Alignment with South Dakota'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

Third Grade Nature of Science

Indicator 1: Understand the nature and origin of scientific knowledge.

✓ Identify scientific contributions.

- Automobile
- Telephone
- Flight
- Motors

Explain science as a process involving asking and answering questions.

Indicator 2: Apply the skills necessary to conduct scientific investigations.

▪ Use investigations in science to acquire knowledge.

- Make observations.
- Make predictions.
- Ask questions.
- Plan investigations.
- Interpret data
- Communicate results.

Third Grade Physical Science

3.P.3.2. Students are able to demonstrate how sound consists of vibrations and pitch.

- Relate the rate of vibration to the pitch of sound.

Third Grade Life Science

Indicator 3: Analyze how organisms are linked to one another and the environment.

3.L.3.1. Students are able to describe how species depend on one another and on the environment for survival.

- Describe cause-and-effect relationships in living systems.

3.L.3.2. Students are able to explain how environments support a diversity of plants and animals.

- Describe types of environments.
- Example: deserts and what lives there

Third Grade Earth/Space Science

Indicator 2: Analyze essential principles and ideas about the composition and structure of the universe.

3.E.2.1. Students are able to identify the Earth as one of the planets that orbits the Sun.

- All planets orbit the Sun.

3.E.2.2. Students are able to recognize changes in the appearance of the Moon over time.

- Know that the Moon does not change shape, but at different times appears to change shape.

Describe the causes for Earth's seasons.

Fourth Grade Nature of Science

Indicator 1: Understand the nature and origin of scientific knowledge.

✓ Describe science as the process of asking and answering questions and comparing the results to what is already known.

Indicator 2: Apply the skills necessary to conduct scientific investigations.

- Use investigations in science to acquire knowledge.

  Example: Investigate the effect of surface area and air temperature on evaporation.

  - Make observations.
  - Make predictions.
  - Ask questions.
  - Form a simple hypothesis.
  - Plan investigations.
  - Interpret data.
  - Communicate results.

Fourth Grade Physical Science

Indicator 1: Describe structures and properties of, and changes in, matter.

4.P.1.3. Students are able to differentiate between the states of matter caused by changes in temperature using water.

Example: from ice to water to water vapor

- Define states of matter.

Indicator 2: Analyze forces, their forms, and their effects on motions.

4.P.2.1. Students are able to demonstrate how forces act over a distance.

Example: magnetism

- Define force.

Fourth Grade Life Science

Indicator 2: Analyze various patterns and products of natural and induced biological change.

4.L.2.1. Students are able to identify behavioral and structural adaptations that allow a plant or animal to survive in a particular environment.

Examples: hibernation and migration

- Explain environments and adaptations.

Fourth Grade Earth/Space Science

Indicator 2: Analyze essential principles and ideas about the composition and structure of the universe.

4.E.2.1. Students are able to describe the motions of Earth, Sun, and Moon.

✓ Use terminology to describe the phases of the Moon.

Examples: waning moon or waxing moon

✓ Describe relative size and position of moons, planets, and stars.

✓ Identify the characteristics of the planets.

Examples: appearance, size, distance from the Sun

Fourth Grade Science, Technology, Environment, and Society

Indicator 1: Analyze various implications/effects of scientific advancement within the environment and society.

4.S.1.1. Students are able to describe how people continue to invent new ways of doing things, solving problems, and getting work done.

- Ways progress makes our lives easier
- People and inventions can have tremendous impact on our daily lives.

Examples: CDs vs tapes; cell phones vs telephones; ziplock baggies vs wax paper

4.S.1.2. Students are able to explain how new ideas and inventions often affect people.

- Explain the benefits of new ideas and inventions.

Examples: television, electric lights

Fifth Grade Nature of Science

Indicator 1: Understand the nature and origin of scientific knowledge.

✓ Investigate scientific contributions of people who have revolutionized scientific thinking.

✓ Describe science as a body of knowledge and an investigative process.

✓ Describe how scientific knowledge increases and changes over time.

Indicator 2: Apply the skills necessary to conduct scientific investigations.

✓ Use investigations in science to accumulate knowledge.

- Make observations.
- Make predictions.
- Differentiate between a hypothesis and a prediction.
- Ask questions.
- Formulate hypotheses based on cause and effect relationships.
- Plan investigations.
- Interpret data and recognize numerical data that are contradictory or unusual in experimental results.
- Communicate results.

