the effects of moving air on objects. This is foundational knowledge that will be further developed in 3rd grade (3-3.8) when students apply this to processes that will affect Earth materials (for example, weathering and erosion). In 4th grade (4-4), students will explore this concept as it relates to weather.

It is essential for students to know that when air interacts with objects, the objects move.

- Examples of things that are affected by moving air are a kite, leaves, or a sailboat.
- When air interacts with these objects, they move.
- If there is no moving air then the kite, the leaves, nor the sailboat will move.
- Moving air can also be called *wind*.

The effects of moving air (wind) can be used to determine how strong the wind is as described on a Beaufort Wind Scale (2-3.4).

It is not essential for students to measure the effects of moving air on objects.

Assessment Guidelines:
The objective of this indicator is to *explain* the effects of moving air on objects; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various ways that objects are affected by moving air. However, appropriate assessments should also require students to *recall* objects that will move when they interact with air; or *exemplify* ways that air moves and affects objects.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.2 Recall weather terminology (including temperature, wind direction, wind speed, and precipitation as rain, snow, sleet, and hail).
Taxonomy level: 1.2-A Remember Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared daily weather patterns. This is the first time that students have been introduced to formal weather terminology. This concept will be further investigated in 4th grade (4-4) when students summarize the conditions and effects of severe weather phenomena (including thunderstorms, hurricanes, and tornadoes) and related safety concerns. In 6th grade (6-4), students will demonstrate an understanding of the relationship between Earth's atmospheric properties and processes and its weather and climate.

It is essential for students to know that weather conditions can be described using specific weather terminology.

Temperature	How hot or cold the air is at a given time. Each day the high and low temperatures are recorded.
Wind direction	The direction from which the wind blows
Wind speed	How fast or slow the wind blows
Precipitation	The type of water falling from the clouds as rain, snow, sleet, or hail

It is not essential for students to know other weather terminology at this grade. Students do not need to know the stages of the water cycle or the types of clouds found in the sky.

Assessment Guidelines:
The objective of this indicator is to *recall* weather terminology; therefore, the primary focus of assessment should be to remember specific weather terms including temperature, wind direction, wind speed, and precipitation as rain, snow, sleet, and hail. However, appropriate assessments should also require students to *identify* each weather term; or *recognize* weather terminology by definition.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.3 Illustrate the weather conditions of different seasons.
Taxonomy level: 2.2-A Understand Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared weather patterns that occurred from season to season. This concept will be further investigated in 4th grade (4-4.3) when students compare daily and seasonal weather patterns and in 6th grade (6-4.6) when they predict weather conditions or patterns.

It is essential for students to know that each season has different weather patterns. There are four basic seasons: winter, spring, summer, and fall/autumn.

Winter	The weather may be cold or freezing; there may be rain, snow, or sleet
Spring	The weather starts to get warmer; there may be a lot of rain; the air can be windy
Summer	The weather is often hot and dry; there may be little or no rain; the air can be windy
Fall/Autumn	The weather starts to get cooler; there may be little or no rainfall; the air can be windy

NOTE TO TEACHER: For students moving into our communities that are not native to South Carolina, they may come from areas that do not experience the four seasons that we do. Many areas only experience two definite seasons so be aware of this during instruction.

It is not essential for students to know air pressure or humidity conditions. They do not need to understand seasons form the astronomy perspective-revolution around the sun and tilt of Earth's axis.

Assessment Guidelines:
The objective of this indicator is to *illustrate* weather conditions of different seasons; therefore, the primary focus of assessment should be to give examples or illustrations of weather conditions from different seasons. However, appropriate assessments should also require students to *recall* the four basic seasons; *identify* different seasonal weather conditions; or *recognize* different seasonal weather conditions.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.4 Carry out procedures to measure and record daily weather conditions (including temperature, precipitation amounts, wind speed as measured on the Beaufort scale, and wind direction as measured with a windsock or wind vane).
Taxonomy level: 3.1-A Apply Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared daily weather patterns. This is the first time that students have been introduced to procedures used to measure daily weather conditions. This concept will be further investigated in 4th grade (4-4.5) when students carry out procedures for data collecting and measuring weather conditions (including wind speed and direction, precipitation, and temperature) by using appropriate tools and instruments. In 6th grade (6-4.5), students will use appropriate instruments to collect weather data (including wind speed and direction, air temperature, humidity, and air pressure).

It is essential for students to carry out proper procedures to read, measure, and record daily weather conditions. Appropriate tools used to measure weather conditions are:

Temperature
- A *thermometer* is used to measure temperature.
- Thermometers record temperature in degrees Fahrenheit or degrees Celsius.

