

This document lists the relevant TEKS and Next Generation Science Standards for the *Orbits* and *Super Planet Crash* games. For more information, please visit the SAVE/Point website (<http://www.save-point.io>).

TEKS

112.14 - Science, Grade 3

(a) Introduction

2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.

4A) Students recognize that patterns, relationships, and cycles exist in matter.

4B) Students will construct models to demonstrate Sun, Earth, and Moon system relationships

(b) Knowledge and Skills

2D) analyze and interpret patterns in data to construct reasonable explanations based on evidence from investigations;

3C) represent the natural world using models such as volcanoes or Sun, Earth, and Moon system and identify their limitations, including size, properties, and materials

8) Earth and space. The student knows there are recognizable patterns in the natural world and among objects in the sky.

8C) construct models that demonstrate the relationship of the Sun, Earth, and Moon, including orbits and positions; and

8D) identify the planets in Earth's solar system and their position in relation to the Sun.

112.15 - Science, Grade 4

(b) Knowledge and Skills

2D) analyze data and interpret patterns to construct reasonable explanations from data that can be observed and measured

2E) perform repeated investigations to increase the reliability of results

3C) represent the natural world using models

8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system.

112.16 - Science, Grade 5

(b) Knowledge and Skills

8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system

112.18 - Science, Grade 6**(a) Introduction**

4C) Force, motion, and energy. Energy occurs in two types, potential and kinetic, and can take several forms. It can also be changed from one form to another. Students will investigate the relationship between force and motion using a variety of means

4D) Earth and space. The focus of this strand is on introducing Earth's processes. Students should develop an understanding of Earth as part of our solar system. The topics include organization of our solar system, the role of gravity, and space exploration.

(b) Knowledge and Skills

2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to:

2E) Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.

8) Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy.

8A) compare and contrast potential and kinetic energy

8B) identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces;

8C) calculate average speed using distance and time measurements;

11) Earth and space. The student understands the organization of our solar system and the relationships among the various bodies that comprise it.

11A) describe the physical properties, locations, and movements of the Sun, planets, Galilean moons, meteors, asteroids, and comets

11B) understand that gravity is the force that governs the motion of our solar system

112.19 - Science, Grade 7**(a) Introduction**

(D) Earth and space. Earth and space phenomena can be observed in a variety of settings. Both natural events and human activities can impact Earth systems. There are characteristics of Earth and relationships to objects in our solar system that allow life to exist.

112.20 - Science, Grade 8**(b) Knowledge and Skills**

6) Force, motion, and energy. The student knows that there is a relationship between force, motion, and energy.

6A) demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion

6B) differentiate between speed, velocity, and acceleration

8) Earth and space. The student knows characteristics of the universe.

8A) describe components of the universe, including stars, nebulae, and galaxie

112.33 - Astronomy, High School

(b) Knowledge and Skills

6) Science concepts. The student knows our place in space. The student is expected to:

6B) compare and contrast the scale, size, and distance of objects in the solar system such as the Sun and planets through the use of data and modeling

9) Science concepts. The student knows that planets of different size, composition, and surface features orbit around the Sun. The student is expected to:

9B) compare the planets in terms of orbit, size, composition, rotation, atmosphere, natural satellites, and geological activity

9C) relate the role of Newton's law of universal gravitation to the motion of the planets around the Sun and to the motion of natural and artificial satellites around the planet

112.36 - Earth and Space Science, High School

(b) Knowledge and Skills

5) Earth in space and time. The student understands the solar nebular accretionary disk model. The student is expected to:

5A) analyze how gravitational condensation of solar nebular gas and dust can lead to the accretion of planetesimals and protoplanets

5E) compare terrestrial planets to gas-giant planets in the solar system, including structure, composition, size, density, orbit, surface features, tectonic activity, temperature, and suitability for life; and

5F) compare extra-solar planets with planets in our solar system and describe how such planets are detected.

112.38 - Integrated Physics and Chemistry, High School

(c) Knowledge and Skills

4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:

4A) describe and calculate an object's motion in terms of position, displacement, speed, and acceleration

4C) investigate how an object's motion changes only when a net force is applied
4D) assess the relationship between force, mass, and acceleration, noting the relationship is independent of the nature of the force
4F) describe the gravitational attraction between objects of different masses at different distances, including satellites

5) Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. The student is expected to:

5A) recognize and demonstrate that objects and substances in motion have kinetic energy
5B) demonstrate common forms of potential energy, including gravitational, elastic, and chemical

112.39 - Physics, High School

(b) Knowledge and Skills

4) Science concepts. The student knows and applies the laws governing motion in a variety of situations. The student is expected to:

4C) analyze and describe accelerated motion in two dimensions using equations, including projectile and circular examples

4D) calculate the effect of forces on objects, including the law of inertia, the relationship between force and acceleration, and the nature of force pairs between objects

6) Science concepts. The student knows that changes occur within a physical system and applies the laws of conservation of energy and momentum. The student is expected to:

6B) investigate examples of kinetic and potential energy and their transformations

NGSS

Grade 3:

3-PS2 Motion and Stability: Forces and Interactions

3-PS2-1 Investigate balanced/unbalanced forces on an object

2-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion

Grade 4:

4-PS3 Energy

4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object

Grade 5:

5-PS2 Motion and Stability: Forces and Interactions

High School:

HS-PS2 Motion and Stability: Forces and Interactions

HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration

HS-PS3 Energy

HS-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).

HS-ESS1 Earth's Place in the Universe

HS-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.