K.ETS1.A: Defining and Delimiting Engineering Problems

A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (K-2-ETS1-1)

Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)
K.ETS1.B: Developing Possible Solutions

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)

K.ETS1.C: Optimizing the Design Solution

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

K.PS2.A: Forces and Motion

Pushes and pulls can have different strengths and directions. (K-PS2-2)
**DCI: Motion and Stability: Forces and Interactions**

**K.PS2.A: Forces and Motion**

Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-2)

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**DCI: Motion and Stability: Forces and Interactions**

**K.ETS1.A: Defining and Delimiting Engineering Problems**

A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (K-PS2-2)

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**DCI: Earth and Human Activity**

**K.ESS3.B: Natural Hazards**

Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-E3S-2)
DCI: Earth and Human Activity

K.ETS1.A: Defining and Delimiting Engineering Problems

Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-ESS3-2)

DCI: Earth’s Systems

K.ESS2.A: Earth Materials and Systems

Wind and water can change the shape of the land. (2-ESS2-1)

DCI: Earth’s Systems

K.ETS1.C: Optimizing the Design Solution

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (2-ESS2-1)
**DCI: Earth and Human Activity**

**K.ESS3.C: Human Impacts on Earth Systems**

Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (K-ESS3-3)

**DCI: Earth and Human Activity**

**K.ETS1.B: Developing Possible Solutions**

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-ESS3-3)

**DCI: Earth and Human Activity**

**K.PS4.C: Information Technologies and Instrumentation**

People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)
**K.LS2.A: Interdependent Relationships in Ecosystems**

Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)

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**K.ETS1.B: Developing Possible Solutions**

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (2-LS2-2)

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**Performance Expectation**

**K-2-ETS1-1:** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

**Clarification Statement:** none

**Assessment Boundary:** none
Performance Expectation

**K-2-ETS1-2:** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

**Clarification Statement:** none

**Assessment Boundary:** none

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Performance Expectation

**K-2-ETS1-3:** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

**Clarification Statement:** none

**Assessment Boundary:** none

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Performance Expectation

**K-PS2-2:** Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

**Clarification Statement:** Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.

**Assessment Boundary:** Assessment does not include friction as a mechanism for change in speed.
Performance Expectation

K-ESS3-2: Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

Clarification Statement: Emphasis is on local forms of severe weather.
Assessment Boundary: none

Performance Expectation

2-ESS2-1: Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.
Assessment Boundary: none

Performance Expectation

K-ESS3-3: Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.
Assessment Boundary: none
Performance Expectation

1-PS4-4: Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string “telephones,” and a pattern of drum beats.

Assessment Boundary: Assessment does not include technological details for how communication devices work.

Performance Expectation

2-LS2-2: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Clarification Statement: none

Assessment Boundary: none

Science and Engineering Practice

Asking Questions and Defining Problems

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.

Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)
Science and Engineering Practice

**Asking Questions and Defining Problems**
Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.
Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

Science and Engineering Practice

**Developing and Using Models**
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

Science and Engineering Practice

**Analyzing and Interpreting Data**
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)
Science and Engineering Practice

**Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2)

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Science and Engineering Practice

**Asking Questions and Defining Problems**

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.

Ask questions based on observations to find more information about the designed world. (K-ESS3-2)

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Science and Engineering Practice

**Obtaining, Evaluating, and Communicating Information**

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)
Science and Engineering Practice

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomenon and designing solutions.

**Compare multiple solutions to a problem. (2-ESS2-1)**

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**Obtaining, Evaluating, and Communicating Information**

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

**Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)**

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**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomenon and designing solutions.

**Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)**
Developing and Using Models

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)

Structure and Function

The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Cause and Effect

Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-2)
Crosscutting Concept

**Cause and Effect**
Events have causes that generate observable patterns. (K-ESS3-2)

Crosscutting Concept

**Stability and Change**
Things may change slowly or rapidly. (2-ESS2-1)

Crosscutting Concept

**Cause and Effect**
Events have causes that generate observable patterns. (K-ESS3-3)
Crosscutting Concept

**Structure and Function**
The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Connection to Engineering, Technology, and Applications of Science

**Science Addresses Questions About the Natural and Material World**
Scientists study the natural and material world. (2-ESS2-1)

Connection to Engineering, Technology, and Applications of Science

**Influence of Science, Engineering, and Technology on Society and the Natural World**
People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2)
Interdependence of Science, Engineering, and Technology

People encounter questions about the natural world every day. (K-ESS3-2)

Influence of Science, Engineering, and Technology on Society and the Natural World

Developing and using technology has impacts on the natural world. (2-ESS2-1)

Influence of Science, Engineering, and Technology on Society and the Natural World

People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)
**Common Core State Standards for ELA/Literacy**

**Reading Informational Text**

**RI.2.1 - Key Ideas and Details**

Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)

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**Common Core State Standards for ELA/Literacy**

**Speaking & Listening**

**SL.2.5 - Presentation of Knowledge and Ideas**

Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

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**Common Core State Standards for ELA/Literacy**

**Card Type name**

**W.2.6 - Production and Distribution of Writing**

With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1), (K-2-ETS1-3)
**Common Core State Standards for ELA/Literacy**

**Card Type name**

**W.2.8 - Research to Build and Present Knowledge**

Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1), (K-2-ETS1-3)

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**Common Core State Standards for Mathematics**

**Measurement & Data**

**2.MD.D.10 - Represent and interpret data.**

Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1), (K-2-ETS1-3)

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**Common Core State Standards for Mathematics**

**Mathematical Practices**

**MP.2 - Reason abstractly and quantitatively**

CCSS text (K-2-ETS1-1), (K-2-ETS1-3)
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