

Alignment with Nebraska'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

Grades 2-4

4.1 Unifying Concepts and Processes

Unifying concepts and processes help students think about and integrate a range of basic ideas which builds an understanding of the natural world.

4.1.2 By the end of fourth grade, students will develop an understanding of evidence, models, and explanation.

- Use evidence gathered from an investigation to develop a scientific explanation.
- Create a model, graph, or illustration that represents an object, living thing, or an event.
- Explain and answer questions about a model and how it represents an object, living thing, or an event.

4.1.3 By the end of fourth grade, students will develop an understanding of change, constancy, and measurement.

- Describe observable changes (e.g., speed, pattern, shape, position, and size).
- Measure a change using appropriate tools and units of measurement.

4.2 Science As Inquiry

Science as inquiry requires students to combine processes and scientific knowledge with scientific reasoning and critical thinking to develop their understanding of science.

4.2.1 By the end of fourth grade, students will develop the abilities needed to do scientific inquiry.

- Ask a question about objects, organisms, and events in their surroundings.
- Plan and conduct a simple investigation.
- Use data develop reasonable explanations.
- Communicate procedures, results, and explanations of an investigation.

4.3 Physical Science

Physical science focuses on the science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

4.3.1 By the end of fourth grade, students will develop an understanding of the characteristics of objects and materials.

- Classify objects by observable characteristics (shape, size, and color).
- Demonstrate that materials can change from solid to liquid to gas by heating and from gas to liquid to solid by cooling.

4.3.2 By the end of fourth grade, students will develop an understanding of the position and motion of objects.

- Use reference points to describe the position of an object.
- Describe an object's motion by tracing its position over time.
- Demonstrate that the position and motion of objects can be changed by pushing or pulling.
- Demonstrate how sound is produced when objects vibrate.

4.3.3 By the end of fourth grade, students will develop an understanding of light, heat, electricity, and magnetism.

- Distinguish between reflection and refraction of light.
- Describe the physical properties of magnets.

4.5 Earth and Space Science

Earth and space science focuses on the science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

4.5.2 By the end of fourth grade, students will develop an understanding of objects in the sky.

- Observe and describe how objects move in patterns (e.g., sun, moon, stars, and clouds).

4.6 Science and Technology

An understanding of science and technology establishes connections between the natural and designed world, by linking science with technology.

4.6.1 By the end of fourth grade, students will develop an understanding of technological design.

- Identify a simple problem.
- Propose a solution to a simple problem.
- Implement the proposed solution.
- Evaluate the implementation.
- Communicate the problem, design, and solution.

4.6.2 By the end of fourth grade, students will develop an understanding of science and technology.

- Identify tools or techniques that use scientific knowledge to solve problems.

4.7 Science in Personal and Social Perspectives

A personal and social perspective of science helps a student understand and act on personal and social issues. This perspective builds a foundation for future decision making.

4.7.4 By the end of fourth grade, students will develop an understanding of how science and technology helps communities resolve problems.

- Research and explain how science and technology affect the quality of life.

4.8 History and Nature of Science

The history and nature of science illustrates different aspects of scientific inquiry, the human aspects of science, and the role of science in the development of various cultures.

4.8.1 By the end of fourth grade, students will develop an understanding of science as a human endeavor.

- Research and report on the contributions to science and technology throughout history by men and women scientists of diverse cultures.

- Research and report on how science is used in different careers.
- Research and report on how current scientific discoveries illustrate that science is an ongoing process.

Grades 5-8

8.1 Unifying Concepts and Processes

Unifying concepts and processes help students think about and integrate a range of basic ideas which builds an understanding of the natural world.

8.1.1 By the end of eighth grade, students will develop an understanding of systems, order, and organization.

- Recognize and describe key parts and functions of any system.
- Analyze and predict the interactions within a system and between systems.
- Create and use classification schemes.
- Interpret cause and effect relationships within and between systems.

8.1.2 By the end of eighth grade, students will develop an understanding of evidence, models, and explanation.

- Collect, manipulate, and analyze data from an experiment.
- Observe and develop models (e.g., physical, mathematical, mental, and computer simulations).
- Interpret and explain results of experimentation.
- Analyze whether or not investigative procedures and conclusions are reasonable.