Precipitation
- A *rain gauge* is used to measure rainfall.
- A rain gauge measures in inches.

Wind direction
- A *wind sock* or *wind vane* is used to determine wind direction.
- The wind sock or vane will point in the direction from which the wind is blowing.

Wind speed
- A *Beaufort Wind Scale* is used to measure wind speed in miles per hour (mph).
- Visual clues are the essential comparisons.

Beaufort Scale	Wind speed	Description	Visual cues
0	1 mph	Calm winds	Smoke rises vertically
1	2 mph	Light winds	Smoke drifts
2	5 mph	Light breeze	Leaves rustle
3	10 mph	Gentle breeze	Lighter branches sway
4	15 mph	Moderate breeze	Dust rises. Branches move
5	21 mph	Fresh breeze	Small trees sway
6	28 mph	Strong breeze	Larger branches move
7	35 mph	Moderate gale	Trees move
8	42 mph	Fresh gale	Twigs break
9	50 mph	Strong gale	Branches break

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

10	59 mph	Whole gale	Trees fall
11	69 mph	Storm	Violent blasts
12	75+ mph	Hurricane	Structures shake

It is not essential for students to know how to measure air pressure or humidity conditions, to use other weather instruments, or memorize the Beaufort Wind Scale.

Assessment Guidelines:
The objective of this indicator is to *carry out* procedures to measure weather conditions; therefore, the primary focus of assessment should be to apply a procedure to the tool that would be needed to record weather measurements. However, appropriate assessments should also require students to *interpret* weather data collected with proper tools; *identify* tools that measure and record daily weather; *use* a Beaufort Wind Scale to identify weather conditions in a drawing or illustration; or *recall* the different types of weather conditions.

Weather

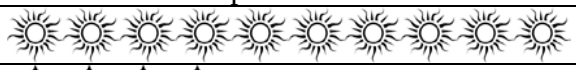
2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.5 Use pictorial weather symbols to record observable sky conditions.
Taxonomy level: 3.2-B Apply Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared daily weather patterns. In 4th grade (4-4.2), students will classify clouds, so being able to use pictures to record weather conditions will provide a foundation.

It is essential for students to use pictorial weather symbols as they record data from observations of the sky.

Below is an example of a pictograph that uses weather symbols to record data on observations of the sky.

Sample Weather Record	
Sunny	
Rainy	
Cloudy	
Snowy	
Key: Each Weather symbol stands for 1 day Sunny  Rainy  Cloudy  Snowy 	

It is not essential for students to use any other weather symbols or understand read or create a weather station model.

Assessment Guidelines:
The objective of this indicator is to *use* pictures to represent weather conditions; therefore; the primary focus of assessment should be to apply a procedure to the symbol that would be needed to record the sky conditions. However, appropriate assessments should also require students to *identify* weather symbols from pictures or diagrams; or *interpret* the reading of the data collected.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.6 Identify safety precautions that one should take during severe weather conditions.
Taxonomy level: 1.1-A Remember Factual Knowledge

Previous/Future knowledge: Students have not previously studied severe weather conditions or the safety precautions one should take during them. In 4th grade (4-4.4), students will summarize the conditions and effects of severe weather phenomena (including thunderstorms, hurricanes, and tornadoes) and related safety concerns.

It is essential for students to know that there are certain safety precautions that should be taken during severe weather conditions. Some examples of severe weather conditions that are most common to South Carolina and the safety precautions needed are:

Flood	Stay on high ground
Lightning storms	Stay indoors or low to the ground
Tornado	Stay indoors away from windows; go to the basement or a windowless room
Thunderstorm	Do not stand under a tree; stay away from water (pools, puddles, bathtubs)
Hurricane	Stay indoors away from windows; follow an evacuation route to a safer place away from the hurricane's path

It is not essential for students to learn safety precautions of other types of severe weather conditions or know how the examples of severe weather given are created.

Assessment Guidelines:
The objective of this indicator is to *identify* safety precautions to observe during severe weather conditions; therefore; the primary focus of assessment should be to remember safety precautions for severe weather conditions. However, appropriate assessments should also require students to *recall* which precautions to use during particular types of severe weather; or *recognize* appropriate safety precautions from drawings, pictures, or illustrations.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.1 Explain the effects of moving air as it interacts with objects.
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: This is the first time that students have investigated the effects of moving air on objects. This is foundational knowledge that will be further developed in 3rd grade (3-3.8) when students apply this to processes that will affect Earth materials (for example, weathering and erosion). In 4th grade (4-4), students will explore this concept as it relates to weather.

