

## *Science Standards* *Grades K-1*

The science standards for grades K-1 consist of seven Core Content Standards within the domains of science. These standards should be learned during the two-year grade span, so that only three or four of them need to be learned *in depth* each year. Local school district curriculum teams will decide which of the areas will be learned at which grade level, depending on students' needs and interests.

As illustrated by the grid below, the three crosscutting EALRs (1-3) of Systems, Inquiry, and Application are not to be learned in isolation but rather in conjunction with content in the (EALR 4) domains of science. Not every topic needs to address all three crosscutting EALRs. But in any given year, content in (EALRs 1-3) Systems, Inquiry, and Application should be experienced in the context of several science lessons, so that students can see the commonalities among the fields of science.

<b>Grades K-1</b>	<b>EALR 1 Systems SYS</b>	<b>EALR 2 Inquiry INQ</b>	<b>EALR 3 Application APP</b>
<b>EALR 4 Domains of Science</b>			
<b>Physical Science</b> PS1 Push-Pull and Position PS2 Liquids and Solids <b>Earth and Space Science</b> ES1 Observing the Sun and Moon ES2 Properties and Change <b>Life Science</b> LS1 Plant and Animal Parts LS2 Habitats LS3 Classifying Plants and Animals	<b>Part-Whole Relationships</b>	<b>Making Observations</b>	<b>Tools and Materials</b>

## Standards for Grades K-1

**EALR 1:**           **Systems**

**Big Idea:**           **Systems (SYS)**

**Core Content:**    ***Part-Whole Relationships***

In grades K-1, students gain fluency in using the concept of part-whole relationships. They agree on names for the parts that make up several types of whole objects, including plants and animals. They learn that objects can be easily taken apart and put back together again, while other objects cannot be taken apart and reassembled without damaging them. Removing one or more parts will usually change how the object functions. Fluency with the part-whole relationship is essential for all of the sciences and is an important building block for more sophisticated understanding of how systems operate in natural and designed environments.

	<b>Content Standards</b>	<b>Performance Expectations</b>
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 SYSA	Living and nonliving things are made of parts. People give names to the parts that are different from the name of the whole object, plant, or animal.	<ul style="list-style-type: none"> <li>Name at least five different parts, given an illustration of a whole object, plant, or animal.</li> <li><i>Compare</i> a part of an object with the whole object, correctly using the words “whole” and “part.”</li> </ul>
K-1 SYSB	Some objects can easily be taken apart and put back together again while other objects cannot be taken apart without damaging them (e.g., books, pencils, plants, and animals).	<ul style="list-style-type: none"> <li>Identify which of several <i>common</i> objects may be taken apart and put back together without damaging them (e.g., a jigsaw puzzle) and which objects cannot be taken apart without damaging them (e.g., books, pencils, plants, and animals). *a</li> </ul>

### Mathematics Connections

\*a            1.3.C            Combine known shapes to create shapes and divide known shapes into other shapes.

**EALR 2: Inquiry****Big Idea: Inquiry (INQ)****Core Content: Making Observations**

Students learn that scientific *investigations* involve trying to answer questions by making observations or trying things out, rather than just asking an adult. Children are naturally curious about nearly everything—butterflies and clouds, and why the Moon seems to follow them at night. The essence of this standard is to channel students’ natural curiosity about the world, so that they become better questioners, observers, and thinkers, laying the groundwork for increasing understanding and abilities in science inquiry in the years to come.

