COURSE DESCRIPTION

Course Title: STEM 6
Course Number: 00794
Course Prerequisites: None

Course Description: In this STEM 6 course, sixth-grade students will further explore topics that are part of their Science 6 curriculum. They will investigate the physical, biological, and environmental principles behind natural disasters and learn about the ways in which extreme weather affects human societies and vise versa. They will also learn how we can prepare for and mitigate the impacts of these increasing phenomena not only for human populations but also for the planet as a whole. They will conclude this unit by designing a multi-part extreme weather arcade game using MakeCode and a weather forecast using Padcaster to demonstrate their new knowledge. In the second part of the course, students will delve into the mysteries of space. They will investigate the physical and Earth science principles that govern the movement of celestial bodies, such as gravity and orbital mechanics. They will conclude this unit by creating a comic strip about space using the ComicLife program. By the end of the course, students will have gained a deeper understanding of key concepts in all three branches of science, and will have developed their skills in critical thinking, problem-solving, and scientific inquiry. Standards are incorporated from all three branches of science and all areas of the STEELS standards to ensure a well-rounded science experience in accordance with the three-dimensional design of these new standards.

Suggested Grade Level: Grade 6
Length of Course: One Nine-Week Marking Period
Units of Credit: .25
PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:
CSPG 32 Biology, CSPG 34 Chemistry, CSPG 40 Earth and Space Science, CSPG 41 Elementary Education K – 6, CSPG 45 Environmental Science, CSPG 46 General Science, CSPG 54 Middle Level Science, CSPG 56 Physics, CSPG 65 Technology Education, CSPG 70 Grades 4 – 8 (3100-05), CSPG 71 Computer Science 7 - 12
To find the CSPG information, go to CSPG
Certification verified by the WCSD Human Resources Department: ☒Yes   ☐No

WCSD STUDENT DATA SYSTEM INFORMATION

Course Level: Academic
Mark Types: Check all that apply.
         ☒F – Final Average   ☒MP – Marking Period   ☐EXM – Final Exam

GPA Type: ☐ GPAEL-GPA Elementary   ☒ GPAML-GPA for Middle Level   ☐ NHS-National Honor Society
         ☐ UGPA-Non-Weighted Grade Point Average   ☐ GPA-Weighted Grade Point Average

State Course Code: 03010
To find the State Course Code, go to State Course Code, download the Excel file for *SCED*, click on SCED 6.0 tab, and choose the correct code that corresponds with the course.

TEXTBOOKS AND SUPPLEMENTAL MATERIALS

Board Approved Textbooks, Software, and Materials:
Title:	Middle School SmartLab Learning Hub
Publisher:	Creative Learning Systems
ISBN #:	Click or tap here to enter text.
Copyright Date:	2023
WCSD Board Approval Date:	01/09/2023

Supplemental Materials: Click or tap here to enter text.

Curriculum Document

WCSD Board Approval:
Date Finalized:	6/26/2023
Date Approved:	6/26/2023
Implementation Year:	2023-2024

SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

SCOPE AND SEQUENCE OF CONTENT AND CONCEPTS

Marking Period 1

- Extreme Weather
  - Climate and Monster Storms
  - Tornadoes
  - Earth's Energy Budget
  - MakeCode Arcade
    - Getting Started
    - Designing an Extreme Weather Themed Games
    - Designing a Multi-Part Extreme Weather Themed Game
  - Padcaster: A New Take on Weather Forecasts
- Space
  - MicroObservatory
    - Introduction
    - Using Telescopes to Understand our Universe
    - AstroPhotography
  - Stellarium
    - Exploring the Celestial Sphere
    - The Sky in Motion
    - Astronomical Predictions
  - Solar Energy and the Earth's Orbit
  - Comic Life
    - Historical Stories
    - Famous Funnies
    - Pictures Worth a Thousand Words