It is essential for students to know that when air interacts with objects, the objects move.

- Examples of things that are affected by moving air are a kite, leaves, or a sailboat.
- When air interacts with these objects, they move.
- If there is no moving air then the kite, the leaves, nor the sailboat will move.
- Moving air can also be called *wind*.

The effects of moving air (wind) can be used to determine how strong the wind is as described on a Beaufort Wind Scale (2-3.4).

It is not essential for students to measure the effects of moving air on objects.

Assessment Guidelines:
The objective of this indicator is to *explain* the effects of moving air on objects; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various ways that objects are affected by moving air. However, appropriate assessments should also require students to *recall* objects that will move when they interact with air; or *exemplify* ways that air moves and affects objects.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.2 Recall weather terminology (including temperature, wind direction, wind speed, and precipitation as rain, snow, sleet, and hail).
Taxonomy level: 1.2-A Remember Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared daily weather patterns. This is the first time that students have been introduced to formal weather terminology. This concept will be further investigated in 4th grade (4-4) when students summarize the conditions and effects of severe weather phenomena (including thunderstorms, hurricanes, and tornadoes) and related safety concerns. In 6th grade (6-4), students will demonstrate an understanding of the relationship between Earth's atmospheric properties and processes and its weather and climate.

It is essential for students to know that weather conditions can be described using specific weather terminology.

Temperature	How hot or cold the air is at a given time. Each day the high and low temperatures are recorded.
Wind direction	The direction from which the wind blows
Wind speed	How fast or slow the wind blows
Precipitation	The type of water falling from the clouds as rain, snow, sleet, or hail

It is not essential for students to know other weather terminology at this grade. Students do not need to know the stages of the water cycle or the types of clouds found in the sky.

Assessment Guidelines:
The objective of this indicator is to *recall* weather terminology; therefore, the primary focus of assessment should be to remember specific weather terms including temperature, wind direction, wind speed, and precipitation as rain, snow, sleet, and hail. However, appropriate assessments should also require students to *identify* each weather term; or *recognize* weather terminology by definition.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.3 Illustrate the weather conditions of different seasons.
Taxonomy level: 2.2-A Understand Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared weather patterns that occurred from season to season. This concept will be further investigated in 4th grade (4-4.3) when students compare daily and seasonal weather patterns and in 6th grade (6-4.6) when they predict weather conditions or patterns.

It is essential for students to know that each season has different weather patterns. There are four basic seasons: winter, spring, summer, and fall/autumn.

Winter	The weather may be cold or freezing; there may be rain, snow, or sleet
Spring	The weather starts to get warmer; there may be a lot of rain; the air can be windy
Summer	The weather is often hot and dry; there may be little or no rain; the air can be windy
Fall/Autumn	The weather starts to get cooler; there may be little or no rainfall; the air can be windy

NOTE TO TEACHER: For students moving into our communities that are not native to South Carolina, they may come from areas that do not experience the four seasons that we do. Many areas only experience two definite seasons so be aware of this during instruction.

It is not essential for students to know air pressure or humidity conditions. They do not need to understand seasons form the astronomy perspective-revolution around the sun and tilt of Earth's axis.

Assessment Guidelines:
The objective of this indicator is to *illustrate* weather conditions of different seasons; therefore, the primary focus of assessment should be to give examples or illustrations of weather conditions from different seasons. However, appropriate assessments should also require students to *recall* the four basic seasons; *identify* different seasonal weather conditions; or *recognize* different seasonal weather conditions.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.4 Carry out procedures to measure and record daily weather conditions (including temperature, precipitation amounts, wind speed as measured on the Beaufort scale, and wind direction as measured with a windsock or wind vane).
Taxonomy level: 3.1-A Apply Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared daily weather patterns. This is the first time that students have been introduced to procedures used to measure daily weather conditions. This concept will be further investigated in 4th grade (4-4.5) when students carry out procedures for data collecting and measuring weather conditions (including wind speed and direction, precipitation, and temperature) by using appropriate tools and instruments. In 6th grade (6-4.5), students will use appropriate instruments to collect weather data (including wind speed and direction, air temperature, humidity, and air pressure).

It is essential for students to carry out proper procedures to read, measure, and record daily weather conditions. Appropriate tools used to measure weather conditions are:

Temperature
- A *thermometer* is used to measure temperature.
- Thermometers record temperature in degrees Fahrenheit or degrees Celsius.

