

Alignment with Maine'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. Unifying Themes: Students apply the principles of *systems*, *models*, constancy and change, and scale in science and technology.

A4 Scale

Grades 3-5

Students use mathematics to describe scale for man-made and natural things.

- Measure things to compare sizes, speeds, times, distances, and weights.
- Use fractions and multiples to make comparisons of scale.

Grades 6-8

Students use scale to describe objects, phenomena, or processes related to Earth, space, matter, and mechanical and living *systems*.

- Describe how some things change or work differently at different scales.
- Use proportions, averages, and ranges to describe small and large extremes of scale.

B. The Skills and Traits of Scientific Inquiry and Technological Design: Students plan, conduct, analyze data from and communicate results of in-depth scientific investigations; and they use a systematic process, tools, equipment, and a variety of materials to create a *technological design* and produce a solution or product to meet a specified need.

B1 Skills and Traits of Scientific Inquiry

Grades 3-5

Students plan, conduct, analyze data from, and communicate results of investigations, including *fair tests*.

- Pose investigable questions and seek answers from reliable sources of scientific information and from their own investigations.
- Communicate scientific procedures and explanations.

Grades 6-8

Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments.

- a. Identify questions that can be answered through scientific investigations.
- b. Use mathematics to gather, organize, and present data and structure convincing explanations.
- c. Use logic, critical reasoning and evidence to develop descriptions, explanations, predictions, and models.
- d. Communicate, critique, and analyze their own scientific work and the work of other students.

C. The Scientific and Technological Enterprise: Students understand the history and nature of scientific knowledge and technology, the processes of inquiry and *technological design*, and the impacts science and technology have on society and the environment.

C1 Understandings of Inquiry

Grades 3-5

Students describe how scientific investigations result in explanations that are communicated to other scientists.

- a. Describe how scientists answer questions by developing explanations based on observations, evidence, and knowledge of the natural world.

Grades 6-8

Students describe how scientists use varied and systematic approaches to investigations that may lead to further investigations.

- a. Describe how scientists' analyses of findings can lead to new investigations.

C2 Understandings About Science and Technology

Grades 3-5

Students describe why people use science and technology and how scientists and engineers work.

- a. Describe how scientists seek to answer questions and explain the natural world.

C4 History and Nature of Science

Grades 6-8

Students describe historical examples that illustrate how science advances knowledge through the scientists involved and through the ways scientists think about their work and the work of others.

- a. Describe a breakthrough from the history of science that contributes to our current understanding of science.
- b. Describe and provide examples that illustrate that science is a human endeavor that generates explanations based on verifiable evidence that are subject to change when new evidence does not match existing explanations.

D. The Physical Setting: Students understand the universal nature of matter, energy, force, and motion and identify how these relationships are exhibited in Earth Systems, in the solar system, and throughout the universe.

D1 Universe and Solar System

Grades 3-5

Students describe the positions and apparent motions of different objects in and beyond our solar system and how these objects can be viewed from Earth.

- a. Show the locations of the sun, Earth, moon, and planets and their orbits.
- b. Recognize that the sun is a star and is similar to other stars in the universe.

Grades 6-8

Students explain the movements and describe the location, composition, and characteristics of our solar system and universe, including planets, the sun, and galaxies.

- a. Describe the different kinds of objects in the solar system including planets, sun, moons, asteroids, and comets.
- b. Describe the location of our solar system in its galaxy and explain that other galaxies exist and that they include stars and planets.

D2 Earth

Grades 3-5

Students describe the properties of Earth's surface materials, the processes that change them, and cycles that affect the Earth.

- a. Recognize that the sun is the source of Earth's surface heat and light energy.
- b. Explain how the substance called air surrounds things, takes up space, and its movement can be felt as wind.

Grades 6-8

Students describe the various cycles, physical and biological forces and processes, position in space, energy transformations, and human actions that affect the short-term and long-term changes to the Earth.

- a. Describe the effect of gravity on objects on Earth.

D3 Matter and Energy

Grades 3-5

Students describe properties of objects and materials before and after they undergo a change or interaction.

- a. Describe how the weight of an object compares to the sum of the weight of its parts.
- b. Explain that the properties of a material may change but the total amount of material remains the same.
- c. Explain that materials can be composed of parts too small to be seen without magnification.

Grades 6-8

Students describe physical and chemical properties of matter, interactions and changes in matter, and transfer of energy through matter

- a. Use examples of energy transformations from one form to another to explain that energy cannot be created or destroyed.
- b. Describe the properties of solar radiation and its interaction with objects on Earth.

D4 Force and Motion

Grades 3-5

Students summarize how various forces affect the motion of objects.

- a. Predict the effect of a given force on the motion of an object.

- b. Describe how fast things move by how long it takes them to go a certain distance.
- c. Describe the path of an object.
- d. Give examples of how gravity, magnets, and electrically charged materials push and pull objects.

Grades 6-8

Students describe the force of gravity, the motion of objects, the properties of waves, and the wavelike property of energy in light waves.

- a. Describe the similarities and differences in the motion of sound vibrations, earthquakes, and light waves.
- b. Explain the relationship among visible light, the electromagnetic spectrum, and sight.
- c. Describe and apply an understanding of how the gravitational force between any two objects would change if their mass or the distance between them changed.
- d. Describe and apply an understanding of the effects of multiple forces on an object, and how unbalanced forces will cause changes in the speed or direction.

E. The Living Environment: Students understand that cells are the basic unit of life, that all life as we know it has evolved through genetic transfer and natural selection to create a great diversity of organisms, and that these organisms create interdependent webs through which matter and energy flow. Students understand similarities and differences between humans and other organisms and the interconnections of these interdependent webs.

E1 Biodiversity

Grades 3-5

Students compare living things based on their behaviors, external features, and environmental needs.

- a. Describe how living things can be sorted in many ways, depending on which features or behaviors are used to sort them, and apply this understanding to sort living things.

E2 Ecosystems

Grades 3-5

Students describe ways organisms depend upon, interact within, and change the living and non-living environment as well as ways the environment affects organisms.

- a. Explain how changes in an organism's habitat can influence its survival.

Grades 6-8

Students examine how the characteristics of the physical, non-living (abiotic) environment, the types and behaviors of living (biotic) organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are part.

- a. Explain that the total amount of matter in the environment stays the same even as its form and location change.

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