	<b>Content Standards</b>	<b>Performance Expectations</b>
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 INQA Question and Investigate	Scientific <i>investigations</i> involve asking and trying to answer a <i>question</i> about the <i>natural world</i> by making and recording <i>observations</i> .	<ul style="list-style-type: none"> <li>Ask <i>questions</i> about objects, <i>organisms</i>, and events in their <i>environment</i>.<sup>*a</sup></li> <li>Follow up a <i>question</i> by looking for an answer through students’ own activities (e.g., making <i>observations</i> or trying things out) rather than only asking an adult to answer the <i>question</i>.</li> <li>Observe patterns and <i>relationships</i> in the <i>natural world</i>, and record <i>observations</i> in a table or picture graph.<sup>*b</sup></li> </ul>
K-1 INQB Model	Many children’s toys are <i>models</i> that represent real things in some ways but not in other ways.	<ul style="list-style-type: none"> <li>Given a child’s toy that is a <i>model</i> of an object found in the real world, <i>explain</i> how it is like and unlike the object it represents.</li> </ul>
K-1 INQC Explain and Infer	Scientists develop explanations using recorded <i>observations</i> ( <i>evidence</i> ).	<ul style="list-style-type: none"> <li><i>Describe patterns</i> of data recorded, using tallies, tables, picture graphs, or bar-type graphs.<sup>*c</sup></li> <li>Participate in a discussion of how the recorded data (<i>evidence</i>) might help to <i>explain</i> the <i>observations</i>.</li> </ul>
K-1 INQD Communicate	Scientists report on their <i>investigations</i> to other scientists, using drawings and words.	<ul style="list-style-type: none"> <li>Report <i>observations</i> of simple <i>investigations</i>, using drawings and simple sentences.</li> <li>Listen to and use <i>observations</i> (<i>evidence</i>) made by other students.</li> </ul>
K-1 INQE Communicate	<i>Observations</i> are more <i>reliable</i> if repeated, especially if repeated by different people.	<ul style="list-style-type: none"> <li>State verbally or in writing a need to repeat <i>observations</i> (<i>evidence</i>) to be certain the results are more <i>reliable</i>.</li> </ul>
K-1 INQF Intellectual Honesty	All scientific <i>observations</i> must be reported honestly and accurately.	<ul style="list-style-type: none"> <li>Record <i>observations</i> (<i>evidence</i>) honestly and accurately.</li> </ul>

**Mathematics Connections**

\*a K.5.A, 1.6.A Identify the question(s) asked in a problem.

\*b 1.5.A Represent data using tallies, tables, picture graphs, and bar-type graphs.

\*c 1.5.B Ask and answer comparison questions about data.

## Standards for Grades K-1

**EALR 3:**            **Application**

**Big Idea:**           **Application (APP)**

**Core Content:**    ***Tools and Materials***

Students learn to use simple tools (e.g., pencils, scissors) and materials (e.g., paper, tape, and glue, cardboard) to solve problems in creative ways. Though students have a natural inclination to use tools and materials to make things, guidance is required to channel these interests into solving a practical problem. Although students are not expected to make a distinction between science and technology at this age, they can and should develop the idea that tools and materials can be used to solve problems, and that many problems can have more than one solution.

	<b>Content Standards</b>	<b>Performance Expectations</b>
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 APPA	Common tools can be used to solve problems.	<ul style="list-style-type: none"> <li>Use simple <i>tools</i> and materials to solve a simple problem (e.g., make a paper or cardboard box to hold seeds so they won't get lost).*a</li> </ul>
K-1 APPB	Different materials are more suitable for some purposes than for other purposes.	<ul style="list-style-type: none"> <li>Choose a material to meet a specific need (e.g., cardboard is better than paper for making a box that will stand up by itself) and explain why that material was chosen. *a</li> </ul>
K-1 APPC	A problem may have more than one acceptable <i>solution</i> .	<ul style="list-style-type: none"> <li>Develop two possible <i>solutions</i> to solve a simple problem (e.g., <i>design</i> a napping place for a favorite stuffed animal; <i>decide</i> on the best food to eat for lunch).*b</li> </ul>
K-1 APPD	Counting, classifying, and measuring can sometimes be helpful in solving a problem.	<ul style="list-style-type: none"> <li><i>Apply</i> the abilities of counting, measuring, and classifying to solving a problem (e.g., Is that enclosure big enough for a pet to stand up in? What types of food can it eat? How much food should I put into the enclosure for my pet?).*c</li> </ul>

### Mathematics Connections

*a	K.5.D, 1.6.D	Select from a variety of problem-solving strategies and use one or more strategies to solve a problem.
*b	K.5.F, 1.6.G	Describe how a problem was solved.
*c	K.1.E	Count objects in a set of up to 20, and count out a specific number of up to 20 objects from a larger set.
	1.1.A	Count by ones forward and backward from 1 to 120, starting at any number, and count by twos, fives, and tens to 100.
	K.4.A	Make direct comparisons, using measurable attributes such as length, weight, and capacity.
	1.4.B	Use a variety of nonstandard units to measure length.

**Note:** This standard is closely aligned to Core Processes K.5 and 1.6

**EALR 4:**           **Physical Science**  
**Big Idea:**           **Force and Motion (PS1)**  
**Core Content:**    ***Push-Pull and Position***

Students learn how to describe the position and motion of objects and the effects of forces on objects. Students start by describing the position of one object with respect to another object (e.g., in front, behind, above, and below) and then describe motion as a change in position. Forces are introduced as pushes and pulls that can change the motion of objects, and students learn through observation that various forces act through contact while others act from a distance (without touching the object). These basic concepts about forces and motion provide a foundation for learning to quantify motion in later years.