Precipitation
- A *rain gauge* is used to measure rainfall.
- A rain gauge measures in inches.

Wind direction
- A *wind sock* or *wind vane* is used to determine wind direction.
- The wind sock or vane will point in the direction from which the wind is blowing.

Wind speed
- A *Beaufort Wind Scale* is used to measure wind speed in miles per hour (mph).
- Visual clues are the essential comparisons.

Beaufort Scale	Wind speed	Description	Visual cues
0	1 mph	Calm winds	Smoke rises vertically
1	2 mph	Light winds	Smoke drifts
2	5 mph	Light breeze	Leaves rustle
3	10 mph	Gentle breeze	Lighter branches sway
4	15 mph	Moderate breeze	Dust rises. Branches move
5	21 mph	Fresh breeze	Small trees sway
6	28 mph	Strong breeze	Larger branches move
7	35 mph	Moderate gale	Trees move
8	42 mph	Fresh gale	Twigs break
9	50 mph	Strong gale	Branches break

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

10	59 mph	Whole gale	Trees fall
11	69 mph	Storm	Violent blasts
12	75+ mph	Hurricane	Structures shake

It is not essential for students to know how to measure air pressure or humidity conditions, to use other weather instruments, or memorize the Beaufort Wind Scale.

Assessment Guidelines:
The objective of this indicator is to *carry out* procedures to measure weather conditions; therefore, the primary focus of assessment should be to apply a procedure to the tool that would be needed to record weather measurements. However, appropriate assessments should also require students to *interpret* weather data collected with proper tools; *identify* tools that measure and record daily weather; *use* a Beaufort Wind Scale to identify weather conditions in a drawing or illustration; or *recall* the different types of weather conditions.

Weather

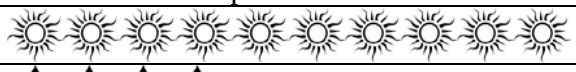
2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.5 Use pictorial weather symbols to record observable sky conditions.
Taxonomy level: 3.2-B Apply Factual Knowledge

Previous/Future knowledge: In kindergarten (K-4.2), students compared daily weather patterns. In 4th grade (4-4.2), students will classify clouds, so being able to use pictures to record weather conditions will provide a foundation.

It is essential for students to use pictorial weather symbols as they record data from observations of the sky.

Below is an example of a pictograph that uses weather symbols to record data on observations of the sky.

Sample Weather Record	
Sunny	
Rainy	
Cloudy	
Snowy	
Key: Each Weather symbol stands for 1 day Sunny  Rainy  Cloudy  Snowy 	

It is not essential for students to use any other weather symbols or understand read or create a weather station model.

Assessment Guidelines:
The objective of this indicator is to *use* pictures to represent weather conditions; therefore; the primary focus of assessment should be to apply a procedure to the symbol that would be needed to record the sky conditions. However, appropriate assessments should also require students to *identify* weather symbols from pictures or diagrams; or *interpret* the reading of the data collected.

Weather

2-3 The student will demonstrate an understanding of daily and seasonal weather conditions. (Earth Science)

2-3.6 Identify safety precautions that one should take during severe weather conditions.
Taxonomy level: 1.1-A Remember Factual Knowledge

Previous/Future knowledge: Students have not previously studied severe weather conditions or the safety precautions one should take during them. In 4th grade (4-4.4), students will summarize the conditions and effects of severe weather phenomena (including thunderstorms, hurricanes, and tornadoes) and related safety concerns.

It is essential for students to know that there are certain safety precautions that should be taken during severe weather conditions. Some examples of severe weather conditions that are most common to South Carolina and the safety precautions needed are:

Flood	Stay on high ground
Lightning storms	Stay indoors or low to the ground
Tornado	Stay indoors away from windows; go to the basement or a windowless room
Thunderstorm	Do not stand under a tree; stay away from water (pools, puddles, bathtubs)
Hurricane	Stay indoors away from windows; follow an evacuation route to a safer place away from the hurricane's path

It is not essential for students to learn safety precautions of other types of severe weather conditions or know how the examples of severe weather given are created.

Assessment Guidelines:
The objective of this indicator is to *identify* safety precautions to observe during severe weather conditions; therefore; the primary focus of assessment should be to remember safety precautions for severe weather conditions. However, appropriate assessments should also require students to *recall* which precautions to use during particular types of severe weather; or *recognize* appropriate safety precautions from drawings, pictures, or illustrations.

