

# Grade 3 Science Item Specifications



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## Introduction

In 2014 Missouri legislators passed House Bill 1490, mandating the development of the Missouri Learning Expectations. In April of 2016, these Missouri Learning Expectations were adopted by the State Board of Education. Groups of Missouri educators from across the state collaborated to create the documents necessary to support the implementation of these expectations.

One of the documents developed is the item specification document, which includes all Missouri grade level/course expectations arranged by domains/strands. It defines what could be measured on a variety of assessments. The document serves as the foundation of the assessment development process.

Although teachers may use this document to provide clarity to the expectations, these specifications are intended for summative, benchmark, and large-scale assessment purposes.

Components of the item specifications include:

**Expectation Unwrapped** breaks down a list of clearly delineated content and skills the students are expected to know and be able to do upon mastery of the Expectation.

**Depth of Knowledge (DOK) Ceiling** indicates the highest level of cognitive complexity that would typically be assessed on a large scale assessment. The DOK ceiling is not intended to limit the complexity one might reach in classroom instruction.

**Item Format** indicates the types of test questions used in large scale assessment. For each expectation, the item format specifies the type best suited for that particular expectation.

**Content Limits/Assessment Boundaries** are parameters that item writers should consider when developing a large scale assessment. For example, some expectations should not be assessed on a large scale assessment but are better suited for local assessment.

**Sample stems** are examples that address the specific elements of each expectation and address varying DOK levels. The sample stems provided in this document are in no way intended to limit the depth and breadth of possible item stems. The expectation should be assessed in a variety of ways.

**Possible Evidence** indicates observable methods in which a student can show understanding of the expectations.

**Stimulus Materials** defines types of stimulus materials that can be used in the item stems.

## Grades 3-5 SCIENCE

Physical Sciences		3.PS1.A.1
<b>Core Idea</b> <b>Component</b> <b>MLS</b>	<b>Matter and Its Interactions</b> <b>Structure and Properties of Matter</b> Predict and investigate that water can change from a liquid to a solid (freeze), and back again (melt), or from a liquid to a gas (evaporation), and back again (condensation) as the result of temperature changes.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<u><b>SCIENCE AND ENGINEERING PRACTICES</b></u> <b>Planning and Carrying Out Investigations</b> <ul style="list-style-type: none"> <li>● Planning and carrying out investigations to answer questions or test solutions to problems in grades 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.               <ul style="list-style-type: none"> <li>○ Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.</li> </ul> </li> </ul> <b>Analyzing and Interpreting Data</b> <ul style="list-style-type: none"> <li>● Analyzing data in grades 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.               <ul style="list-style-type: none"> <li>○ Represent data in tables and various graphical displays (e.g., bar graphs, pictographs) to reveal patterns that indicate relationships.</li> </ul> </li> </ul>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>DISCIPLINARY CORE IDEAS</b></u> <b>Structure and Properties of Matter</b> <ul style="list-style-type: none"> <li>● Predict and investigate that water can change from a liquid to a solid (freeze), and back again (melt), or from a liquid to a gas (evaporation), and back again (condensation) as the result of temperature changes.</li> </ul>		
<u><b>CROSCUTTING CONCEPTS</b></u> <b>Cause and Effect</b> <ul style="list-style-type: none"> <li>● Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.</li> </ul>		

## Grades 3-5 SCIENCE

<b><u>ENGINEERING DESIGN CONNECTIONS</u></b> 3.ETS1.C.1	
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <ul style="list-style-type: none"><li>• Tasks should not include placement or movement of molecules or how temperature affects molecule placement or movement.</li></ul>	<b><u>Sample Stems</u></b>
<p style="text-align: center;"><b><u>Possible Evidence</u></b></p> <ul style="list-style-type: none"><li>• Students predict and investigate the water cycle, which includes the following idea: water has different properties depending on temperature.</li><li>• Students collaboratively develop an investigation plan and describe the evidence that will be collected, including the properties of matter (e.g., whether it is a solid, liquid, or gas) of the water that would allow for classification, and the temperature at which those properties are observed.</li><li>• Plan how water will be observed at different temperatures and how those temperatures will be determined (e.g. measuring the temperature of a stovetop burner or lamp used to melt ice) and measured (i.e., qualitatively or quantitatively).</li><li>• Students collect and chart data according to the results of the investigation.</li><li>• Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question about the states of matter as it pertains to the water cycle using the following: frozen, melted, evaporation, precipitation, and condensation.</li></ul>	
<p style="text-align: center;"><b><u>Stimulus Materials</u></b></p> <p>Graphic organizers, diagrams, graphs, data tables, drawings</p>	

