

Alignment with Kentucky'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

Structure and Transformation of Matter

End of Primary

SC-EP-1.1.3

Students will describe the properties of water as it occurs as a solid, liquid or gas.

Motion and Forces

End of Primary

SC-EP-1.2.2

Students will describe the change in position over time (motion) of an object.

SC-EP-1.2.3

Students will describe the position and motion of objects and predict changes in position and motion as related to the strength of pushes and pulls.

4th Grade

SC-04-1.2.1

Students will interpret or represent data related to an object's straight-line motion in order to make inferences and predictions of changes in position and/or time.

SC-04-1.2.2

Students will infer causes and effects of pushes and pulls (forces) on objects based on representations or interpretations of straight-line movement/motion in charts, graphs and qualitative comparisons.

SC-04-1.2.3

Students will:

- explain that sound is a result of vibrations, a type of motion;
- describe pitch (high, low) as a difference in sounds that are produced and relate that to the rate of vibration.

5th Grade

SC-05-1.2.1

Students will interpret data in order to make qualitative (e.g., fast, slow, forward, backward) and quantitative descriptions and predictions about the straight-line motion of an object.

SC-05-1.2.2

Students will understand that forces are pushes and pulls, and that these pushes and pulls may be invisible (e.g., gravity, magnetism) or visible (e.g., friction, collisions)

The Earth and the Universe

End of Primary

SC-EP-2.3.1

Students will describe earth materials (solid rocks, soils, water and gases of the atmosphere) using their properties.

SC-EP-2.3.3

Students will describe the properties, locations and real or apparent movements of objects in the sky (Sun, moon).

5th Grade

SC-05-2.3.3

Students will:

- describe Earth's atmosphere as a relatively thin blanket of air consisting of a mixture of nitrogen, oxygen and trace gases, including water vapor;
- analyze atmospheric data in order to draw conclusions about real life phenomena related to atmospheric changes and conditions.

SC-05-2.3.4

Students will:

- analyze global patterns of atmospheric movement;

explain the basic relationships of patterns of atmospheric movement to local weather.

SC-05-2.3.5

Students will compare components of our solar system, including using models/representations that illustrate the system.

Unity and Diversity

End of Primary

SC-EP-3.4.1

Students will explain the basic needs of organisms.

SC-EP-3.4.2

Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

End of 4th Grade

SC-04-3.4.1

Students will:

- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;

- **make inferences about the relationship between structure and function in organisms.**

SC-04-3.4.2

Students will understand that things in the environment are classified as living, nonliving and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

Biological Change

5th Grade

SC-05-3.5.1

Students will describe cause and effect relationships between enhanced survival/reproductive success and particular biological adaptations (e.g., changes in structures, behaviors, and/or physiology) to generalize about the diversity of populations of organisms.

SC-05-3.5.2

Students will understand that all organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

Energy Transformations

End of Primary

SC-EP-4.6.1

Students will describe basic relationships of plants and animals in an ecosystem (food chains).

SC-EP-4.6.2

Students will describe evidence of the sun providing light and heat to the Earth.

SC-EP-4.6.4

Students will describe light as traveling in a straight line until it strikes an object.

End of 4th

SC-04-4.6.2

Students will:

- **analyze data/evidence of the Sun providing light and heat to earth;**

use data/evidence to substantiate the conclusion that the Sun's light and heat are necessary to sustaining life on Earth.

SC-04-4.6.4

Students will:

- **analyze models/representations of light in order to generalize about the behavior of light;**
- **represent the path of light as it interacts with a variety of surfaces (reflecting, refracting, absorbing).**

End of 5th

SC-05-4.6.1

Students will:

- **classify energy phenomena as kinetic or potential;**
- **describe the transfer of energy occurring in simple systems or related data.**

SC-05-4.6.2

Students will understand that the Sun is a major source of energy for changes on Earth's surface. The Sun loses energy by emitting light. A tiny fraction of that light reaches Earth, transferring energy from the Sun to Earth.

