Science

Science and Engineering Practices

Observation and Investigation

1.1 Making Observations

Early (3 to 4½ years)

1. Observe and actively explore objects and events using their senses and describe their observations. 1.1

Later (4 to 5½ years)

1. Observe and actively explore objects and events using their senses and describe their observations in greater detail. 1.1

1.2 Comparing and Contrasting

Early (3 to 4½ years)

2. Compare and contrast objects and events and describe similarities and differences based on observable properties. 1.2

Later (4 to 5½ years)

2. Compare and contrast objects and events based on physical properties and functions and describe similarities and differences in greater detail. 1.2

1.3 Asking Questions

Early (3 to 4½ years)

3. Demonstrate curiosity and raise simple questions about objects and events in their environment. 1.3

Later (4 to 5½ years)

3. Demonstrate curiosity and an increased ability to formulate specific and detailed questions about objects and events in their environment. 1.3

1.4 Defining Problems

Early (3 to 4½ years)

4. Identify problems during play and everyday interactions and try simple solutions on their own or in collaboration with peers and adults. 1.4

Later (4 to 5½ years)

4. Identify problems during play and everyday interactions and try multistep solutions on their own or in collaboration with peers and adults. 1.4

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1.5 Making Predictions

Early (3 to 4½ years)

5. Make simple predictions, give simple reasons for their predictions, and, with adult support, check the predictions through concrete experiences. 1.5

Later (4 to 5½ years)

5. Make more detailed predictions drawing on prior experiences and observations, create plans with adult support to check predictions, and demonstrate an emerging ability to discuss why predictions were correct or incorrect. 1.5

1.6 Planning and Carrying Out Investigations

Early (3 to 4½ years)

6. Carry out simple experiments or investigations, on their own or in collaboration with peers and adults, to test their ideas about their observations. 1.6

Later (4 to 5½ years)

6. Carry out more complex experiments or investigations, on their own or in collaboration with peers and adults, with greater persistence. Use observations and results of prior explorations to generate new questions and test their hypotheses. 1.6

1.7 Using Tools

Early (3 to 4½ years)

7. Identify and use some observation and measurement tools, with adult support. 1.7

Later (4 to 5½ years)

7. Identify and more spontaneously use a greater variety of observation and measurement tools, with some adult support. 1.7

Documentation, Analysis, and Communication

1.8 Documenting Observations and Using Models

Early (3 to 4½ years)

8. Record observations or findings with adult support and use simple representations, including drawings, models, movement, role-play, and other methods, to convey their observations and understanding of science concepts. 1.8

Later (4 to 5½ years)

8. Record observations or findings in greater detail with some adult support and use more elaborate representations, including drawings, models, charts, diagrams, movement, role-play, and other methods, to convey their observations and understanding of science concepts. 1.8

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1.9 Mathematical Thinking and Analyzing Data

Early (3 to 4½ years)

9. Use mathematical thinking to analyze and quantify their observations and answer questions that arise in everyday activities, with adult support. 1.9

Later (4 to 5½ years)

9. Use mathematical thinking with greater precision to analyze and quantify their observations and answer questions that arise in everyday activities, with some adult support. 1.9

1.10 Formulating and Communicating Explanations and Solutions

Early (3 to 4½ years)

10. Formulate and communicate simple explanations and solutions during play and collaborative investigations. 1.10

Later (4 to 5½ years)

10. Formulate and communicate more detailed and precise explanations and solutions during play and collaborative investigations. 1.10

Physical Science

Properties and Characteristics of Nonliving Objects and Materials

2.1 Characteristics of Objects and Materials

Early (3 to 4½ years)

1. Investigate and describe the characteristics and physical properties of objects and solid or nonsolid materials (for example, size, weight, shape, color, texture, smell, and sound). 2.1

Later (4 to 5½ years)

1. Investigate and describe in greater detail the characteristics and physical properties of objects and solid, liquid, or gas materials (for example, size, weight, shape, color, texture, smell, and sound). 2.1

2.2 Light and Sound Waves

Early (3 to 4½ years)

2. Notice and explore sound, light, and shadows using their senses and by manipulating objects and materials during play and collaborative investigations. 2.2

Later (4 to 5½ years)

2. Explore and describe changes in the properties of sound, light, and shadows by manipulating different objects and materials during play and collaborative investigations. 2.2

Changes in Nonliving Objects and Materials

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2.3 Exploring Changes in Objects and Materials

Early (3 to 4½ years)

3. Explore and describe changes in objects and materials using their senses (for example, change in color, shape, texture, temperature) during play and collaborative investigations. 2.3

Later (4 to 5½ years)

3. Explore, describe in greater detail, and explain changes in objects and materials using their senses (for example, change in color, shape, texture, form, temperature) during play and collaborative investigations. 2.3

2.4 Force and Motion

Early (3 to 4½ years)

4. Observe and describe the way objects' speed and direction change and explore the effect of their own actions (for example, pushing, pulling, rolling, dropping) on making objects move or stop during play and collaborative investigations. 2.4

Later (4 to 5½ years)

4. Make and test predictions about how objects change direction, speed, or the distance they go and, based on their observations, explain why objects start, stop, or change direction or speed during play and collaborative investigations. 2.4

2.5 Energy

Early (3 to 4½ years)

5. Demonstrate awareness, with adult support, that things (living and nonliving) need sources of energy to function. 2.5

Later (4 to 5½ years)

5. Demonstrate awareness, with adult support, of the different sources of energy that things (living and nonliving) need and describe the changes they observe as a result of these sources of energy. 2.5

