



Children are scientists from the moment they are born, using their senses to observe and gain knowledge about the world around them. As they grow older, they become increasingly more adept at using their observations to make predictions and to plan investigations in order to solve problems and answer questions. These skills are important aspects of school readiness as they provide a process for children to ask and answer their own questions by absorbing and making sense of information. The components within this domain address a child's ability to use scientific methods—observing, planning for investigations, collecting and analyzing data, and communicating information—as well as indicators of a child's content knowledge of the natural and physical world.

Children with disabilities may demonstrate alternate ways of meeting the goals of science development. Children with visual impairments, for example, will explore and understand a flower in a way that is different from that of a child who can see; and children with a cognitive impairment may reach many of these same goals, but at a different pace, with a different degree of accomplishment, and in a different order than typically developing children. However, the goals for all children are the same, even though the path and the pace toward realizing the goals may be different. Principles of universal design for learning (UDL) offer the least restrictive and most inclusive approach to developing environments and curricula that best support the science development of all children.

Remember: While this domain represents general expectations for science development, each child will reach the individual learning goals at his or her own pace and in his or her own way.

- S 1: Scientific Inquiry and Application
- S 2: Knowledge of Science Concepts





Component 1: Scientific Inquiry and Application
Learning Goal 1.a: Children learn to plan for and carry out investigations and collect, evaluate, and communicate information.

By the following ages, most children will:

9m



- › Demonstrate an awareness of individual objects and stimuli
- › Feel and explore objects placed in their hands and bring the objects to their mouth
- › Use multiple senses to observe and respond to their natural world
- › Bang a block or other object on the floor repeatedly to hear the sound it makes
- › Repeatedly turn an object over and listen to the sound of its movement; purposely push buttons on a toy box to produce a sound
- › Use their bodies as “tools” (a means to an end) to gather information and obtain results (e.g., reaching out and grasping to get the rattle)

18m



- › Demonstrate an awareness that new objects and stimuli are different from already-known objects
- › Vary their behaviors or actions to see what the result will be (e.g., splash hands in water, watch toys move)
- › Explore and manipulate objects to see what happens or how things work (e.g., flip light switches on and off, press buttons on a music player)
- › Pat, push, squish, and pound play dough, clay, or wet sand to experience how it feels and discover what they can do with it
- › Demonstrate a recognition of cause-and-effect relationships (e.g., pushing on a toy truck and watching it roll away)

24m



- › Make simple decisions, take action, and observe the effect of their actions on others (e.g., knocking down a tower of blocks)
- › Make simple predictions about what comes next based on previous experience (e.g., predicting that “outside” time comes after their nap)
- › Explore cause-and-effect relationships (e.g., pushing a button on an adult’s smart phone to change the picture)
- › Use tools to collect information and to influence their environment (e.g., if a toy is on a towel, pulling the blanket to bring the toy closer)

36m



- › Provide simple descriptions of objects, people, and events based on observations
- › Ask questions about the world around them
- › Explore cause-and-effect relationships by intentionally repeating an action and observing the reaction (e.g., attempting to balance blocks on slanted surfaces, using fingers to move objects on a touch screen)
- › Collect information and adapt an approach to reaching a goal by using actual objects as tools (e.g., using a stick to reach something that is under a chair)

48m



- › Make increasingly complex observations about objects and events in their environment (e.g., noticing patterns in events or identifying attributes of objects that are similar and/or different)
- › Make simple predictions and plans to carry out investigations
- › Explore cause-and-effect relationships by intentionally varying the action to change the reaction (e.g., changing the size and/or orientation of blocks used when attempting to build a tall structure that doesn’t fall down)
- › Demonstrate an understanding that tools can be used to gather information and investigate materials (e.g., placing objects on a balance scale to see which is heavier)

60m



- › Use a variety of tools (e.g., measuring devices) to gather information and observe processes and relationships (e.g., using the Internet to find information on what types of food fish eat and how much food they need, using measuring cups to measure fish food, then observing fish and recording how much they eat)
- › Engage in elements of the scientific process, which includes observing, making predictions, recording predictions (through pictures, drawing, or dictation), developing plans for testing hypotheses, trying out ideas, and communicating outcomes
- › Analyze the result of an attempted solution and use the new information to solve a problem (e.g., after observing a paper boat sinking in the water, making a new boat out of different material to see if the new one will float)

Continued



SCIENCE

Component 1: Scientific Inquiry and Application
Learning Goal 1.a: Children learn to plan for and carry out investigations and collect, evaluate, and communicate information.

Continued from previous:

9m

See previous

18m

Continued from previous

› Understand the use of people as “tools” for help (e.g., pulling on an adult’s hand and guiding it to twist the knob on a wind-up toy)

24m

See previous

36m

See previous

48m

See previous

60m

See previous

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Quality science learning experiences provide a solid foundation for the subsequent development of scientific concepts that children will encounter throughout their academic lives. This foundation helps students to construct understanding of key science concepts and allows for future learning of more abstract ideas.

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- Dr. Kathy Cabe Trundle



Component 2: Knowledge of Science Concepts

Learning Goal 2.a: Children explore the characteristic of objects and materials that are living, non-living, man-made, or naturally occurring.

By the following ages, most children will:

9m



- › Show interest and curiosity in the natural world
- › Explore the properties of objects and materials

18m



- › Explore the characteristics of living things (e.g., petting a cat or dog to explore the soft fur)
- › Actively experiment with and explore the physical properties of objects and substances (e.g., stacking and knocking down towers and stacking them up again; bouncing balls; playing with play dough)

24m



- › Observe and react to living things (e.g., when outside, chasing or follow a small creature, such as a butterfly, bird, or lizard)
- › Explore living surfaces (e.g. rolling in grass or playing in the dirt)
- › Explore representations of living things (e.g., playing with a stuffed animal and referring to it as a “doggy”)
- › Explore characteristics of man-made and natural materials (e.g., playing with rocks that are bumpy and smooth, pairing mother and baby toy animals)

36m



- › Show curiosity and ask questions about the natural world
- › Make observations about the characteristics of living things
- › Observe and identify natural materials
- › Compare and contrast properties of physical objects
- › Demonstrate an understanding that different weather requires different clothing (e.g., looking outside at newly fallen snow and running to get boots and mittens)

48m



- › Demonstrate an understanding of the differences between living and non-living things
- › Describe how living things change over time
- › Understand the characteristics of and differences between habitats for people and habitats for animals
- › Investigate the properties of natural elements and provide simple descriptions
- › Use observable characteristics to describe and categorize physical objects and materials based on differences or similarities

60m



- › Describe the characteristics that define living things
- › Observe the similarities, differences, and categories of plants and animals
- › Ask and answer questions about changes in the appearance, behavior, and habitats of living things
- › Use increasingly complex vocabulary to describe natural elements
- › Differentiate between natural and man-made materials
- › Describe changes that occur in the natural environment over time
- › Make observations about physical properties of objects, the motion of toys and objects, and changes in matter