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.1 Recall the properties of solids and liquids.
Taxonomy level: 1.2-A Remember Factual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects by observable properties. This is the first time that students have investigated the three states of matter. This is foundational knowledge that will be further developed in 3rd grade (3-4.1) when students classify different forms of matter (including solids, liquids, and gases) according to their observable and measurable properties. In the 5th grade (5-4.2), students will compare the physical properties of the states of matter (including volume, shape, and the movement and spacing of particles).

It is essential for students to know the properties of solids and liquids.

Liquid
- A liquid is a form of matter that does not have its own shape.
- A liquid takes the shape of the container it is in.
- A liquid can flow, be poured, or spilled.
- A liquid can change to a solid by freezing, for example, water to ice cubes.

Solids
- A solid is the only form of matter that has its own shape.
- Some examples of solids are a chair, a rock, or a table.
- Some properties of solids are color, shape, size, weight, texture, sinks, floats, hardness, and magnetism.

It is not essential for students to know about gases at this grade level. They will be introduced to that concept at third grade in indicator 3-4.1.

Assessment Guidelines:
The objective of this indicator is to *recall* the properties of solids and liquids; therefore, the primary focus of assessment should be to remember these properties. However, appropriate assessments should also require students to *identify* objects as a solid or a liquid; or *recognize* the properties of solids and liquids

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.2 Exemplify matter that changes from a solid to a liquid and from a liquid to a solid.
Taxonomy level: 2.2-B Understand Conceptual Knowledge

Previous/Future knowledge: Students have explored the concept of changes in kindergarten (seasons) and first grade (the sky), but this is the first time they have learned about changes in matter. This is foundational knowledge that will be further developed in 3rd grade (3-4.2) when students explain how water and other substances change from one state to another (including melting, freezing, condensing, boiling, and evaporating).

It is essential for students to know that matter can change from a solid to a liquid and a liquid to a solid.

Solid to a liquid

- By heating—for example solid butter, chocolate, popsicles, or ice cream will melt into a liquid when heat is added.

Liquid to a solid

- By cooling—for example melted wax will harden into the shape of its container when heat is removed.

It is not essential for students to know about gases at this grade level. They will be introduced to that concept at third grade in indicator 3-4.1.

Assessment Guidelines:
The objective of this indicator is to *exemplify* matter that changes forms; therefore, the primary focus of assessment should be to give examples matter changing from a solid to liquid and a liquid to a solid. However, appropriate assessments should also require students to *identify* examples of matter that has changed using a picture, drawing, or diagram.

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.3 Explain how matter can be changed in ways such as heating or cooling, cutting or tearing, bending or stretching.
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 2nd grade (2-2.4), students exemplified matter that changes from a solid to a liquid and from a liquid to a solid. This is foundational knowledge that will be further developed in 3rd grade (3-4.2) when students explain how water and other substances change from one state to another (including melting, freezing, condensing, boiling, and evaporating). In 7th grade (7-5.10), students will compare physical changes (including changes in size, shape, and state) to chemical changes that are the result of chemical reactions (including changes in color or temperature and formation of a precipitate or gas).

It is essential for students to know that matter can be changed in many different ways.

Heating	For example, when you heat butter, it melts
Cooling	For example, when you cool water, it freezes to ice
Cutting	For example, when you cut meat, it changes from one piece to many pieces
Tearing	For example, when you tear paper, it changes from one piece to many pieces
Bending	For example, when you bend metal, it changes shape like bending a paperclip could make it straight instead of curvy
Stretching	For example, when you stretch modeling clay, it becomes thin

It is not essential for students to explain the chemical changes that occur as things are heated or cooled.

Assessment Guidelines:
The objective of this indicator is to *explain* how matter can be changed; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various ways that matter is affected by heating or cooling, cutting or tearing, bending or stretching. However, appropriate assessments should also require students to *recall* that heating or cooling, cutting or tearing, bending or stretching matter are all ways to change matter.

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.4 Recognize that different materials can be mixed together and then separated again.
Taxonomy level: 1.1-A Remember Factual Knowledge

Previous/Future knowledge: This is the first time that students have investigated the concepts of mixtures and separation. This is foundational knowledge that will be further developed in 5th grade (5-4.2) when students summarize the characteristics of a mixture, recognizing a solution as a kind of mixture and use the processes of filtration, sifting, magnetic attraction, evaporation, chromatography, and floatation to separate mixtures.

It is essential for students to know that materials can be mixed together and then separated again.

- For example, a salad may contain lettuce, tomatoes, and cucumbers. The ingredients can be mixed all together and then separated out again.
- Another example may be taking a handful of different coins or buttons and separating them out into the individual types of coins or buttons.