Life Science

Properties and Characteristics of Living Things

3.1 Characteristics of Living Things

Early (3 to 4½ years)

1. Identify and describe characteristics of a variety of animals and plants, including appearance (inside and outside) and behavior, and demonstrate an emerging ability to categorize them. 3.1

Later (4 to 5½ years)

1. Identify and describe characteristics of a greater variety of animals and plants and demonstrate an increased ability to categorize them. 3.1

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3.2 Bodily Processes

Early (3 to 4½ years)

2. Indicate emerging knowledge of bodily processes (for example, eating, sleeping, breathing, walking) in humans and other animals. 3.2

Later (4 to 5½ years)

2. Indicate greater knowledge of bodily processes (for example, eating, sleeping, breathing, walking) in humans and other animals through more detailed observations and descriptions. 3.2

3.3 Living and Nonliving Things

Early (3 to 4½ years)

3. Expect animate objects (people and animals) to self-initiate movement and to have different insides and biological processes that make them behave differently from inanimate objects. 3.3

Later (4 to 5½ years)

3. Indicate knowledge of the difference between living and nonliving things and recognize that only living things (people, animals, plants) undergo biological changes such as growth, illness, healing, and dying. 3.3

3.4 Heredity and Traits

Early (3 to 4½ years)

4. Name and describe similarities and differences they observe between grown animals, including humans, and their young ones. 3.4

Later (4 to 5½ years)

4. Express their expectation that young animals and plants will reflect similar characteristics to grown animals and plants of the same kind. 3.4

3.5 Habitats

Early (3 to 4½ years)

5. Identify the habitats of people and familiar animals and plants and communicate their understanding that living things have different habitats. 3.5

Later (4 to 5½ years)

5. Recognize that living things have different habitats suited to their unique needs. 3.5

Changes in Living Things

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3.6 Growth, Change, and the Life Cycle of Living Things

Early (3 to 4½ years)

6. Observe and explore growth and changes in humans, animals, and plants and communicate an understanding that living things change over time in size and other capacities as they grow and age. 3.6

Later (4 to 5½ years)

6. Observe and explore growth in humans, animals, and plants and communicate an increased understanding that living things change as they grow and age. Describe transformations related to an individual's life cycle (for example, birth, growth, reproduction, death). 3.6

3.7 Needs of Living Things

Early (3 to 4½ years)

7. Recognize that animals and plants require care and show an emerging understanding that feeding and watering support the growth and survival of humans, animals, and plants. 3.7

Later (4 to 5½ years)

7. Describe the needs of humans, animals, and plants for growth and survival (for example, food, water, sleep, sunshine, shelter). 3.7

Earth and Space Science

Properties and Characteristics of Earth Materials and Objects

4.1 Characteristics of Earth Materials

Early (3 to 4½ years)

1. Investigate and describe the characteristics (for example, size, weight, shape, color, texture) of earth materials such as sand, rocks, soil, water, and air. 4.1

Later (4 to 5½ years)

1. Investigate and describe the characteristics of earth materials and compare and contrast materials based on their different features (for example, size, weight, shape, color, texture). 4.1

Changes in the Earth and Space

4.2 Natural Objects in the Sky

Early (3 to 4½ years)

2. Observe and describe natural objects in the sky (sun, moon, stars, and clouds). 4.2

Later (4 to 5½ years)

2. Observe and describe natural objects in the sky and describe patterns of movement and apparent changes in the sun, moon, stars, and clouds. 4.2

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4.3 Weather

Early (3 to 4½ years)

3. Notice and describe changes in weather. Notice the effects of weather and seasonal changes on their own lives and on plants and animals. 4.3

Later (4 to 5½ years)

3. Observe and describe changes in weather and provide examples of the effects of changes in weather and seasons on their own lives and on plants and animals. 4.3

4.4 Earth and Human Activity

Early (3 to 4½ years)

4. Notice, with adult prompting and support, how humans' actions and use of resources impact the environment and their community, participate in activities related to caring for the environment. 4.4

Later (4 to 5½ years)

4. Investigate, with adult support, how humans' actions and use of resources impact the environment and their community, discuss in simple terms how to care for the environment, and participate in activities related to its care. 4.4

Engineering, Technology, and Applications of Science

Engineering Design

5.1 Engineering Design Process

Early (3 to 4½ years)

1. Engage collaboratively with peers and adults in engineering design by identifying problems in play and everyday activities, planning and creating simple solutions to the problems they identify, and, with adult support, testing and refining their solutions. 5.1

Later (4 to 5½ years)

1. Engage collaboratively with peers and adults in engineering design by identifying problems in play and everyday activities, planning and creating more detailed solutions to the problems they identify, and testing and refining their solutions with less adult support and over longer periods of time. 5.1

Engineering Design and Society

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5.2 Design Solutions and Society

Early (3 to 4½ years)

2. Notice and explore, with adult support, how tools and design solutions help address their own and other people's needs and goals in everyday life. 5.2

Later (4 to 5½ years)

2. Explore in more detail how tools and design solutions help address their own and other people's needs and, with adult support, develop different solutions to address the needs of their families and communities. 5.2

5.3 Using Digital Devices

Early (3 to 4½ years)

3. Demonstrate emerging understanding that different digital tools and devices serve different functions (for example, taking videos or photos) and use digital tools, with adult support, to meet their needs and goals in everyday situations. 5.3

Later (4 to 5½ years)

3. Recognize a greater diversity of digital tools and devices and their function (for example, look up information, learn or practice a new skill) and use them with less adult support to meet their needs and goals in everyday situations. 5.3