## Grades 3-5 SCIENCE

Physical Sciences		3.PS1.B.1
<b>Core Idea Component MLS</b>	<p><b>Matter and Its Interactions</b></p> <p><b>Types of Interactions of Matter</b></p> <p>Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.</p>	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<p>[Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]</p> <p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b></p> <p><b>Engaging in Argument from Evidence</b></p> <ul style="list-style-type: none"> <li>Engaging in argument from evidence in grades 3–5 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed worlds.</li> <li>Construct an argument with evidence to support a claim.</li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b></p> <p><b>Types of Interactions of Matter</b></p> <ul style="list-style-type: none"> <li>Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.</li> </ul> <p><b><u>CROSCUTTING CONCEPTS</u></b></p> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified, tested, and used to explain change.</li> </ul>		<b><u>Item Format</u></b>
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Sample Stems</u></b>
<ul style="list-style-type: none"> <li>Tasks should include scenarios that are familiar to grade 3 students.</li> </ul>		

## Grades 3-5 SCIENCE

<p style="text-align: center;"><b><u>Possible Evidence</u></b></p> <ul style="list-style-type: none"><li>• Students will predict and investigate how effects of heating and cooling may change materials. (e.g. water melting, plastic melting)</li><li>• Students will use analysis and data collected during the investigation to construct an argument about effects of heating and cooling on materials and how some changes cannot be reversed.</li><li>• Students will be able to identify what causes the changes in the material and recognize that some changes cannot be reversed.</li></ul>	
<p style="text-align: center;"><b><u>Stimulus Materials</u></b></p> <p>Graphic organizers, diagrams, graphs, data tables, drawings</p>	



## Grades 3-5 SCIENCE

Physical Sciences		3.PS2.B.1
<b>Core Idea Component MLS</b>	<b>Motion and Stability: Forces and Interactions</b> <b>Types of Interaction</b> Plan and conduct investigations to determine the cause and effect relationship of electric or magnetic interactions between two objects not in contact with each other.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<p>[Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.]</p> <p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b>  <b>Asking Questions and Defining Problems</b></p> <ul style="list-style-type: none"> <li>Ask questions that can be investigated based on patterns such as cause and effect relationships.</li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b>  <b>Types of Interactions</b></p> <ul style="list-style-type: none"> <li>Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects, their distances apart, and, for forces between two magnets, on their orientation relative to each other.</li> </ul> <p><b><u>CROSSCUTTING CONCEPTS</u></b>  <b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified, tested, and used to explain change.</li> </ul>		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Sample Stems</u></b>
<ul style="list-style-type: none"> <li>Tasks should be limited to forces produced by objects that can be manipulated by students</li> <li>Electrical interactions are limited to static electricity.</li> </ul>		

## Grades 3-5 SCIENCE

### Possible Evidence

- Students ask questions that arise from observations of two objects not in contact with each other interacting through electric or magnetic forces, the answers to which would clarify the cause and effect relationships between the following:
  - The sizes of the forces on the two interacting objects due to the distance between the two objects
  - The relative orientation of two magnets and whether the force between the magnets is attractive or repulsive
  - The presence of a magnet and the force the magnet exerts on other objects
  - Electrically charged objects and an electric force
- Students' questions are investigated within the scope of the classroom.

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Life Sciences		3.LS1.A.1
<b>Core Idea Component MLS</b>	<b>From Molecules to Organisms: Structure and Processes</b> <b>Structure and Function</b> Construct an argument with evidence that in a particular ecosystem some organisms — based on structural adaptations or behaviors — can survive well, some survive less well, and some cannot survive at all.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p>[Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]</p> <p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b></p> <ul style="list-style-type: none"> <li>● <b>Engaging in Argument from Evidence</b> <ul style="list-style-type: none"> <li>○ Engaging in argument from evidence in grades 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed worlds.</li> <li>○ Construct an argument with evidence.</li> </ul> </li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b></p> <p><b>Structure and Function</b></p> <ul style="list-style-type: none"> <li>● For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</li> </ul> <p><b><u>CROSCUTTING CONCEPTS</u></b></p> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>● Cause and effect relationships are routinely identified and used to explain change.</li> </ul>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Sample Stems</b></u>
<ul style="list-style-type: none"> <li>● Tasks should be limited to regional ecosystems (Missouri): prairies, forests, lakes, rivers.</li> </ul>		

