

Alignment with Arkansas' 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 3-4

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

Grade 3

NS.1.3.2

Develop questions that guide scientific inquiry

NS.1.3.5

Estimate and measure length, mass, temperature, and elapsed time using International System of Units (SI)

NS.1.3.7

Make and explain predictions based on prior knowledge

Grade 4

NS.1.4.2

Refine questions that guide scientific inquiry

NS.1.4.6

Estimate and measure length, mass, temperature, capacity/volume, and elapsed time using International System of Units (SI)

NS.1.4.8

Develop a hypothesis based on prior knowledge and observations

NS.1.4.10

Identify patterns and trends in data

NS.1.4.11

Generate conclusions based on evidence

NS.1.4.12

Evaluate the quality and feasibility of an idea or project

Strand 2: Life Science

Standard 2: Living Systems: Characteristics, Structure, and Function

Grade 4

LS.2.4.1

Classify vertebrates into major subgroups:

- mammals
- birds
- fish
- amphibians
- reptiles

Strand 2: Life Science

Standard 4: Populations and Ecosystems

Grade 4

LS.4.4.1

Recognize environmental adaptations of plants and animals

Strand 3: Physical Science

Standard 5: Matter: Properties and Changes

Grade 3

PS.5.3.1

Compare and contrast objects based on two or more properties

PS.5.3.4

Compare and contrast solids and liquids

Grade 4

Demonstrate multiple ways to classify objects

PS.5.4.3

Compare and contrast gases to solids and liquids

Strand 3: Physical Science

Standard 6: Motion and Forces

Grade 3

PS.6.3.2

Investigate the relationship between sound and wave motion

Grade 4

PS.6.4.1

Investigate the relationship between force and direction

PS.6.4.2

Investigate the relationship between force and mass

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Grade 3

PS.7.3.1

Classify materials as those which can reflect, refract, or absorb light

PS.7.3.4

Differentiate between magnets and non-magnets

Strand 4: Earth and Space Science

Standard 8: Earth Systems: Structure and Properties

Grade 3

ESS.8.3.6

Describe the layers of Earth:

- crust
- mantle
- inner core
- outer core

Strand 4: Earth and Space Science

Standard 9: Earth's History: Changes in Earth and Sky

Grade 3

ESS.9.3.1

Analyze the effect of wind and water on Earth's surface

Grade 4

ESS.9.4.1

Analyze changes to Earth's surface:

- erosion
- glaciation
- weathering
- earthquakes
- volcanic activity

Strand 4: Earth and Space Science

Standard 10: Objects in the Universe

Grade 3

ESS.10.3.1

Demonstrate how the planets orbit the sun

ESS.10.3.2

Demonstrate the orbit of Earth and its moon around the sun

ESS.10.3.3

Relate Earth's rotation to the day/night cycle

GRADES 5-8

Strand 1: Nature of Science
Standard 1: Characteristics and Processes of Science

Grade 5

NS.1.5.1

Make accurate observations

NS.1.5.2

Identify and define components of experimental design used to produce empirical evidence:

- hypothesis
- replication
- sample size
- appropriate use of control
- use of standardized variables

NS.1.5.7

Summarize the characteristics of science

NS.1.5.8

Explain the role of observation in the development of a theory

NS.1.5.9

Define and give examples of hypotheses

Grade 6

NS.1.6.1

Verify accuracy of observations

NS.1.6.2

Apply components of experimental design used to produce empirical evidence:

- hypothesis
- replication
- sample size
- appropriate use of control
- use of standardized variables

NS.1.6.7

Distinguish between scientific fact and opinion

NS.1.6.8

Explain the role of prediction in the development of a theory

NS.1.6.9

Define and give examples of laws and theories

Grade 7

NS.1.7.2

Analyze components of experimental design used to produce empirical evidence:

- hypothesis
- replication
- sample size
- appropriate use of control
- use of standardized variables

NS.1.7.7

Distinguish between questions that can and cannot be answered by science

NS.1.7.8

Explain the role of testability and modification in the development of a theory

NS.1.7.9

Compare and contrast hypotheses, laws, and theories

Grade 8

NS.1.8.2

Evaluate the merits of empirical evidence based on experimental design:

- hypothesis
- replication
- sample size
- appropriate use of control
- use of standardized independent and dependent variables

NS.1.8.9

Generate questions that can and cannot be answered by science

NS.1.8.10

Explain the role of peer review, evidence, and modification in the development of a theory

NS.1.8.11

Evaluate the merit of hypotheses, laws, and theories

Strand 2: Life Science

Standard 3: Life Cycles, Reproduction, and Heredity

Grade 8

LS.3.8.12

Compare the theory of evolution to the characteristics of a scientific theory

LS.3.8.13

Identify basic ideas related to biological evolution:

- diversity of species
- variations within species
- adaptations
- natural selection
- extinction of a species

Strand 2: Life Science

Standard 4: Populations and Ecosystems

Grade 5

LS.4.5.11

Create ecosystems in which plants can exist without animals

Grade 6

LS.4.6.1

Identify environmental conditions that can affect the survival of individual organisms and entire species

LS.4.6.4

Analyze natural selection

Grade 7

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LS.4.7.1

Explain the role of reproduction in the continuation of a species

Grade 8

LS.4.8.1

Analyze the effect of changes in environmental conditions on the survival of individual organisms and entire species