Content Standards		Performance Expectations
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 PS1A	The position of an object can be <i>described</i> by locating it relative to another object or to the object’s surroundings.	<ul style="list-style-type: none"> <li>Use <i>common</i> terms so that all observers can agree on the position of an object in relation to another object (e.g., <i>describe</i> whether the teacher’s desk is in front of the room, at the side, or in the back; say whether the top of the school’s flagpole is higher or lower than the roof).<sup>*a</sup></li> </ul>
K-1 PS1B	<i>Motion</i> is defined as a change in position over time.	<ul style="list-style-type: none"> <li>Demonstrate <i>motion</i> by moving an object or a part of a student’s body and <i>explain that motion</i> means a change in position.</li> </ul>
K-1 PS1C	A <i>force</i> is a push or a pull. Pushing or pulling can move an object. The <i>speed</i> an object moves is related to how strongly it is pushed or pulled.	<ul style="list-style-type: none"> <li>Respond to a request to move an object (e.g., toy wagon, doll, or book) by pushing or pulling it.</li> <li>When asked to move the object farther, respond by pushing or pulling it more strongly.</li> <li><i>Explain that</i> a push or a pull is a <i>force</i>.</li> </ul>
K-1 PS1D	Some <i>forces</i> act by touching and other <i>forces</i> can act without touching.	<ul style="list-style-type: none"> <li>Distinguish a <i>force</i> that acts by touching it with an object (e.g., by pushing or pulling) from a <i>force</i> that can act without touching (e.g., the attraction between a magnet and a steel paper clip).</li> </ul>

#### Mathematics Connections

<sup>\*a</sup>        K.3.C            Describe the location of one object relative to another using words such as in, out, over, under, above, below, between, next to, behind, and in front of.

## Standards for Grades K-1

**EALR 4:**            **Physical Science**

**Big Idea:**            **Matter: Properties and Change (PS2)**

**Core Content:**    *Liquids and Solids*

Students learn about the properties of liquids and solids. When a liquid is poured into a container, it takes the shape of the part of the container that it occupies. Cooling a liquid can turn the liquid into a solid (e.g., water to ice). When it becomes a solid it assumes the shape of the container and retains that shape, even when removed from the container. These observations about the properties of materials and how numerous materials can change from liquid to solid and back again begin to build an understanding of matter and its transformations that will be formalized as states of matter during the grade 2-3 band.

Content Standards		Performance Expectations
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 PS2A	<i>Liquids</i> take the shape of the part of the container they occupy.	<ul style="list-style-type: none"><li>• <i>Predict</i> the shape that water will take in a variety of different containers.</li></ul>
K-1 PS2B	<i>Solids</i> retain their shape regardless of the container they are in.	<ul style="list-style-type: none"><li>• <i>Predict</i> that frozen water (e.g., ice) will retain its shape when moved among containers of different shapes (e.g., ice cubes in a tray).</li><li>• Given several substances, sort them into those that are <i>liquid</i> and those that are <i>solid</i>.</li></ul>

**EALR 4:**            **Physical Science**

**Big Idea:**            **Matter: Properties and Change (PS3)**

**Core Content:**    *None*

No standards for K-1 Matter: Properties and Change because the content is not developmentally appropriate for students in this grade band.

## Standards for Grades K-1

**EALR 4:** Earth and Space Science

**Big Idea:** Earth in Space (ES1)

**Core Content:** *Observing the Sun and Moon*

Students learn that objects they see in the sky, such as clouds and birds, change from minute to minute, while other things, such as the Sun and Moon, follow patterns of movement if observed carefully over time. The Moon can sometimes be seen during the day and sometimes at night, and its shape appears to change gradually during the month. The study of the sky can help young children realize that they can find patterns in the world through their own observations.