Fifth Grade Physical Science

Indicator 2: Analyze forces, their forms, and their effects on motions.

5.P.2.1. Students are able to identify forces in specific situations that require objects to interact, change directions, or stop.

Give examples of ways gravitational forces affect every object.

Indicator 3: Analyze interactions of energy and matter.

5.P.3.3. Students are able to describe basic properties of light.

Examples: reflection, scattering, color spectrum, shadows

Fifth Grade Life Science

Indicator 1: Understand the fundamental structures, functions, classifications, and mechanisms found in living things.

5.L.1.1. Students are able to describe the basic process of photosynthesis and the role of light as a source of energy in plants.

- Use words to describe photosynthesis.

Example: Carbon dioxide + water $\rightarrow$ sunlight; chlorophyll = sugar and oxygen.

Fifth Grade Earth/Space Science

Indicator 1: Analyze the various structures and processes of the Earth system.

5.E.1.1. Students are able to describe the basic structure of Earth's interior.

- Define crust, mantle, and core.

✓ Explain the formation of geological features of the Earth through plate tectonics.

Examples: volcanoes, faults, ocean trenches

✓ Describe how Earth's surface is constantly changing.

Examples: earthquakes, volcanoes, weathering, erosion, and deposition

Indicator 2: Analyze essential principles and ideas about the composition and structure of the universe.

5.E.2.1. Students are able to describe the components (Sun, planets, and moons) of the solar system.

- Relative size
- Order and relative distance from the Sun and each other
- Describe the relative scale of the Earth to the Sun, planets, and the Moon.

5.E.2.2. Students are able to explain how the Earth's rotation affects the appearance of the sky.

- Constellations appear to move as a result of Earth's rotation.

  Example: The Big Dipper appears in different locations throughout the night.
- Apparent brightness of a star depends in part upon its distance from the Earth.
- Example: A flashlight beam appears brighter as it moves closer.

Fifth Grade Science, Technology, Environment, and Society

Indicator 1: Analyze various implications/effects of scientific advancement within the environment and society.

5.S.1.1. Students are able to identify scientific changes that have affected transportation, health, sanitation, and communication.

5.S.1.2. Students are able to describe how designing a solution may have constraints.

Examples: costs, time, space, materials, and safety

- Explain why the benefits of science and technology are not available to all people.
- Describe the consumption of resources over time.

Sixth Grade Nature of Science

Indicator 1: Understand the nature and origin of scientific knowledge.

✓ Recognize scientific knowledge as not merely a set of static facts, but is dynamic and affords the best current explanations.

✓ Identify important contributions to the advancement of science from people of differing cultures, genders, and ethnicity.

Examples: George W. Carver-peanuts, Gregor Mendel-genetics, Sylvia Earle-oceanography, Darwin-evolution

Indicator 2: Apply the skills necessary to conduct scientific investigations.

6.N.2.1. Students are able to pose questions that can be explored through scientific investigations.

Example: How does light affect plant growth?

✓ Conduct systematic scientific investigations.

- Use appropriate supportive technologies.
- Describe the limits of accuracy inherent in a particular measuring device or measurement procedure.
- Use research methods to investigate practical and/or personal scientific problems and questions.

Sixth Grade Physical Science

Indicator 2: Analyze forces, their forms, and their effects on motions.

6.P.2.1. Students are able to describe how push/pull forces acting on an object produce motion.

Examples: illustration of see-saw, sailboat on water, kite

✓ Demonstrate how all forces have magnitude and direction.

Newton's Laws of Motion

Indicator 3: Analyze interactions of energy and matter.

6.P.3.1. Students are able to identify types of energy transformations.

Examples: mechanical to electrical, chemical to light, kinetic to potential (and vice versa)

✓ Investigate the properties of light (electromagnetic spectrum).

✓ Illustrate sunlight to chemical (photosynthesis).

Sixth Grade Earth/Space Science

Indicator 1: Analyze the various structures and processes of the Earth system.

6.E.1.1. Students are able to describe how the spheres (lithosphere, hydrosphere, atmosphere, and biosphere) of the Earth interact.

- Impact of humans and natural events

- Composition of spheres

Indicator 2: Analyze essential principles and ideas about the composition and structure of the universe.