## Grades 3-5 SCIENCE

### Possible Evidence

- Students make a claim to be supported about a phenomenon (observable event). In their claim, students include the idea that in a particular habitat, some organisms can survive well, some can survive less well, and some cannot survive at all.
- Students describe the given evidence necessary for supporting the claim, including:
  - Characteristics of a given particular environment (e.g., soft earth, trees and shrubs, seasonal flowering plants)
  - Characteristics of a particular organism (e.g., plants with long, sharp leaves; rabbit coloration)
- Students evaluate the evidence to determine whether it is relevant to and supports the claim.
- Students evaluate the evidence to determine the following:
  - The characteristics of organisms that might affect survival
  - The similarities and differences in needs among at least three types of organisms
  - How and what features of the habitat meet the needs of each of the organisms (e.g., the degree to which a habitat meets the needs of an organism)
  - How and what features of the habitat do not meet the needs of each of the organisms (e.g., the degree to which a habitat does not meet the needs of an organism)
- Students describe whether the given evidence is sufficient to support the claim, and whether additional evidence is needed.
- Students use reasoning to construct an argument, connecting the relevant and appropriate evidence to the claim, including describing how any particular environment meets different organisms' needs to different degrees due to the characteristics of that environment and the needs of the organisms.
- Students describe a chain of reasoning in their argument, including the following cause and effect relationships:
  - If an environment fully meets the needs of an organism, then that organism can survive well within that environment.
  - If an environment partially meets the needs of an organism, then that organism survives less well (e.g., lower survival rate, increased sickliness, shorter lifespan) than organisms whose needs are met within that environment.
  - If an environment does not meet the needs of an organism, then that organism cannot survive within that environment.

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Life Sciences		3.LS1.B.1
<b>Core Idea Component MLS</b>	<b>From Molecules to Organisms: Structure and Processes</b> <b>Growth and Development of Organisms</b> Develop a model to compare and contrast observations on the life cycle of different plants and animals.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b>
<b><u>SCIENCE AND ENGINEERING PRACTICES</u></b> <ul style="list-style-type: none"> <li>● <b>Developing and Using Models</b> <ul style="list-style-type: none"> <li>○ Modeling in grades 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.               <ul style="list-style-type: none"> <li>▪ Develop models to describe phenomena.</li> </ul> </li> </ul> </li> </ul>		3
<b><u>DISCIPLINARY CORE IDEAS</u></b> <b>Growth and Development of Organisms</b> <ul style="list-style-type: none"> <li>● Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.</li> </ul>		<b><u>Item Format</u></b>
<b><u>CROSSCUTTING CONCEPTS</u></b> <b>Patterns</b> <ul style="list-style-type: none"> <li>● Patterns of change can be used to make predictions.</li> </ul>		Selected Response Constructed Response Technology Enhanced
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Sample Stems</u></b>
<ul style="list-style-type: none"> <li>● Assessment of plant life cycles is limited to those of flowering plants.</li> <li>● Tasks should not assess human reproduction.</li> </ul>		

## Grades 3-5 SCIENCE

### Possible Evidence

- Students develop models (e.g., conceptual, physical, drawing) to describe the phenomenon. In their models, students identify the relevant components of their models, including the following:
  - Organisms (both plant and animal)
  - Birth, growth, reproduction, and death
- In the models, students describe relationships between components, including the following:
  - Organisms are born, grow, and die in a pattern known as a life cycle.
  - Different organisms' life cycles can look very different.
  - A casual direction of the cycle (e.g., without birth, there is no growth; without reproduction, there are no births)
- Students use the models to describe how, although organisms can display life cycles that look different, all organisms follow the same pattern.
- Students use the models to make predictions related to the phenomenon, based on patterns identified among life cycles (e.g., if there are no births, deaths will continue and eventually there will be no more of that type of organism).

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Life Sciences		3.LS3.A.1
<b>Core Idea Component MLS</b>	<b>Heredity: Inheritance and Variation of Traits</b> <b>Inheritance of Traits</b> Construct scientific arguments to support claims that some characteristics of organisms are inherited from parents and some are influenced by the environment.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p>[Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; or, a pet dog that is given too much food and little exercise may become overweight.]</p> <p>[Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.]</p> <p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b></p> <p><b>Constructing Explanations and Designing Solutions</b></p> <ul style="list-style-type: none"> <li>Analyzing data in grades 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.</li> <li>Analyze and interpret data to make sense of phenomena using logical reasoning.</li> <li>Constructing explanations and designing solutions in grades 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.</li> <li>Use evidence (e.g., observations, patterns) to support an explanation.</li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b></p> <p><b>Inheritance of Traits</b></p> <ul style="list-style-type: none"> <li>Many characteristics of organisms are inherited from their parents.</li> <li>Different organisms vary in how they look and function because they have different inherited information.</li> <li>Other characteristics result from individuals’ interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.</li> <li>The environment also affects the traits that an organism develops.</li> </ul>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced

## Grades 3-5 SCIENCE

### CROSSCUTTING CONCEPTS

#### **Similarities and Differences**

- Similarities and differences in patterns can be used to sort and classify natural phenomena.

#### **Cause and Effect**

- Cause and effect relationships are routinely identified and used to explain change.

### ENGINEERING DESIGN CONNECTIONS

3.ETS1.C.1

### Content Limits/Assessment Boundaries

- Tasks should not include genetic mechanisms of inheritance and prediction of traits and is limited to non-human examples
- Note that the word “claim” is not taught as an academic vocabulary until middle school. Do not use the word “claim” as part of the assessment.