8.1.3 By the end of eighth grade, students will develop an understanding of change, constancy, and measurement.

- Select and use appropriate measurement units.
- Quantify changes in systems (e.g., magnitude, direction, and rate).
- Apply English and metric systems of measurements.
- Investigate and describe changes in terms of scale, rate, and pattern.

8.2 Science as Inquiry

Science as inquiry requires students to combine processes and scientific knowledge with scientific reasoning and critical thinking to develop their understanding of science.

8.2.1 By the end of eighth grade, students will develop the abilities needed to do scientific inquiry.

- Identify questions and form hypotheses that can be examined through scientific investigations.
- Given evidence, develop descriptions, explanations, predictions, and models.
- Show the relationship between evidence and explanations.
- Recognize and analyze alternative explanations and predictions.
- Communicate scientific procedures and explanations.
- Use mathematics in scientific inquiry.

8.3 Physical Science

Physical science focuses on the science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

8.3.2 By the end of eighth grade, students will develop an understanding of motion and forces.

- Investigate and describe the motion of an object by its position, direction of motion, and speed.
- Investigate and demonstrate that the speed and/or direction of an object changes when a force is applied to that object.

8.4 Life Science

Life science focuses on the science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

8.4.5 By the end of eighth grade, students will develop an understanding of diversity and adaptations of organisms.

- Investigate and explain how organisms adapt to living and nonliving factors in a biome.

8.5 Earth and Space Science

Earth and space science focuses on the science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.

8.5.1 By the end of eighth grade, students will develop an understanding of the structure of the earth.

- Investigate and describe the crust, mantle, and core of the earth.
- Investigate and describe the composition of the atmosphere at different altitudes.

8.5.2 By the end of eighth grade, students will develop an understanding of the earth's history.

- Investigate and describe how earth processes that occur today (e.g., volcanism, weather, and erosion) are similar to those that occurred in the past.

8.5.3 By the end of eighth grade, students will develop an understanding of the earth in the solar system.

- Investigate and list the components of the solar system.
- Investigate and describe the motion of objects in the solar system that support the concepts of day, year, eclipses, and phases of the moon.
- Investigate and describe the influence of gravity on objects in the solar system.
- Investigate and describe the sun as the major source of energy that influences the atmosphere and the earth's surface.
- Investigate and describe the effect of the tilt of the earth's axis on seasons.

8.6 Science and Technology

An understanding of science and technology establishes connections between the natural and designed world, linking science and technology.

8.6.2 By the end of eighth grade, students will develop an understanding of science and technology.

- Distinguish between scientific inquiry (asking questions about the natural world) and technological design (using science to solve practical problems).
- Describe how science and technology are reciprocal.
- Assess the avoidable and unavoidable limits of a technological design.
- Recognize that solutions have intended and unintended consequences.

8.7.5 By the end of eighth grade, students will develop an understanding of science and technology in society.

Example Indicators

- Explain that the effect of science on society is neither entirely beneficial nor entirely detrimental.
- Describe how societal challenges and priorities influence research priorities.
- Explain why science cannot answer all questions and technology cannot solve all human problems or meet all human needs.

8.8 History and Nature of Science

An understanding of the history and nature of science illustrates different aspects of scientific inquiry,

the human aspects of science, and the role of science in the development of various cultures.

8.8.1 By the end of eighth grade, students will develop an understanding of science as a human endeavor.

- Investigate and understand that women and men of various social and ethnic backgrounds, working alone or in teams, engage in the activities of science, engineering, and related fields.
- Investigate and understand that science requires different abilities based on the type of inquiry and relies upon basic human qualities and scientific habits of mind.

8.8.2 By the end of eighth grade, students will develop an understanding of the nature of science.

- Formulate and test a hypothesis using observations, experiments, and models.
- Use questioning, response to criticism, and open communication when defending a conclusion.
- Evaluate the results of scientific investigations, experiments, observations, theoretical models, and the explanations proposed by other scientists.
- Understand that scientific theories are based on observations, governed by rules of reasoning, and used to predict events.

8.8.3 By the end of eighth grade, students will develop an understanding of the history of science.

- Research and describe the difficulties experienced by scientific innovators who had to overcome commonly held beliefs of their times to reach conclusions that we now take for granted.

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