	<b>Content Standards</b>	<b>Performance Expectations</b>
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 ES1A	Many things can be seen in the sky. Some change minute by minute, while others move in <i>patterns</i> that can be seen if they are observed day after day.	<ul style="list-style-type: none"> <li>Observe and <i>communicate</i> the many things that can be seen in the sky that change minute by minute (e.g., birds, airplanes, and clouds) and those that change their shape or position in observable <i>patterns</i> day after day (e.g., apparent shape of the moon).*a</li> </ul>
K-1 ES1B	The position of the Sun in the sky appears to change during the day.	<ul style="list-style-type: none"> <li><i>Compare</i> the position of the Sun in the sky in the morning with its position in the sky at midday and in the afternoon.*b</li> </ul>
K-1 ES1C	The Moon can be seen sometimes during the day and sometimes during the night. The Moon appears to have different shapes on different days.	<ul style="list-style-type: none"> <li>Observe the Moon during different times of the day and month, and draw its apparent shape.*b</li> </ul>

### Mathematics Connections

- \*a K.4.A Make direct comparisons, using measurable attributes such as length, weight, and capacity.
- \*b K.3.C Describe the location of one object relative to another using words such as in, out, over, under, above, below, between, next to, behind, and in front of.

**EALR 4:** Earth and Space Science

**Big Idea:** Earth Systems, Structures and Processes (ES2)

**Core Content:** *Properties and Change*

Students learn about Earth materials through their own observations. They learn to distinguish between natural materials and those that have been changed by people. They study natural substances such as rocks and soil, and find that these Earth materials are made up of smaller parts and different components. They learn to use common terms, such as hard, soft, dry, wet, heavy, and light, to describe what they see. These observations help students become familiar with the materials in the world around them in terms of properties and to think about how people use natural materials in various ways.

	<b>Content Standards</b>	<b>Performance Expectations</b>
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 ES2A	Some objects occur in nature; others have been <i>designed</i> and processed by people.	<ul style="list-style-type: none"> <li>Sort objects into two groups: <i>natural</i> and <i>human-made</i>.<sup>*a</sup></li> </ul>
K-1 ES2B	Earth materials include solid rocks, sand, soil, and water. These materials have different observable physical <i>properties</i> .	<ul style="list-style-type: none"> <li><i>Describe</i> Earth objects using appropriate terms, such as hard, soft, dry, wet, heavy, and light, to <i>describe</i> these materials.</li> <li>Sort Earth objects by one observable property (e.g., rocks by size or color).<sup>*a</sup></li> <li><i>Compare</i> Earth objects by at least two properties (e.g., first <i>compare</i> rocks by size, then by color). <sup>*a</sup></li> </ul>
K-1 ES2C	Some Earth objects are made of more than one material.	<ul style="list-style-type: none"> <li>Observe and <i>describe</i> objects made of more than one Earth material (e.g., certain rocks and soil).</li> </ul>

**Mathematics Connections**

<sup>\*a</sup> K.3.B Sort shapes, using a sorting rule, and explain the sorting rule.

## **Standards for Grades K-1**

**EALR 4:**           **Earth and Space Science**

**Big Idea:**           **Earth Systems, Structures and Processes (ES2)**

**Core Content:**    *None*

No standards for K-1 Earth Systems, Structures and Processes because the content is not developmentally appropriate for students in this grade band.

**EALR 4: Life Science****Big Idea: Structures and Functions of Living Organisms (LS1)****Core Content: *Plant and Animal Parts***

Students learn that all living things have basic needs, and they meet those needs in various ways. Just as humans have external body parts that perform different functions to meet their needs, animals and plants also have body parts that perform different functions to meet their needs. A magnifier is a tool that reveals further details of plant and animal parts that are not easily seen with the unaided eye. Learning about the diverse needs of plants and animals and the various ways they meet their needs will help to prepare students to understand more detailed structures beginning at the 2-3 grade band.

Content Standards		Performance Expectations
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 LS1A	The human body is made up of various external parts.	<ul style="list-style-type: none"> <li>Identify the external parts of a human body (e.g., head, hands, feet, knees, and elbows).</li> </ul>
K-1 LS1B	All plants and animals have various external parts.	<ul style="list-style-type: none"> <li>Identify the external parts of different plants and animals (e.g., legs on an insect, flowers, stems, and roots on many plants, feathers on birds, scales on fish, eyes and ears on many animals).</li> </ul>
K-1 LS1C	The parts of a plant or animal appear different under a <i>magnifier compared</i> with the unaided eye.	<ul style="list-style-type: none"> <li>Observe how parts of a plant or animal look under a <i>magnifier</i> and draw or use words to <i>describe</i> them (e.g., a single hair, the leg of an insect, a fingerprint).</li> </ul>
K-1 LS1D	Different animals use their body parts in different ways to see, hear, grasp objects, and move from place to place.	<ul style="list-style-type: none"> <li><i>Compare</i> how different animals use the same body parts for different purposes (e.g., humans use their tongues to taste, while snakes use their tongues to smell).</li> </ul>
K-1 LS1E	Animals have various ways of obtaining food and water. Nearly all animals drink water or eat foods that contain water.	<ul style="list-style-type: none"> <li><i>Compare</i> how different animals obtain food and water (e.g., a squirrel hunts for nuts, a pet dog eats prepared food and drinks water from a bowl or puddle, many birds and insects find nectar in flowers, which contain food and water, people may grow food in gardens and many shop for food in stores and get water from the tap).</li> </ul>
K-1 LS1F	Most plants have roots to get water and leaves to gather sunlight.	<ul style="list-style-type: none"> <li><i>Explain</i> that most plants get water from soil through their roots and that they gather light through their leaves.</li> </ul>

