CAISL
Carlucci American International School of Lisbon

GRADE 3 SCIENCE FRAMEWORK

Contents

THEMES AND CONTENT

- Forces and Interactions
- Life Cycles, Traits, and Environmental Impacts on Organisms
- Weather and Climate

SCIENCE AND ENGINEERING PRACTICES (DEVELOPMED IN CONJUNCTION WITH THE PERFORMANCE INDICATORS)

Asking Questions and Defining Problems

Asking questions and defining problems in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships.

- Ask questions about what would happen if a variable is changed.
- Identify scientific (testable) and non-scientific (non-testable) questions.
- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
- Use prior knowledge to describe problems that can be solved.

- 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.

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Identify limitations of models.
- Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- Develop and/or use models to describe and/or predict phenomena.
- Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- 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.
- Evaluate appropriate methods and/or tools for collecting data.
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Make predictions about what would happen if a variable changes.
- Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.

Analyzing and Interpreting Data

Analyzing data in 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.

- Represent data in tables and/or various graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.
- Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.
- Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
- Analyze data to refine a problem statement or the design of a proposed object, tool, or process.
- Use data to evaluate and refine design solutions.

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Decide if qualitative or quantitative data are best to determine whether a proposed object or tool meets criteria for success.
- Organize simple data sets to reveal patterns that suggest relationships.
- Describe, measure, estimate, and/or graph quantities (e.g., area, volume, weight, time) to address scientific and engineering questions and problems.
- Create and/or use graphs and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem.

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 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.

- Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard).
- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
- Identify the evidence that supports particular points in an explanation.
- Apply scientific ideas to solve design problems.
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

Engaging in Argument from Evidence

Engaging in argument from evidence in 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 world(s).

- Compare and refine arguments based on an evaluation of the evidence presented.
- Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation.
- Respectfully provide and receive critiques from peers about a proposed procedure, explanation, or model by citing relevant evidence and posing specific questions.
- Construct and/or support an argument with evidence, data, and/or a model.
- Use data to evaluate claims about cause and effect.
- 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.

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence.
- Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices.
- Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the engagement in other scientific and/or engineering practices.
- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media as well as tables, diagrams, and charts.

SCIENCE NOTEBOOK EXPECTATIONS

- In Grade 3, students are introduced to the use of a science notebook.
- Inquiry is the focus of science notebooks.
- Students build their own science notebook in order to feel ownership of their science exploration.
- Science notebooks can include student notes added to structured pages such as cloze reading, graphic organizers, unlabeled diagrams, and questions to guide reflections for investigations.

SCIENTIFIC WRITING EXPECTATIONS

- In Grade 3, students are introduced to new vocabulary such as data and conclusion.
- Students start an investigation by talking about the purpose, and practice developing a focus question as a class based on an initial observations or a prompt at the beginning of the investigation. By the end of the investigation they will be able to answer their focus question.
- Students write observations and collect data during their investigations.
- Students write a paragraph to describe patterns and come to conclusions about the observations and data collected during their investigations.

SCIENCE LABORATORY SAFETY EXPECTATIONS

Students will be expected to learn and to follow the expectations for safe and appropriate practices during laboratory activity, as shown on the "Science Laboratory Safety" document.

See link below:
https://www.caislisbon.org/uploaded/Curriculum_links/Science/Science_lab_safety_EC3to5th.pdf

INFORMATION TECHNOLOGY EXPECTATIONS

Students will be expected to use a variety of digital tools according to grade level expectations stated in CAISL's Research and Information Technology Integration Scope and Sequence.
See link below:
https://www.caislisbon.org/uploaded/Curriculum_links/2019-2020/IT_Skills_Scope_and_Sequence_by_Grade.pdf

PERFORMANCE INDICATORS (ASSESSED ON REPORT CARDS)

PHYSICAL SCIENCE

Motion and Stability: Forces and Interactions: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. DOK 4
Motion and Stability: Forces and Interactions: Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. DOK 2

Motion and Stability: Forces and Interactions: Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. DOK 3
Motion and Stability: Forces and Interactions: Define a simple design problem that can be solved by applying scientific ideas about magnets. DOK 3

LIFE SCIENCE
From Molecules to Organisms: Structures and Processes: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. DOK 4
Ecosystems: Interactions, Energy, and Dynamics: Construct an argument that some animals form groups that help members survive. DOK 3
Heredity: Inheritance and Variation of Traits: Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. DOK 3
Heredity: Inheritance and Variation of Traits: Use evidence to support the explanation that traits can be influenced by the environment. DOK 4
Biological Evolution: Unity and Diversity: Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. DOK 3
Biological Evolution: Unity and Diversity: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. DOK 4
Biological Evolution: Unity and Diversity: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. DOK 4
Biological Evolution: Unity and Diversity: 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. DOK 4

EARTH AND SPACE SCIENCE
Earth's Systems: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. DOK 2
Earth's Systems: Obtain and combine information to describe climates in different regions of the world. DOK 3
Earth and Human Activity: Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. DOK 4

ENGINEERING, TECHNOLOGY, AND APPLICATIONS OF SCIENCE
Engineering Design: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. DOK 3
Engineering Design: 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. DOK 4
Engineering Design: 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. DOK 3