Marking Period 2

- Extreme Weather
  - Climate and Monster Storms
  - Tornadoes
  - Earth's Energy Budget
  - MakeCode Arcade
    - Getting Started
    - Designing an Extreme Weather Themed Games
    - Designing a Multi-Part Extreme Weather Themed Game
  - Padcaster: A New Take on Weather Forecasts
- Space
  - MicroObservatory
    - Introduction

- Using Telescopes to Understand our Universe
- AstroPhotography
  - o Stellarium
    - Exploring the Celestial Sphere
    - The Sky in Motion
    - Astronomical Predictions
  - o Solar Energy and the Earth's Orbit
  - o Comic Life
    - Historical Stories
    - Famous Funnies
    - Pictures Worth a Thousand Words

Marking Period 3

- Extreme Weather
  - o Climate and Monster Storms
  - o Tornadoes
  - o Earth's Energy Budget
  - o MakeCode Arcade
    - Getting Started
    - Designing an Extreme Weather Themed Games
    - Designing a Multi-Part Extreme Weather Themed Game
  - o Padcaster: A New Take on Weather Forecasts
- Space
  - o MicroObservatory
    - Introduction
    - Using Telescopes to Understand our Universe
    - AstroPhotography
  - o Stellarium
    - Exploring the Celestial Sphere
    - The Sky in Motion
    - Astronomical Predictions
  - o Solar Energy and the Earth's Orbit
  - o Comic Life
    - Historical Stories
    - Famous Funnies
    - Pictures Worth a Thousand Words

Marking Period 4

- Extreme Weather
  - Climate and Monster Storms
  - Tornadoes
  - Earth's Energy Budget
  - MakeCode Arcade
    - Getting Started
    - Designing an Extreme Weather Themed Games
    - Designing a Multi-Part Extreme Weather Themed Game
  - Padcaster: A New Take on Weather Forecasts
- Space
  - MicroObservatory
    - Introduction
    - Using Telescopes to Understand our Universe
    - AstroPhotography
  - Stellarium
    - Exploring the Celestial Sphere
    - The Sky in Motion
    - Astronomical Predictions
  - Solar Energy and the Earth's Orbit
  - Comic Life
    - Historical Stories
    - Famous Funnies
    - Pictures Worth a Thousand Words

Standards/Eligible Content and Skills

Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	3.3.6-8.I	MP1, MP2, MP3, MP4
Collect data to provide evidence for how the motion and complex interactions of air masses result in changes in weather conditions.	3.3.6-8.J	MP1, MP2, MP3, MP4
Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	3.3.6-8.O	MP1, MP2, MP3, MP4
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	3.3.6-8.L	MP1, MP2, MP3, MP4
Collect, analyze, and interpret environmental data to describe a local environment.	3.4.6-8.E	MP1, MP2, MP3, MP4
Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	3.1.6-8.L	MP1, MP2, MP3, MP4
Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	3.1.6-8.E	MP1, MP2, MP3, MP4
Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	3.1.6-8.I	MP1, MP2, MP3, MP4
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	3.1.6-8.J	MP1, MP2, MP3, MP4
Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	3.1.6-8.U	MP1, MP2, MP3, MP4
Develop a model that predicts and describes changes in the particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	3.2.6-8.B	MP1, MP2, MP3, MP4
Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer	3.2.6-8.M	MP1, MP2, MP3, MP4
Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	3.2.6-8.N	MP1, MP2, MP3, MP4
Gather, read, and synthesize information from multiple sources to investigate how Pennsylvania environmental issues affect Pennsylvania's human and natural systems.	3.4.6-8.D	MP1, MP2, MP3, MP4
Design a solution to an environmental issue in which individuals and societies can engage as stewards of the environment.	3.4.6-8.H	MP1, MP2, MP3, MP4
Construct an explanation that describes regional environmental conditions and their implications on environmental justice and social equity.	3.4.6-8.I	MP1, MP2, MP3, MP4

Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
Hypothesize what alternative outcomes (individual, cultural, and/or environmental) might have resulted had a different technological solution been selected.	3.5.6-8.C	MP1, MP2, MP3, MP4
Analyze examples of technologies that have changed the way people think, interact, live, and communicate.	3.5.6-8.F	MP1, MP2, MP3, MP4
Design methods to gather data about technological systems.	3.5.6-8.L	MP1, MP2, MP3, MP4
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	3.5.6-8.N (ETS)	MP1, MP2, MP3, MP4
Interpret the accuracy of information collected.	3.5.6-8.O	MP1, MP2, MP3, MP4
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	3.5.6-8.P (ETS)	MP1, MP2, MP3, MP4
Apply a technology and engineering design thinking process.	3.5.6-8.Q	MP1, MP2, MP3, MP4
Illustrate the benefits and opportunities associated with different approaches to design.	3.5.6-8.S	MP1, MP2, MP3, MP4
Create solutions to problems by identifying and applying human factors in design.	3.5.6-8.T	MP1, MP2, MP3, MP4
Evaluate and assess the strengths and weaknesses of various design solutions given established principles and elements of design.	3.5.6-8.U	MP1, MP2, MP3, MP4
Refine design solutions to address criteria and constraints.	3.5.6-8.V	MP1, MP2, MP3, MP4
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	3.5.6-8.W (ETS)	MP1, MP2, MP3, MP4
Defend decisions related to a design problem.	3.5.6-8.X	MP1, MP2, MP3, MP4
Compare, contrast, and identify overlap between the contributions of science, technology, engineering, and mathematics in the development of technological systems.	3.5.6-8.Y	MP1, MP2, MP3, MP4
Analyze how different technological systems often interact with economic, environmental, and social systems.	3.5.6-8.Z	MP1, MP2, MP3, MP4
Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.	3.5.6-8.DD	MP1, MP2, MP3, MP4
Differentiate between inputs, processes, outputs, and feedback in technological systems.	3.5.6-8.EE	MP1, MP2, MP3, MP4
Create an open-loop system that has no feedback path and requires human intervention.	3.5.6-8.GG	MP1, MP2, MP3, MP4
Create a closed-loop system that has a feedback path and requires no human intervention.	3.5.6-8.HH	MP1, MP2, MP3, MP4

Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
Develop and use a model of the Earth sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	3.3.6-8.A	MP1, MP2, MP3, MP4
Develop and use a model to describe the role of gravity in the motion within galaxies and the solar system.	3.3.6-8.B	MP1, MP2, MP3, MP4
Analyze and interpret data to determine scale properties of objects in the solar system.	3.3.6-8.C	MP1, MP2, MP3, MP4
Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	3.2.6-8.J	MP1, MP2, MP3, MP4
Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	3.1.6-8.C	MP1, MP2, MP3, MP4
Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	CC.3.5.6-8.C	MP1, MP2, MP3, MP4
Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics	CC.3.5.6-8.D	MP1, MP2, MP3, MP4
Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	CC.3.5.6-8.G	MP1, MP2, MP3, MP4
Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	CC.3.5.6-8.I	MP1, MP2, MP3, MP4
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	CC.3.6.6-8.C	MP1, MP2, MP3, MP4
Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	CC.3.6.6-8.E	MP1, MP2, MP3, MP4
Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	CC.3.6.6-8.F	MP1, MP2, MP3, MP4
Draw evidence from informational texts to support analysis reflection, and research.	CC.3.6.6-8.H	MP1, MP2, MP3, MP4
Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	CC.3.6.6-8.I	MP1, MP2, MP3, MP4

ASSESSMENTS

PDE Academic Standards, Assessment Anchors, and Eligible Content: The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

Formative Assessments: The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

Effective formative assessments for this course include: Bell ringers, exit tickets, worksheets, quizzes, lab assignments, practice tests, writing prompts, teacher questioning, class discussions, individual and team based projects

Summative Assessments: The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

Effective summative assessments for this course include: Projects, performance tasks, tests