### Sample Stems

### Possible Evidence

- Students organize the data (e.g., from students’ previous work, grade-appropriate existing data sets) using graphical displays (e.g., tables, charts, graphs) to support the argument. The organized data may include the following:
  - Traits of plant and animal parents
  - Traits of plant and animal offspring
  - Variations in similar traits in a grouping of similar organisms
- Students identify and describe patterns in the data, including:
  - Similarities in the traits of a parent and the traits of an offspring (e.g., tall plants typically have tall offspring).
  - Similarities in traits among siblings (e.g., siblings often resemble each other)
  - Differences in traits in a group of similar organisms (e.g., dogs come in many shapes and sizes, a field of corn plants have plants of different heights)
  - Differences in traits of parents and offspring (e.g., offspring do not look exactly like their parents)
  - Differences in traits among siblings (e.g., siblings may not look exactly like their mother)
- Students describe that the pattern of similarities in traits between parents and offspring and between siblings provides evidence that traits are inherited



## Grades 3-5 SCIENCE

- Students describe that the pattern of differences in traits between parents and offspring and between siblings provides evidence that inherited traits can vary.
- Students describe that the variation in inherited traits results in a pattern of variation in traits in groups of organisms that are of a similar type
- Students identify the given explanation to be supported with a statement that relates the phenomenon to a scientific idea, including that many inherited traits can be influenced by the environment.
- Students describe the given evidence that supports the explanation, including the following:
  - Environmental factors that vary for organisms of the same type (e.g., amount of food, amount of water, amount of exercise an animal gets, chemicals in the water) that may influence organisms' traits
  - Inherited traits that vary between organisms of the same type (e.g., height or weight of a plant or animal, color or quantity of the flowers)
  - Observable inherited traits of organisms in varied environmental conditions
- Students use reasoning to connect the evidence and support an explanation about environmental influences on inherited traits in organisms.
- In their chain of reasoning, students describe a cause and effect relationship between a specific causal environmental factor and its effect on a given variation in a trait (e.g., not enough water produces plants that are shorter and have fewer flowers than plants that had more water available).

### **Stimulus Materials**

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Life Sciences		3.LS3.B.1
<b>Core Idea Component MLS</b>	<b>Heredity: Inheritance and Variation of Traits</b> <b>Natural Selection</b> Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving and finding mates.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p>[Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]</p> <p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b></p> <p><b>Constructing Explanations and Designing Solutions</b></p> <ul style="list-style-type: none"> <li>Constructing explanations and designing solutions in grades 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.</li> <li>Use evidence (e.g., observations, patterns) to construct an explanation.</li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b></p> <p><b>Natural Selection</b></p> <ul style="list-style-type: none"> <li>Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.</li> </ul> <p><b><u>CROSCUTTING CONCEPTS</u></b></p> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified and used to explain change.</li> </ul> <p><b><u>ENGINEERING DESIGN CONNECTIONS</u></b></p> <p>3.ETS1.B.1</p>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Sample Stems</b></u>
<ul style="list-style-type: none"> <li>Tasks are limited to non-human examples.</li> </ul>		

## Grades 3-5 SCIENCE

### Possible Evidence

- Students make a scientific statement about how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
- Students use evidence and reasoning to construct an explanation for the phenomenon (observable event).
- Students describe the given evidence necessary for the explanation, including the following:
  - A given characteristic of a species (e.g., thorns on a plant, camouflage of an animal, the coloration of moths)
  - The patterns of variation of a given characteristic among individuals in a species (e.g., longer or shorter thorns on individual plants, dark or light coloration of animals)
  - Potential benefits of a given variation of the characteristic (e.g., the light coloration of some moths makes them difficult to see on the bark of a tree)
- Students use reasoning to logically connect the evidence to support the explanation for the phenomenon.
- Students describe a chain of reasoning that includes the following:
  - That certain variations in characteristics make it harder or easier for an animal to survive, find mates, and reproduce (e.g., longer thorns prevent predators more effectively and increase the likelihood of survival; light coloration of some moths provides camouflage in certain environments, making it more likely that they will live long enough to be able to mate and reproduce)
  - That the characteristics that make it easier for some organisms to survive, find mates, and reproduce give those organisms an advantage over other organisms of the same species that don't have those traits
  - That there can be a cause and effect relationship between a specific variation in a characteristic (e.g., longer thorns, coloration of moths) and its effect on the ability of the individual organism to survive and reproduce (e.g., plants with longer thorns are less likely to be eaten, darker moths are less likely to be seen and eaten on dark trees).