It is not essential for students to work with mixtures that cannot be separated (flour and eggs) at this grade level.

Assessment Guidelines:
The objective of this indicator is to *recognize* that materials can be mixed together and then separated; therefore, the primary focus of assessment should be to remember that some mixtures can be separated.

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.1 Recall the properties of solids and liquids.
Taxonomy level: 1.2-A Remember Factual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects by observable properties. This is the first time that students have investigated the three states of matter. This is foundational knowledge that will be further developed in 3rd grade (3-4.1) when students classify different forms of matter (including solids, liquids, and gases) according to their observable and measurable properties. In the 5th grade (5-4.2), students will compare the physical properties of the states of matter (including volume, shape, and the movement and spacing of particles).

It is essential for students to know the properties of solids and liquids.

Liquid
- A liquid is a form of matter that does not have its own shape.
- A liquid takes the shape of the container it is in.
- A liquid can flow, be poured, or spilled.
- A liquid can change to a solid by freezing, for example, water to ice cubes.

Solids
- A solid is the only form of matter that has its own shape.
- Some examples of solids are a chair, a rock, or a table.
- Some properties of solids are color, shape, size, weight, texture, sinks, floats, hardness, and magnetism.

It is not essential for students to know about gases at this grade level. They will be introduced to that concept at third grade in indicator 3-4.1.

Assessment Guidelines:
The objective of this indicator is to *recall* the properties of solids and liquids; therefore, the primary focus of assessment should be to remember these properties. However, appropriate assessments should also require students to *identify* objects as a solid or a liquid; or *recognize* the properties of solids and liquids

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.2 Exemplify matter that changes from a solid to a liquid and from a liquid to a solid.
Taxonomy level: 2.2-B Understand Conceptual Knowledge

Previous/Future knowledge: Students have explored the concept of changes in kindergarten (seasons) and first grade (the sky), but this is the first time they have learned about changes in matter. This is foundational knowledge that will be further developed in 3rd grade (3-4.2) when students explain how water and other substances change from one state to another (including melting, freezing, condensing, boiling, and evaporating).

It is essential for students to know that matter can change from a solid to a liquid and a liquid to a solid.

Solid to a liquid

- By heating—for example solid butter, chocolate, popsicles, or ice cream will melt into a liquid when heat is added.

Liquid to a solid

- By cooling—for example melted wax will harden into the shape of its container when heat is removed.

It is not essential for students to know about gases at this grade level. They will be introduced to that concept at third grade in indicator 3-4.1.

Assessment Guidelines:
The objective of this indicator is to *exemplify* matter that changes forms; therefore, the primary focus of assessment should be to give examples matter changing from a solid to liquid and a liquid to a solid. However, appropriate assessments should also require students to *identify* examples of matter that has changed using a picture, drawing, or diagram.

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.3 Explain how matter can be changed in ways such as heating or cooling, cutting or tearing, bending or stretching.
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 2nd grade (2-2.4), students exemplified matter that changes from a solid to a liquid and from a liquid to a solid. This is foundational knowledge that will be further developed in 3rd grade (3-4.2) when students explain how water and other substances change from one state to another (including melting, freezing, condensing, boiling, and evaporating). In 7th grade (7-5.10), students will compare physical changes (including changes in size, shape, and state) to chemical changes that are the result of chemical reactions (including changes in color or temperature and formation of a precipitate or gas).

It is essential for students to know that matter can be changed in many different ways.

Heating	For example, when you heat butter, it melts
Cooling	For example, when you cool water, it freezes to ice
Cutting	For example, when you cut meat, it changes from one piece to many pieces
Tearing	For example, when you tear paper, it changes from one piece to many pieces
Bending	For example, when you bend metal, it changes shape like bending a paperclip could make it straight instead of curvy
Stretching	For example, when you stretch modeling clay, it becomes thin

It is not essential for students to explain the chemical changes that occur as things are heated or cooled.

Assessment Guidelines:
The objective of this indicator is to *explain* how matter can be changed; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various ways that matter is affected by heating or cooling, cutting or tearing, bending or stretching. However, appropriate assessments should also require students to *recall* that heating or cooling, cutting or tearing, bending or stretching matter are all ways to change matter.

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2-4.4 Recognize that different materials can be mixed together and then separated again.
Taxonomy level: 1.1-A Remember Factual Knowledge

Previous/Future knowledge: This is the first time that students have investigated the concepts of mixtures and separation. This is foundational knowledge that will be further developed in 5th grade (5-4.2) when students summarize the characteristics of a mixture, recognizing a solution as a kind of mixture and use the processes of filtration, sifting, magnetic attraction, evaporation, chromatography, and floatation to separate mixtures.