6.E.2.1. Students are able to identify the organization and relative scale of the solar system.

- Sun, Moon, Earth, other planets and their moons, meteors, asteroids, and comets
- ✓ Origins and age of the universe

Sixth Grade Science, Technology, Environment, and Society

Indicator 1: Analyze various implications/effects of scientific advancement within the environment and society.

6.S.1.1. Students are able to describe how science and technology have helped society to solve problems.

Examples: GPS, GIS, remote sensing, prevention and treatment of diseases, vaccinations, water treatment, prosthetics

Seventh Grade Nature of Science

Indicator 1: Understand the nature and origin of scientific knowledge.

✓ Describe societal response to major scientific findings or theories.

Examples: cloning, stem cell research, biotechnology

✓ Investigate important contributions to the advancement of science from people of differing cultures, genders, and ethnicity.

Examples: Louis Pasteur-disease, Rachel Carson-ecology, Linnaeus- classification, Redi-biology, Darwin-evolution, Jane Goodall-zoology

Indicator 2: Apply the skills necessary to conduct scientific investigations.

7.N.2.1. Students are able to conduct scientific investigations using given procedures.

- Interpret to make predictions and/or justify conclusions.
- Use research methods to investigate practical and/or personal scientific problems and questions.
- Analyze the benefits and potential of scientific investigations.

Seventh Grade Science, Technology, Environment, and Society

Indicator 1: Analyze various implications/effects of scientific advancement within the environment and society.

7.S.1.1. Students are able to describe how science and technology are used to solve problems in different professions and businesses.

Examples: GPS, GIS, remote sensing, agriculture and genetics, medical and bio-technology (EKG), food industry and chemistry

Eighth Grade Nature of Science

Indicator 1: Understand the nature and origin of scientific knowledge.

8.N.1.1. Students are able to differentiate among facts, predictions, theory, and law/principles in scientific investigations.

- Define fact, predictions, theory, and law/principle.
- Discuss how theory can become law.

✓ Evaluate important contributions to the advancement of science from people of differing cultures, genders, and ethnicity.

Examples: Marie Curie-radiation, Hess, Galileo- astronomy, Kepler-astronomy, Newton-physics, Neil Tice-astronomy, Mendeleev-physics

Indicator 2: Apply the skills necessary to conduct scientific investigations.

8.N.2.1. Students are able to design a replicable scientific investigation.

- Interpret data to justify predictions or conclusions.
- Use research methods to investigate practical and/or personal scientific problems and questions.

Evaluate the benefits and potential of scientific investigations.

Eighth Grade Earth/Space Science

Indicator 1: Analyze the various structures and processes of the Earth system.

8.E.1.2. Students are able to explain the role of plate tectonics in shaping Earth.

- Plates boundaries
- Volcanoes
- Earthquakes
- Seismic waves
- Mountains
- Convection currents in the mantle
- Changes over time

Examples: adaptations, extinction, geologic time (relative and absolute), extinct species, fossils, surface features

Indicator 2: Analyze essential principles and ideas about the composition and structure of the universe.

8.E.2.1. Students are able to compare celestial bodies within the solar system using composition, size, and orbital motion.

- Describe the composition of the Sun, the planets, asteroids, and comets.

✓ Use of spectroscopic analysis of celestial bodies

✓ Measurement in space

✓ Constellations

✓ Galaxies

✓ Life cycle of a star

✓ HR Diagram

✓ Law of Gravitation

✓ Big Bang Theory

✓ Doppler Effect

8.E.2.2. Students are able to differentiate the influences of the relative positions of the Earth, Moon, and Sun.

- Lunar and solar eclipses, moon phases, tides, seasons

Eighth Grade Science, Technology, Environment, and Society

Indicator 1: Analyze various implications/effects of scientific advancement within the environment and society.

8.S.1.1. Students are able to describe how science and technology have been influenced by social needs, attitudes, and values.

Examples: GPS, GIS, remote sensing, Corps of Engineers (dams), NOAA (weather satellites), NASA (earth and space exploration), USGS (mapping)

Indicator 2: Analyze the relationships/interactions among science, technology, environment, and society.

8.S.2.1. Students are able, given a scenario, to offer solutions to problems created by human activity on the local, regional, or global environment.

Examples: global warming, deforestation