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Life Sciences		3.LS3.C.1
<b>Core Idea Component MLS</b>	<b>Heredity: Inheritance and Variation of Traits</b> <b>Adaptation</b> Construct an argument with evidence that in a particular ecosystem some organisms — based on structural adaptations or behaviors — can survive well, some survive less well, and some cannot.	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>[Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]</p> <p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b>  <b>Constructing an Argument with Evidence</b></p> <ul style="list-style-type: none"> <li>Engaging in argument from evidence in grades 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed worlds.</li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b>  <b>Adaptation</b></p> <ul style="list-style-type: none"> <li>For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</li> </ul> <p><b><u>CROSCUTTING CONCEPTS</u></b>  <b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified and used to explain change.</li> </ul> <p><b><u>ENGINEERING DESIGN CONNECTIONS</u></b></p> <ul style="list-style-type: none"> <li>3.ETS1.B.1</li> </ul>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b> 3</p> <p style="text-align: center;"><b><u>Item Format</u></b></p> Selected Response Constructed Response Technology Enhanced
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <ul style="list-style-type: none"> <li>Assessment should be limited to regional ecosystems (Missouri): prairies, forests, lakes, rivers.</li> </ul>		<p style="text-align: center;"><b><u>Sample Stems</u></b></p>

## Grades 3-5 SCIENCE

### Possible Evidence

- Students make a claim to be supported about a phenomenon. In their claim, students include the idea that in a particular habitat, some organisms can survive well, some can survive less well, and some cannot survive at all.
- Students describe the given evidence necessary for supporting the claim, including the following:
  - Characteristics of a given particular environment (e.g., soft earth, trees and shrubs, seasonal flowering plants)
  - Characteristics of a particular organism (e.g., plants with long, sharp leaves; rabbit coloration)
  - Needs of a particular organism (e.g., shelter from predators, food, water)
- Students evaluate the evidence to determine the following:
  - The characteristics of organisms that might affect survival
  - The similarities and differences in needs among at least three types of organisms
  - How and what features of the habitat meet the needs of each of the organisms (e.g., the degree to which a habitat meets the needs of an organism)
  - How and what features of the habitat do not meet the needs of each of the organisms (i.e., the degree to which a habitat does not meet the needs of an organism)
- Students evaluate the evidence to determine whether it is relevant to and supports the claim.
- Students describe whether the given evidence is sufficient to support the claim and whether additional evidence is needed.

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Life Sciences		3.LS3.D.1
<b>Core Idea</b> <b>Component</b> <b>MLS</b>	<b>Heredity: Inheritance and Variation of Traits</b> <b>Biodiversity and Humans</b> Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	
<u><b>Expectation Unwrapped</b></u> [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.]		<u><b>DOK Ceiling</b></u> 3
<u><b>SCIENCE AND ENGINEERING PRACTICES</b></u> <b>Engaging in Argument from Evidence</b> <ul style="list-style-type: none"> <li>Engaging in argument from evidence in grades 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed worlds.</li> <li>Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.</li> </ul>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>DISCIPLINARY CORE IDEAS</b></u> <b>Biodiversity and Humans</b> <ul style="list-style-type: none"> <li>When the environment changes in ways that affect a place’s physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.</li> <li>Populations live in a variety of habitats, and change in those habitats affects the organisms living there.</li> </ul>		
<u><b>CROSSCUTTING CONCEPTS</b></u> <b>Systems and Systems Model</b> <ul style="list-style-type: none"> <li>A system can be described in terms of its components and their interactions.</li> <li>Knowledge of relevant scientific concepts and research findings is important in engineering.</li> </ul>		
<u><b>ENGINEERING DESIGN CONNECTIONS</b></u> <ul style="list-style-type: none"> <li>3.ETS1.B.1</li> </ul>		

## Grades 3-5 SCIENCE

<u>Content Limits/Assessment Boundaries</u>	<u>Sample Stems</u>
<ul style="list-style-type: none"><li>● Grade 3 tasks are limited to a single environmental change’s cause and effect.</li><li>● Tasks should not include the greenhouse effect or climate change.</li><li>● Do not use the word “claim” as part of the assessment.</li></ul> <p style="text-align: center;"><b><u>Possible Evidence</u></b></p> <ul style="list-style-type: none"><li>● Students make a claim about the merit of a given solution to a problem that is caused when the environment changes, which results in changes in the types of plants and animals that live there.</li><li>● Students describe the given evidence about how the solution meets the given criteria and constraints. This evidence includes the following:<ul style="list-style-type: none"><li>○ A system of plants, animals, and a given environment within which they live before the given environmental change occurs</li><li>○ A given change in the environment</li><li>○ How the change in the given environment causes a problem for the existing plants and animals living within that area</li><li>○ The effect of the solution on the plants and animals within the environment.</li><li>○ The resulting changes to plants and animals living within that changed environment, after the solution has been implemented</li></ul></li><li>● Students evaluate the solution to the problem to determine the merit of the solution.</li><li>● Students describe how well the proposed solution meets the given criteria and constraints to reduce the impact of the problem created by the environmental change in the system, including the following:<ul style="list-style-type: none"><li>○ How the solution makes changes to one part of the system (e.g., a feature of the environment), affecting the other parts of the system (e.g., plants and animals)</li><li>○ How the solution affects plants and animals</li></ul></li><li>● Students evaluate the evidence to determine whether it is relevant to and supports the claim.</li><li>● Students describe whether the given evidence is sufficient to support the claim and whether additional evidence is needed.</li></ul>	
<p style="text-align: center;"><b><u>Stimulus Materials</u></b></p> <p>Graphic organizers, diagrams, graphs, data tables, drawings</p>	

