

Alignment with Alaska's Science Standards

This document evaluates the state's Education Standards for Science to determine alignment with content found in Cogno board games. Grades 3-8 were analyzed.



Highlighting Key

Indicates a significant amount of material addresses the standard

Indicates a moderate amount of material is present to develop student understanding of the standard

A. Science as Inquiry and Process

A student should understand and be able to apply the processes and applications of scientific inquiry.

SA1 Students develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments.

[3] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

[3] SA1.2 observing and describing the student's own world to answer simple questions

[4] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

[5] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

[6] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

[7] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

[8] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

SA2 Students develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.

[3] SA2.1 answering "how do you know?" questions with reasonable answer

[4] SA2.1 supporting the student's own ideas with observations and peer review

[5] SA2.1 supporting the student's own statements with facts from a variety of resources and by identifying their sources

[6] SA2.1 identifying and differentiating fact from opinion

[7] SA2.1 identifying and evaluating the sources used to support scientific statements

[8] SA2.1 recognizing and analyzing differing scientific explanations and models

SA3 Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and that local

applications provide opportunity for understanding scientific concepts and global issues.

[3] SA3.1 observing local conditions that determine which plants and/or animals survive

[4] SA3.1 identifying the local limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive

[5] SA3.1 identifying the limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive

B. Concepts of Physical Science

SB Students develop an understanding of the concepts, models, theories, universal principles, and facts that explain the physical world.

SB1 Students develop an understanding of the characteristic properties of matter and the relationship of these properties to their structure and behavior.

[4] SB1.1 identifying and comparing the characteristics of gases, liquids, and solids

SB2 Students develop an understanding that energy appears in different forms, can be transformed from one form to another, can be transferred or moved from one place or system to another, may be unavailable for use, and is ultimately conserved.

[6] SB2.1 recognizing that energy can exist in many forms (i.e., heat, light, chemical, electrical, mechanical)

[7] SB2.1 explaining that energy (i.e., heat, light, chemical, electrical, mechanical) can change form

SB3 Students develop an understanding of the interactions between matter and energy, including physical, chemical, and nuclear changes, and the effects of these interactions on physical systems.

[3] SB3.1 recognizing that temperature changes cause changes in phases of substances (e.g., ice changing to liquid, water changing to water vapor, and vice versa)

[4] SB3.1 explaining that temperature changes cause changes in phases of substances (e.g., ice changing to liquid water and liquid water to water vapor)

[5] SB3.1 identifying physical and chemical changes based on observable characteristics (e.g., tearing paper vs. burning paper)

[6] SB3.1 recognizing that most substances can exist as a solid, liquid, or gas depending on temperature

[8] SB3.1 exploring changes of state with increase or decrease of particle speed associated with heat transfer

SB4 Students develop an understanding of motions, forces, their characteristics and relationships, and natural forces and their effects.

[3] SB4.2 recognizing that objects can be moved without being touched (e.g., using magnets, falling objects, static electricity)

[4] SB4.1 simulating that changes in speed or direction of motion are caused by forces

[5] SB4.1 investigating that the greater the force acting on an object, the greater the change in motion will be

[6] SB4.2 stating that every object exerts gravitational force on every other object

[6] SB4.3 making waves move through a variety of media

[7] SB4.1 illustrating that unbalanced forces will cause an object to accelerate

[8] SB4.1 demonstrating and explaining circular motion

[8] SB4.2 describing the interactions between charges

C. Concepts of Life Science

SC Students develop an understanding of the concepts, models, theories, facts, evidence, systems, and processes of life science.

SC1 Students develop an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution.

[3] **SC1.2** describing how some traits (e.g., claws, teeth, camouflage) of living organisms have helped them survive as a species

[6] **SC1.2** recognizing that species survive by adapting to changes in their environment

[7] **SC1.2** describing possible outcomes of mutations (i.e., no effect, damage, benefit)

[8] **SC1.1** describing the role of genes in sexual reproduction (i.e., traits of the offspring)

SC2 Students develop an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms.

[3] **SC2.2** observing and comparing external features of plants and of animals that may help them grow, survive, and reproduce

[4] **SC2.2** describing the basic characteristics and requirements of living things

[5] **SC2.2** explaining how external features and internal systems (i.e., respiratory, excretory, skeletal, circulatory, and digestive) of plants and animals may help them grow, survive, and reproduce

[6] **SC2.1** using a dichotomous key to classify animals and plants into groups using external or internal features

[8] **SC2.2** explaining that most organisms utilize inherited and learned behaviors to meet the basic requirements of life

SC3 Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

[3] **SC3.2** organizing a simple food chain of familiar plants and animals things and the relationship between them (e.g., living things need water, herbivores need plants)

[4] **SC3.1** identifying examples of living and non-living things and the relationship between them (e.g., living things need water, herbivores need plants)

D. Concepts of Earth Science

SD Students develop an understanding of the concepts, processes, theories, models, evidence, and systems of earth and space sciences.