Strand 3: Physical Science

Standard 5: Matter: Properties and Changes

Grade 5

PS.5.5.1

Identify the relationship of atoms to all matter

PS.5.5.6

Explain how heat influences the states of matter of a substance:

- solid
- liquid
- gas
- plasma

Grade 6

PS.5.6.9

Demonstrate the law of the conservation of matter

Strand 3: Physical Science

Standard 6: Motion and Forces

Grade 5

PS.6.5.4

Compare and contrast potential energy and kinetic energy as applied to motion

PS.6.5.5

Classify real world examples as potential energy or kinetic energy as applied to motion

Grade 6

PS.6.6.4

Recognize and give examples of different types of forces:

- gravitational forces
- magnetic forces
- friction

PS.6.6.5

Understand why objects have weight

PS.6.6.6

Compare and contrast weight and mass

PS.6.6.7

Describe the effects of force:

- move a stationary object
- speed up, slow down or change the direction of motion
- change the shape of objects

PS.6.6.8

Conduct investigations to demonstrate change in direction caused by force

PS.6.6.9

Conduct investigations to calculate the change in speed caused by applying forces to an object

Grade 7

PS.6.7.1

Compare and contrast Newton's three laws of motion

PS.6.7.2

Conduct investigations demonstrating Newton's first law of motion

PS.6.7.3

Demonstrate Newton's second law of motion

PS.6.7.4

Conduct investigations of Newton's third law of motion

PS.6.7.5

Explain how Newton's three laws of motion apply to real world situations (e.g., sports, transportation)

Grade 8

PS.6.8.1

Model how motion and forces change Earth's surface:

- compression
- tension
- weathering
- erosion

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Grade 5

PS.7.5.1

Summarize how light can interact with matter through absorption, refraction, and reflection

PS.7.5.2

Investigate how light travels and interacts with an object or material

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Grade 8

PS.7.8.6

Explain how energy is transferred through waves:

- seismic waves
- sound waves
- water waves
- electromagnetic waves

PS.7.8.7

Describe how waves travel through different kinds of media

PS.7.8.13

Compare ways to transfer information:

- sound

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- light
- radio
- microwave energy

Strand 4: Earth and Space Science
Standard 8: Earth Systems

Grade 7

ESS.8.7.3

Conduct investigations demonstrating the effects of solar energy on the atmosphere

ESS.8.7.5

Identify elements of weather:

- temperature
- air pressure
- wind speed
- wind direction
- humidity

Strand 4: Earth and Space Science
Standard 9: Earth's History

Grade 7

ESS.9.7.2

Demonstrate that Earth has a magnetic field that is detectible at the surface with a compass

Strand 4: Earth and Space Science
Standard 10: Objects in the Universe

Grade 5

ESS.10.5.1

Compare the physical characteristics of the sun to other stars:

- size
- color
- brightness

ESS.10.5.2

Demonstrate the order of planets and other space objects in our solar system

ESS.10.5.3

Compare the properties of planets in our solar system:

- size
- shape
- density
- atmosphere
- distance from the sun
- orbital path
- moons
- surface

- composition

ESS.10.5.4

Distinguish between mass and weight

ESS.10.5.5

Compare the human body's mass to weight on Earth, the moon, and other planets in our solar system

ESS.10.5.6

Investigate careers, scientists, and historical breakthroughs related to planets

Grade 6

ESS.10.6.1

Explain how planets seem to wander against the background of the stars

ESS.10.6.2

Compare the distance of the following:

- from the sun to Earth (light minutes)
- from the next nearest star to Earth (light years)

ESS.10.6.3

Describe how astronomers measure distance to stars

ESS.10.6.4

Calculate the rate at which we would have to travel to other stars and planets in our solar system using current technology

ESS.10.6.5

Explain the effect of the sun on comets

ESS.10.6.9

Investigate careers, scientists, and historical breakthroughs related to the sun and space travel

Grade 7

ESS.10.7.1

Identify and model the causes of night and day

ESS.10.7.2

Compare and contrast Earth's day to those of other planets in our solar system

ESS.10.7.3

Identify and model the cause of planetary years

ESS.10.7.4

Compare and contrast Earth's year to those of other planets in our solar system

ESS.10.7.5

Identify and model the causes of seasons

ESS.10.7.6

Investigate careers, scientists, and historical breakthroughs related to rotations and revolutions of bodies in space

Grade 8

ESS.10.8.1

Summarize the effects of gravity on bodies in space

ESS.10.8.2

Identify variables that affect the amount of gravitational force between two objects:

- mass of the objects

- distance between the objects

ESS.10.8.3

Relate the effects of the moon's gravitational force on Earth's ocean tides

ESS.10.8.5

Define the terms galaxy and universe

ESS.10.8.6

Illustrate the appearance of galaxies as seen through a telescope:

- clarity
- shape

ESS.10.8.7

Compare and contrast the Milky Way Galaxy to other galaxies

ESS.10.8.8

Illustrate the position of our solar system within the Milky Way Galaxy

ESS.10.8.9

Investigate careers, scientists, and historical breakthroughs related to gravity, galaxies, and the universe

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