SC-05-4.6.4

Students will identify predictable patterns and make generalizations about light and matter interactions using data/evidence.

Interdependence

End of Primary

SC-EP-4.7.1

Students will describe the cause and effect relationships existing between organisms and their environments.

End of 4th

SC-04-4.7.1

Students will make predictions and/or inferences based on patterns of evidence related to the survival and reproductive success of organisms in particular environments.

6th Grade

Big Idea: Structure and Transformation of Matter (Physical Science) Grade 6

SC-6-STM-U-1

Students will understand that all matter is composed of parts that are too small to be seen without magnification.

SC-6-STM-U-3

Students will understand that chemical changes result in the formation of a substance that has different properties than the original substance.

SC-6-STM-U-5

Students will understand that new ideas in science sometimes spring from unexpected findings, and they usually lead to new investigations.

Big Idea: Motion and Forces (Physical Science) Grade 6

SC-6-MF-U-1

Students will understand that friction is a force that turns the energy of motion into heat, causing moving objects to eventually slow or stop unless additional force (energy) is added.

SC-6-MF-U-2

Students will understand that when any force acts on an object, the change in speed or direction depends on the size and direction of the force.

SC-6-MF-U-3

Students will understand that mechanical systems must be designed to take forces such as friction into account. Friction and/or the heat produced by it can have significant effects on the system.

Big Idea: The Earth and the Universe (Earth/Space Science) Grade 6

SC-6-EU-U-4

Students will understand that complex systems like the Earth or solar system are difficult to comprehend or explain without depending on averages and ranges of data. Technology is essential for helping to collect and analyze this data.

Big Idea: Unity and Diversity (Biological Science) Grade 6

SC-6-UD-U-2

Students will understand that every cell within an organism contains all of the information needed to completely replicate that organism, regardless of the function that cell performs.

SC-6-UD-U-5

Students will understand that the great diversity of life is a result of many factors, both internal and external to organisms.

Big Idea: Biological Change (Biological Science) Grade 6

SC-6-BC-U-1

Students will understand that small differences between parents and offspring result in future generations that are very different from their ancestors.

SC-6-BC-U-3

Students will understand that scientists vary widely in what they study and how they do their work. While there is no fixed set of steps they follow, the basic process of science involves collecting relevant evidence, logical reasoning and the use of imaginative thinking in constructing explanations for what they observe.

Big Idea: Energy Transformations (Unifying Concepts) Grade 6

SC-6-ET-U-1

Students will understand that oceans have a major effect on climate, because water in the oceans holds a large amount of heat.

SC-6-ET-U-2

Students will understand that several Earth systems and processes occur primarily because of the constant influx of solar energy.

SC-6-ET-U-4

Students will understand that energy, in the form of sunlight, is transformed by a chemical reaction in plant cells (photosynthesis) to form essential nutrients for the plant to live and grow.

Big Idea: Structure and Transformation of Matter (Physical Science) Grade 7

SC-7-STM-U-1

Students will understand that equal volumes of different substances usually have different weights.

SC-7-STM-U-5

Students will understand that investigations are conducted for different reasons, including to explore new phenomena, to check on previous results, to test how well a theory predicts, and to compare different theories.

Big Idea: Motion and Forces (Physical Science) Grade 7

SC-7-MF-U-1

Students will understand that an object remains at rest or maintains a constant speed and direction of motion unless an unbalanced force acts on it (inertia).

SC-7-MF-U-2

Students will understand that forces acting against each other can be balanced, canceling each other out and having no net effect.

SC-7-MF-U-3

Students will understand that gravity is an attractive force created by mass. All objects are attracted to each other by gravity, but this attraction is easy to see only when at least one of the objects has a large mass.

SC-7-MF-U-4

Students will understand that technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.

Big Idea: The Earth and the Universe (Earth/Space Science) Grade 7

SC-7-EU-U-1

Students will understand that regular and predictable movement is not limited to our solar system. New technologies, coupled with an understanding of the laws of motion, allow for the discovery of celestial bodies that cannot be directly observed.