SD1 Students develop an understanding of Earth's geochemical cycles.

[3] **SD1.1** recognizing that most rocks are composed of combinations of different substances

[4] **SD1.1** describing that most smaller rocks come from the breaking and weathering of larger rocks as part of the rock cycle

SD2 Students develop an understanding of the origins, ongoing processes, and forces that shape the structure, composition, and physical history of the Earth.

[6] **SD2.2** identifying and describing its layers (i.e., crust, mantle, core)

SD3 Students develop an understanding of the cyclical changes controlled by energy from the sun and by Earth's position and motion in our solar system.

[4] **SD3.1** recognizing changes to length of daylight over time and its relationship to seasons

[8] **SD3.1** recognizing the relationship between the seasons and Earth's tilt relative to the sun and describing the day/night cycle as caused by the rotation of the Earth every 24 hours

SD4 Students develop an understanding of the theories regarding the evolution of the universe.

- [3] SD4.1 recognizing that objects appear smaller the farther away they are
- [3] SD4.2 recognizing that objects have properties, locations, and movements that can be observed and described
- [3] SD4.3 recognizing and using appropriate instruments of magnification (e.g., binoculars and telescopes)
- [4] SD4.1 recognizing that stars are like the sun but are so far away that they look like points of light
- [4] SD4.2 recognizing that objects have properties, locations, and movements that can be observed and described
- [5] SD4.1 distinguishing among stars, planets, moons, comets, and meteors
- [5] SD4.2 recognizing that the Earth is in regular and predictable motion and this motion explains the length of a day and a year
- [5] SD4.3 recognizing and using appropriate instruments of magnification (e.g., binoculars and telescopes)
- [6] SD4.1 contrasting characteristics of planets and stars (i.e., light reflecting, light emitting, orbiting, orbited, composition)
- [6] SD4.2 defining a light year
- [7] SD4.1 comparing and contrasting characteristics of planets and stars (i.e., light reflecting, light emitting, orbiting, orbited, composition)
- [7] SD4.2 using light years to describe distances between objects in the universe
- [8] SD4.2 comparing the brightness of a star to its distance and size

E. Science and Technology

SE Students develop an understanding of the relationships among science, technology, and society.

SE2 Students develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that lead to the exploration of multiple paths that are analyzed using scientific, technological, and social merits.

- [6] SE2.1 identifying and designing a solution to a problem

SE3 Students develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures.

- [4] SE3.1 listing the positive and negative effects of a scientific discovery
- [7] SE3.1 recognizing the effects of a past scientific discovery, invention, or scientific breakthrough (e.g., DDT, internal combustion engine)
- [8] SE3.1 predicting the possible effects of a recent scientific discovery, invention, or scientific breakthrough

G. History and Nature of Science

SG Students develop an understanding of the history and nature of science.

SG1 Students develop an understanding that historical perspectives of scientific explanations demonstrate that scientific knowledge changes over time, building on prior knowledge.

- [8] SG2.1 describing how repeating experiments improves the likelihood of accurate results

SG2 Students develop an understanding that the advancement of scientific knowledge embraces innovation and requires empirical evidence, repeatable investigations, logical arguments, and critical review in striving for the best possible explanations of the natural world.

[3] **SG2.1** comparing the results of multiple observations of a single local event

[4] **SG2.1** recognizing the need for repeated measurements

SG3 Students develop an understanding that scientific knowledge is ongoing and subject to change as new evidence becomes available through experimental and/or observational confirmation(s).

[7] **SG3.1** revising a personal idea when presented with experimental/observational data inconsistent with that personal idea (e.g., the rates of falling bodies of different masses)

[8] **SG3.1** revising a personal idea when presented with experimental/observational data inconsistent with that personal idea (e.g., the rates of falling bodies of different masses)

SG4 Students develop an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base.

[3] **SG4.1** asking questions about the natural world

[4] **SG4.1** using an account of a discovery to recognize that an individual's (e.g., George Washington Carver, Marie Curie) curiosity led to advancements in science

[5] **SG4.1** investigating that scientists' curiosity led to advancements in science

Please note that use of these standards does not imply this state's endorsement of Cogno.