## Grades 3-5 SCIENCE

Earth and Space Sciences		3.ESS2.D.1
<b>Core Idea Component MLS</b>	<b>Earth's Systems</b> <b>Weather and Climate</b> Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<p>[Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.]</p> <p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b></p> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>Analyzing data in grades 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.</li> <li>Represent data in tables and various graphical displays (e.g., bar graphs, line graphs, pictographs) to reveal patterns that indicate relationships.</li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b></p> <p><b>Weather and Climate</b></p> <ul style="list-style-type: none"> <li>Scientists record patterns of the weather across different times and areas so they can make predictions about what kind of weather might happen next.</li> </ul> <p><b><u>CROSSCUTTING CONCEPTS</u></b></p> <p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>Patterns of change can be used to make predictions.</li> </ul>		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Sample Stems</u></b>
<ul style="list-style-type: none"> <li>Graphical displays are limited to line graphs, pictographs, and bar graphs.</li> <li>Tasks should not include climate change.</li> <li>The focus of tasks should be on Missouri and the central United States.</li> </ul>		



## Grades 3-5 SCIENCE

### Possible Evidence

- Students use graphical displays (e.g., tables, charts, graphs) to organize the given data by season, including the following:
  - Weather condition data (e.g., average temperature, precipitation, wind direction, air pressure) from the same area across multiple seasons
  - Weather condition data from different areas (e.g., hometown and a town in another state)
- Students recognize and then describe patterns of weather conditions across the following:
  - Different seasons (e.g., cold and dry in the winter, hot and wet in the summer; more or less wind in a particular season)
  - Different areas (e.g., a town in the Pacific Northwest has high precipitation, while a town in the Southwest has low precipitation)
- Students use patterns of weather conditions in different seasons and different areas to predict the following:
  - The typical weather conditions expected during a particular season (e.g., “In our town, in the summer it is typically hot, as indicated on a line graph over time, while in the winter it is typically cold; therefore, the prediction is that next summer it will be hot and next winter it will be cold.”).
  - The typical weather conditions expected during a particular season in different areas.

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Earth and Space Sciences		3.ESS2.D.2
<b>Core Idea Component MLS</b>	<b>Earth's Systems</b> <b>Weather and Climate</b> Obtain and combine information to describe climates in different regions of the world.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<b><u>SCIENCE AND ENGINEERING PRACTICES</u></b> <b>Obtaining, Evaluating, and Communicating Information</b> <ul style="list-style-type: none"> <li>Obtaining, evaluating, and communicating information in grades 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.</li> <li>Obtain and combine information from books and other reliable media to explain phenomena (observable events).</li> </ul> <b><u>DISCIPLINARY CORE IDEAS</u></b> <b>Weather and Climate</b> <ul style="list-style-type: none"> <li>Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.</li> </ul> <b><u>CROSSCUTTING CONCEPTS</u></b> <b>Patterns</b> <ul style="list-style-type: none"> <li>Patterns of change can be used to make predictions.</li> </ul>		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Sample Stems</u></b>
<ul style="list-style-type: none"> <li>Assessment of information is limited to narrative accounts and graphical displays of data that can include multiple data points (e.g., temperature, precipitation).</li> <li>Tasks should not include data dealing with climate change.</li> </ul>		

## Grades 3-5 SCIENCE

### Possible Evidence

- Students use books and other reliable media to gather information about the following:
  - Climates in different regions of the world (e.g., equatorial, polar, coastal, mid-continental).
  - Variations in climates within different regions of the world (e.g., an area's average temperatures and precipitation during various months over several years, an area's average rainfall and temperatures during the rainy season over several years).
- Students combine obtained information to provide evidence about the climate pattern in a region that can be used to make predictions about typical weather conditions in that region.
- Students use the information they obtained and combined to describe the following:
  - Climates in different regions of the world
  - Examples of how patterns in climate could be used to predict typical weather conditions
  - How climate can vary over years in different regions of the world