It is essential for students to know that materials can be mixed together and then separated again.

- For example, a salad may contain lettuce, tomatoes, and cucumbers. The ingredients can be mixed all together and then separated out again.
- Another example may be taking a handful of different coins or buttons and separating them out into the individual types of coins or buttons.

It is not essential for students to work with mixtures that cannot be separated (flour and eggs) at this grade level.

Assessment Guidelines:
The objective of this indicator is to *recognize* that materials can be mixed together and then separated; therefore, the primary focus of assessment should be to remember that some mixtures can be separated.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.1 Use magnets to make an object move without being touched.
Taxonomy level: 3.2-A Apply Factual Knowledge

Previous/Future knowledge: Students will build upon this foundation knowledge in 4th (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know that magnets can make an object move without touching the object. Other properties of magnets are:

- A magnet is solid material that attracts iron or products that contain iron like steel.
- A magnet can pull objects if the object contains iron.
- The magnet pulls the object using its *magnetic force*. This magnetic force cannot be seen but it can be observed when the magnet moves the object without touching it.

It is not essential for students to know about electromagnets at this grade level.

Assessment Guidelines:
The objective of this indicator is to *use* magnets to make objects move without being touched; therefore, the primary focus of assessment should be to apply a procedure to magnets to make them move objects without being touched. However, appropriate assessments should also require students to *identify* magnets; or *explain* how a magnet can move objects without touching them.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.2 Explain how the poles of magnets affect each other (that is, they attract and repel one another).
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects observable properties including magnetic attraction. This concept will be further developed in 4th grade (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know that a magnet has two poles; one on each end.
- These poles are called the North pole (N) or the South pole (S).
- If the poles that are alike (North to North or South to South) are put together, they repel or push away.
- If the poles that are different (North to South or South to North) are put together, they attract or stick together.
- Some magnets, for example ring magnets, do not have the (N) or the (S) marked on them but they do have two poles that are either located on the top or bottom of the magnet.
- The poles can be determined by placing the magnets together.
- If they stay together then the poles are opposite but if they push away from each other the poles are alike.

It is not essential for students to learn about electromagnets at this grade level.

Assessment Guidelines:
The objective of this indicator is to *explain* the effects magnets have on each other; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the effects magnets have on each other. However, appropriate assessments should also require students to *recall* that magnets have two poles and opposite poles attract where like poles repel.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.3 Compare the effect of magnets on various materials.
Taxonomy level: 2.6-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects observable properties including magnetic attraction. This concept will be further developed in 4th grade (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know the effect of magnets on various materials.

- A magnet is solid material that attracts iron or products that contain iron like steel.
- If a material does not have iron in its composition, the magnet will not attract it.

NOTE TO TEACHER: A possible misconception can be formed if students do not realize some objects that look like metal do not contain iron, therefore they do not have magnetic properties, and they will not be attracted to a magnet.

SAFETY NOTE TO TEACHER: The effect of magnets on various materials is a very important classroom safety issue. Students need to know that they should not use magnets around computers, computer disks, TVs, VCRs, tape recorders, videotapes, or cassette tapes. Continual use of magnets around these materials will cause them to not work properly or their contents will be erased.

It is not essential for students to know that cobalt and nickel also have magnetic properties.

Assessment Guidelines:
The objective of this indicator is to *compare* the effect of magnets on various materials; therefore, the primary focus of assessment should be to detect ways that magnets will react with various materials. However, appropriate assessments should also require students to *identify* ways that magnets will interact with various materials.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.4 Identify everyday uses of magnets.
Taxonomy level: 1.1-A Remember Factual Knowledge

Previous/Future knowledge: This is the first time that students have investigated everyday uses of magnets, but the concept will be further developed in 4th grade (4-5.9) with the introduction of electromagnets.

It is essential for students to know that magnets are used in our everyday lives. They are found in their homes, schools and at places where people work. Some examples of everyday uses of magnets are:

- Magnets on cranes lift heavy objects like cars in a junk yard
- Some screwdrivers have a magnetic end to hold the screw in place
- Magnets on the refrigerator hold student art work so everyone can see it
- A compass points out the direction we are traveling and the compass needle is magnetic
- The cabinet doors in our kitchen may be held shut by a magnet
- Farmers use a magnet to put in a cow's stomach to attract any metal a cow may eat. This keeps the cow from getting hurt by the metal.