## Standards for Grades K-1

**EALR 4:** Life Science

**Big Idea:** Ecosystems (LS2)

**Core Content:** *Habitats*

Students learn that all plants and animals live in and depend on habitats. Earth has many different habitats, and these different habitats support the life of many different plants and animals, including humans. People have the ability to make rapid changes in natural habitats and to keep a habitat healthy so that living conditions can be maintained.

	Content Standards	Performance Expectations
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 LS2A	There are different kinds of natural areas, or <i>habitats</i> , where many different plants and animals live together.	<ul style="list-style-type: none"> <li>• <i>Investigate</i> an area near their home or school where many different plants and animals live together (e.g., a lawn, a vacant lot, a wooded park, a flower bed) and <i>describe</i> the different plants and animals found there.</li> </ul>
K-1 LS2B	A <i>habitat</i> supports the growth of many different plants and animals by meeting their basic needs of food, water, and shelter.	<ul style="list-style-type: none"> <li>• Identify the <i>characteristics</i> of a habitat that enable the habitat to support the growth of many different plants and animals (e.g., have trees to provide nesting places for birds and squirrels, pond water for tadpoles and frogs, blackberry bushes for rabbits to hide in).</li> </ul>
K-1 LS2C	Humans can change natural <i>habitats</i> in ways that can be helpful or harmful for the plants and animals that live there.	<ul style="list-style-type: none"> <li>• List two or more things that humans do that might harm plants and animals in a given habitat (e.g., throwing litter in a pond might cause difficulty for water birds and fish to find food or might poison the plants and animals that live there).</li> <li>• Communicate ways that humans protect <i>habitats</i> and/or improve conditions for the growth of the plants and animals that live there (e.g., reuse or recycle products to avoid littering).</li> </ul>

**EALR 4:** Life Science

**Big Idea:** Biological Evolution (LS3)

**Core Content:** *Classifying Plants and Animals*

Students learn that some objects are alive and others are not, and that many living things are classified as either plants or animals based on observable features and behaviors. Plants and animals are further classified into smaller groups such as insects and trees. Even these groups can be further subdivided. Classification provides a way to organize and find patterns in the amazing diversity of plants, animals, and the nonliving environment.

	<b>Content Standards</b>	<b>Performance Expectations</b>
	<i>Students know that:</i>	<i>Students are expected to:</i>
K-1 LS3A	Some things are alive and others are not.	<ul style="list-style-type: none"> <li>Use logical rules to sort objects into two groups, those that are alive and those that are not. *a</li> </ul>
K-1 LS3B	There are many different types of living things on Earth. Many of them are classified as plants or animals.	<ul style="list-style-type: none"> <li>Given a list, illustrations, or actual plants or animals, <i>classify</i> them as plants or animals.</li> </ul>
K-1 LS3C	External features of animals and plants are used to <i>classify</i> them into groups.	<ul style="list-style-type: none"> <li><i>Describe</i> several external features and behaviors of animals that can be used to <i>classify</i> them (e.g., size, color, shape of body parts).</li> <li><i>Describe</i> several external features of plants that can be used to <i>classify</i> them (e.g., size, color, kinds of seeds, shapes, or texture of plant parts).</li> <li>Give examples to illustrate how pairs of plants and/or animals are similar to and different from each other (e.g., cats and dogs both have four legs, but many dogs have longer snouts than cats). *b</li> </ul>

**Mathematics Connections**

\*a K.3.B Sort shapes, using a sorting rule, and explain the sorting rule.

\*b K.4.A Make direct comparisons, using measurable attributes such as length, weight, and capacity.