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Earth and Space Sciences		3.ESS3.B.1
<b>Core Idea</b> <b>Component</b> <b>MLS</b>	<b>Earth and Human Activity</b> <b>Natural Hazards</b> Make a claim about the merit of an existing design solution (e.g. levies, tornado shelters, sea walls, etc.) that reduces the impacts of a weather-related hazard.	
<u><b>Expectation Unwrapped</b></u> [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind-resistant roofs, and lightning rods.]		<u><b>DOK Ceiling</b></u> 3
<u><b>SCIENCE AND ENGINEERING PRACTICES</b></u> <b>Engaging in Argument from Evidence</b> <ul style="list-style-type: none"> <li>Engaging in argument from evidence in grades 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed worlds.</li> <li>Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.</li> </ul> <u><b>DISCIPLINARY CORE IDEAS</b></u> <b>Natural Hazards</b> <ul style="list-style-type: none"> <li>A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.</li> </ul> <u><b>CROSSCUTTING CONCEPTS</b></u> <b>Cause and Effect</b> <ul style="list-style-type: none"> <li>Cause and effect relationships are routinely identified, tested, and used to explain change.</li> </ul> <u><b>INFLUENCE OF ENGINEERING, TECHNOLOGY, AND SCIENCE ON SOCIETY AND THE NATURAL WORLD</b></u> <ul style="list-style-type: none"> <li>Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones).</li> </ul> <u><b>ENGINEERING DESIGN CONNECTIONS</b></u> <ul style="list-style-type: none"> <li>3.ETS1.A.1</li> </ul>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced

## Grades 3-5 SCIENCE

<u>Content Limits/Assessment Boundaries</u>	<u>Sample Stems</u>
<ul style="list-style-type: none"><li>● Tasks should not use the word “claim” as part of the assessment.</li></ul> <p style="text-align: center;"><b><u>Possible Evidence</u></b></p> <ul style="list-style-type: none"><li>● Students make a claim about the merit of a given design solution that reduces the impact of a weather-related hazard.</li><li>● Students describe the given evidence about the design solution, including evidence about the following:<ul style="list-style-type: none"><li>○ The given weather-related hazard (e.g., heavy rain or snow, strong winds, lightning, flooding along river banks)</li><li>○ Problems caused by the weather-related hazard (e.g., heavy rains cause flooding, lightning causes fires)</li><li>○ How the proposed solution addresses the problem (e.g., dams and levees are designed to control flooding, lightning rods reduce the chance of fires) [note: mechanisms are limited to simple observable relationships that rely on logical reasoning]</li></ul></li><li>● Students evaluate the evidence using given criteria and constraints to determine the following:<ul style="list-style-type: none"><li>○ How the proposed solution addresses the problem, including the impact of the weather-related hazard after the design solution has been implemented</li><li>○ The merits of a given solution in reducing the impact of a weather-related hazard (i.e., whether the design solution meets the given criteria and constraints)</li><li>○ The benefits and risks a given solution poses when responding to the societal demand to reduce the impact of a hazard</li></ul></li></ul>	
<p style="text-align: center;"><b><u>Stimulus Materials</u></b></p> <p>Graphic organizers, diagrams, graphs, data tables, drawings</p>	

## Grades 3-5 SCIENCE

Engineering, Technology, and Application of Science		3.ETS1.A.1
<b>Core Idea</b> <b>Component</b> <b>MLS</b>	<b>Engineering Design</b> <b>Defining and Delimiting Engineering Problems</b> Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p><b><u>SCIENCE AND ENGINEERING PRACTICES</u></b></p> <p><b>Asking Questions and Defining Problems</b></p> <ul style="list-style-type: none"> <li>● Asking questions and defining problems in grades 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships.               <ul style="list-style-type: none"> <li>○ Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.</li> </ul> </li> </ul> <p><b><u>DISCIPLINARY CORE IDEAS</u></b></p> <p><b>Defining and Delimiting Engineering Problems</b></p> <ul style="list-style-type: none"> <li>● Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.</li> </ul> <p><b><u>INFLUENCE OF SCIENCE, ENGINEERING, AND TECHNOLOGY ON SOCIETY AND THE NATURAL WORLD</u></b></p> <ul style="list-style-type: none"> <li>● People’s needs and wants change over time, as do their demands for new and improved technologies.</li> </ul> <p><b><u>CONNECTIONS TO DISCIPLINARY CORE IDEAS</u></b></p> <p>3.ESS3.B.1</p>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Sample Stems</b></u>
<ul style="list-style-type: none"> <li>● Actual data production should not be expected unless it can be simulated on the assessment.</li> <li>● Simple data should be given in a single bar graph, a line graph, a line plot, or a pictograph.</li> </ul>		

## Grades 3-5 SCIENCE

### Possible Evidence

- Students use given scientific information and information about a situation or phenomenon to define a simple design problem that includes responding to a need or want.
- Students design a problem that can be solved with the development of a new or improved object, tool, process, or system.
- Students describe how people's needs and wants change over time.
- Students define the limits within which the problem will be addressed, which includes addressing something people want and need at the current time.
- Based on the situation people want to change, students specify criteria (required features) of a successful solution.