It is not essential for students to be introduced to every type of magnet.

Assessment Guidelines:
The objective of this indicator is to *identify* uses of magnets in everyday life; therefore, the primary focus of assessment should be to locate magnets in our everyday life. However, appropriate assessments should also require students to *recall* ways magnets are used in everyday life; or *recognize* ways magnets are used in everyday life.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.1 Use magnets to make an object move without being touched.
Taxonomy level: 3.2-A Apply Factual Knowledge

Previous/Future knowledge: Students will build upon this foundation knowledge in 4th (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know that magnets can make an object move without touching the object. Other properties of magnets are:

- A magnet is solid material that attracts iron or products that contain iron like steel.
- A magnet can pull objects if the object contains iron.
- The magnet pulls the object using its *magnetic force*. This magnetic force cannot be seen but it can be observed when the magnet moves the object without touching it.

It is not essential for students to know about electromagnets at this grade level.

Assessment Guidelines:
The objective of this indicator is to *use* magnets to make objects move without being touched; therefore, the primary focus of assessment should be to apply a procedure to magnets to make them move objects without being touched. However, appropriate assessments should also require students to *identify* magnets; or *explain* how a magnet can move objects without touching them.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.2 Explain how the poles of magnets affect each other (that is, they attract and repel one another).
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects observable properties including magnetic attraction. This concept will be further developed in 4th grade (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know that a magnet has two poles; one on each end.
- These poles are called the North pole (N) or the South pole (S).
- If the poles that are alike (North to North or South to South) are put together, they repel or push away.
- If the poles that are different (North to South or South to North) are put together, they attract or stick together.
- Some magnets, for example ring magnets, do not have the (N) or the (S) marked on them but they do have two poles that are either located on the top or bottom of the magnet.
- The poles can be determined by placing the magnets together.
- If they stay together then the poles are opposite but if they push away from each other the poles are alike.

It is not essential for students to learn about electromagnets at this grade level.

Assessment Guidelines:
The objective of this indicator is to *explain* the effects magnets have on each other; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the effects magnets have on each other. However, appropriate assessments should also require students to *recall* that magnets have two poles and opposite poles attract where like poles repel.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.3 Compare the effect of magnets on various materials.
Taxonomy level: 2.6-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects observable properties including magnetic attraction. This concept will be further developed in 4th grade (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know the effect of magnets on various materials.

- A magnet is solid material that attracts iron or products that contain iron like steel.
- If a material does not have iron in its composition, the magnet will not attract it.

NOTE TO TEACHER: A possible misconception can be formed if students do not realize some objects that look like metal do not contain iron, therefore they do not have magnetic properties, and they will not be attracted to a magnet.

SAFETY NOTE TO TEACHER: The effect of magnets on various materials is a very important classroom safety issue. Students need to know that they should not use magnets around computers, computer disks, TVs, VCRs, tape recorders, videotapes, or cassette tapes. Continual use of magnets around these materials will cause them to not work properly or their contents will be erased.

It is not essential for students to know that cobalt and nickel also have magnetic properties.

Assessment Guidelines:
The objective of this indicator is to *compare* the effect of magnets on various materials; therefore, the primary focus of assessment should be to detect ways that magnets will react with various materials. However, appropriate assessments should also require students to *identify* ways that magnets will interact with various materials.

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)

2-5.4 Identify everyday uses of magnets.
Taxonomy level: 1.1-A Remember Factual Knowledge

Previous/Future knowledge: This is the first time that students have investigated everyday uses of magnets, but the concept will be further developed in 4th grade (4-5.9) with the introduction of electromagnets.

It is essential for students to know that magnets are used in our everyday lives. They are found in their homes, schools and at places where people work. Some examples of everyday uses of magnets are:

- Magnets on cranes lift heavy objects like cars in a junk yard
- Some screwdrivers have a magnetic end to hold the screw in place
- Magnets on the refrigerator hold student art work so everyone can see it
- A compass points out the direction we are traveling and the compass needle is magnetic
- The cabinet doors in our kitchen may be held shut by a magnet
- Farmers use a magnet to put in a cow's stomach to attract any metal a cow may eat. This keeps the cow from getting hurt by the metal.

It is not essential for students to be introduced to every type of magnet.

Assessment Guidelines:
The objective of this indicator is to *identify* uses of magnets in everyday life; therefore, the primary focus of assessment should be to locate magnets in our everyday life. However, appropriate assessments should also require students to *recall* ways magnets are used in everyday life; or *recognize* ways magnets are used in everyday life.