SC-7-EU-U-2

Students will understand that our solar system is part of a larger collection of millions of stars (Milky Way Galaxy), any of which may be the center of its own system of orbiting planets.

SC-7-EU-U-3

Students will understand that gravitational interactions within the Earth, sun and moon system impact phenomena and organisms on the surface of the Earth.

SC-7-EU-U-4

Students will understand that models of the interior of the Earth have been constructed primarily from inferences based on limited data obtained during earthquakes and volcanic eruptions. These models are useful, but are open to revision or rejection as new information is obtained.

Big Idea: Unity and Diversity (Biological Science) Grade 7

SC-7-UD-U-1

Students will understand that specialized structures called genes are located in the chromosomes of each living cell. These structures have the task of passing on characteristics that make offspring resemble their parents (heredity).

Big Idea: Biological Change (Biological Science) Grade 7

SC-7-BC-U-2

Students will understand that most of the species that have lived on Earth no longer exist. A species will become extinct when changes in environmental conditions (either gradual or rapid) are greater than its ability to adapt.

SC-7-BC-U-4

Students will understand that results of scientific investigations are seldom exactly the same, but if the differences are large it is important to try to figure out why. Keeping careful records is important to help investigate what might have caused the differences.

Big Idea: Energy Transformations (Unifying Concepts) Grade 7

SC-7-ET-U-1

Students will understand that most of the energy that powers the Earth's systems comes from the sun. Energy from inside the Earth, however, is responsible for some important phenomena (volcanism, plate tectonics).

SC-7-ET-U-2

Students will understand that the amount of energy in a closed system remains the same, so that the energy lost by a hot object equals the energy gained by a cold one.

Big Idea: Interdependence (Unifying Concepts) Grade 7

SC-7-I-U-3

Students will understand that not all actions/decisions have the possibility of a desirable outcome. Sometimes a compromise requires accepting one unwanted outcome to avoid a different unwanted outcome.

Grade 8

Big Idea: Structure and Transformation of Matter (Physical Science) Grade 8

SC-8-STM-U-1

Students will understand that all matter is made of tiny moving particles called atoms, which are far too small to see directly through a microscope. The atoms of any element are alike but are different from atoms of other elements.

SC-8-STM-U-4

Students will understand that the idea of atoms explains the conservation of matter: If the number of atoms stays the same no matter how they are rearranged, then their total mass

stays the same. The atoms that are present today are the same atoms that have always existed.

Big Idea: Motion and Forces (Physical Science) Grade 8

SC-8-MF-U-1

Students will understand that Isaac Newton developed a set of rules that can be used to describe and predict virtually all observed motion on Earth and in the universe. These Laws of Motion demonstrate that the rules governing the Earth are the same as those controlling the rest of the observed universe.

Big Idea: The Earth and the Universe (Earth/Space Science) Grade 8

SC-8-EU-U-1

Students will understand that the Earth is almost unimaginably old when viewed on a human time scale, and some processes that shape it are happening so slowly they cannot be easily detected in a lifetime. The accepted age of our Earth and solar system (4.6 billion years) is based on a wide variety of data collected by a number of different methods.

Big Idea: Energy Transformations (Unifying Concepts) Grade 8

SC-8-ET-U-1

Students will understand that energy can be transferred in many ways, but it can neither be created nor destroyed.

SC-8-ET-U-3

Students will understand that solar energy influences global climate in a number of direct and indirect ways. Patterns of global climate can be determined through analysis of climatic data.

SC-8-ET-U-4

Students will understand that although many forms of energy exist, they can all be classified as either kinetic energy, potential energy, or energy contained within a field.

Big Idea: Interdependence (Unifying Concepts) Grade 8

SC-8-I-U-2

Students will understand that the matter in an ecosystem is constantly transferred between and among organisms and the physical environment. While the form and location is continuously changing, the total amount of matter in the system remains constant.

SC-8-I-U-3

Students will understand that it is important to consider what population will benefit and what population (not necessarily the same one) will bear the cost when deciding among alternative courses of action.

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