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Engineering, Technology, and Application of Science		3.ETS1.B.1
<b>Core Idea</b> <b>Component</b> <b>MLS</b>	<b>Engineering Design</b> <b>Developing Possible Solutions</b> Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<b>SCIENCE AND ENGINEERING PRACTICES</b> <b>Constructing Explanations and Designing Solutions</b> <ul style="list-style-type: none"> <li>Constructing explanations and designing solutions in grades 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.</li> <li>Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.</li> </ul> <b>DISCIPLINARY CORE IDEAS</b> <b>Developing Possible Solutions</b> <ul style="list-style-type: none"> <li>Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.</li> <li>At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.</li> </ul> <b>INFLUENCE OF SCIENCE, ENGINEERING, AND TECHNOLOGY ON SOCIETY AND THE NATURAL WORLD</b> <ul style="list-style-type: none"> <li>Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.</li> </ul> <u><b>CONNECTIONS TO DISCIPLINARY CORE IDEAS</b></u> 3.LS3.B.1 3.LS3.C.1		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Sample Stems</b></u>
<ul style="list-style-type: none"> <li>Actual data production should not be expected unless it can be simulated on the assessment.</li> <li>Simple data should be given in a bar graph, a line graph, a line plot, or a pictograph.</li> </ul>		



## Grades 3-5 SCIENCE

### Possible Evidence

- Students use grade-appropriate information from research about a given problem, including the causes and effects of the problem and relevant scientific information.
- Students generate at least two possible solutions to the problem based on scientific information and understanding of the problem.
- Students specify how each design solution solves the problem.
- Students share ideas and findings with others about design solutions to generate a variety of possible solutions.
- Students describe the necessary steps for designing a solution to a problem, including conducting research and communicating with others throughout the design process to improve the design [note: emphasis is on what is necessary for designing solutions, not on a stepwise process].
- Students identify the given criteria (required features) and constraints (limits) for the solutions, including increasing benefits, decreasing risks/costs, and meeting societal demands as appropriate.
- Students specify how the criteria and constraints will be used to generate and test the design solutions.
- Students test each solution under a range of likely conditions and gather data to determine how well the solutions meet the criteria and constraints of the problem.
- Students use the collected data to compare solutions based on how well each solution meets the criteria and constraints of the problem.

### Stimulus Materials

Graphic organizers, diagrams, graphs, data tables, drawings

## Grades 3-5 SCIENCE

Engineering, Technology, and Application of Science		3.ETS1.C.1
<b>Core Idea</b> <b>Component</b> <b>MLS</b>	<b>Engineering Design</b> <b>Optimizing the Solution Process</b> Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<u><b>SCIENCE AND ENGINEERING PRACTICES</b></u> <b>Planning and Carrying Out Investigations</b> <ul style="list-style-type: none"> <li>Planning and carrying out investigations to answer questions or test solutions to problems in grades 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.</li> <li>Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.</li> </ul> <u><b>DISCIPLINARY CORE IDEAS</b></u> <b>Developing Possible Solutions</b> <ul style="list-style-type: none"> <li>Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.</li> </ul> <b>Optimizing the Design Solution</b> <ul style="list-style-type: none"> <li>Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.</li> </ul> <u><b>INFLUENCE OF SCIENCE, ENGINEERING, AND TECHNOLOGY ON SOCIETY AND THE NATURAL WORLD</b></u> <ul style="list-style-type: none"> <li>People’s needs and wants change over time, as do their demands for new and improved technologies.</li> <li>Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.</li> </ul> <u><b>CONNECTIONS TO DISCIPLINARY CORE IDEAS</b></u> 3.PS1.A.1 3.LS3.A.1		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced

## Grades 3-5 SCIENCE

<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p>	<p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<ul style="list-style-type: none"><li>● Actual data production should not be expected unless it can be simulated on the assessment.</li><li>● Simple data should be given in a bar graph, a line graph, a line plot, or a pictograph.</li></ul>	
<p style="text-align: center;"><b><u>Possible Evidence</u></b></p> <ul style="list-style-type: none"><li>● Students describe the purpose of the investigation, which includes finding possible failure points or difficulties to identify aspects of a model or prototype that can be improved.</li><li>● Students describe the evidence to be collected, including the following:<ul style="list-style-type: none"><li>○ How well the model/prototype performs against the given criteria and constraints.</li><li>○ Specific aspects of the prototype or model that do not meet one or more of the criteria or constraints (e.g., failure points, difficulties)</li><li>○ Aspects of the model/prototype that can be improved to better meet the criteria and constraints</li></ul></li><li>● Students describe how the evidence is relevant to the purpose of the investigation.</li></ul>	
<p style="text-align: center;"><b><u>Stimulus Materials</u></b></p> <p>Graphic organizers, diagrams, graphs, data tables, drawings</p>	