WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Science 8
Course Number: 00307
Course Prerequisites: None

Course Description: Students in Science 8 continue to develop understanding of four core ideas in the physical sciences. The Science 8 performance expectations in the Physical Sciences build on the K – 5 ideas and capabilities to allow learners to explain phenomena central to the physical sciences but also to the life sciences and earth and space science. There are four physical science topics in Science 8: 1)Structures and Properties of Matter, 2)Forces and Interactions, 3)Energy, and 4)Waves and Electromagnetic Radiation. The performance expectations in Science 8 blend core ideas with scientific and engineering practices and crosscutting concepts to support students in developing usable knowledge across the science disciplines.

Suggested Grade Level: Grade 8
Length of Course: Two Semesters
Units of Credit: 1
PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:
CSPG 32 Biology, CSPG 34 Chemistry, CSPG 40 Earth and Space Science, CSPG 45 Environmental Science, CSPG 46 General Science, CSPG 54 Middle Level Science, CSPG 56 Physics, CSPG 70 Grades 4 – 8

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: 03238
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:	OpenSciEd
Publisher:	OpenSciEd
ISBN #:	NA
Copyright Date:	NA
WCSD Board Approval Date:	6/12/2023

Supplemental Materials: OpenSciEd Kits and Digital Platform through Carolina Biological

Curriculum Document

WCSD Board Approval:

Date Finalized:	5/22/2023
Date Approved:	6/12/2023
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

- Thermal Energy
    - Structure and Property of Matter
    - Definitions of Energy
    - Conservation of Energy and Energy Transfer
    - Wave Properties
    - Developing Possible Solutions
- Chemical Reactions and Matter
    - Structure and Properties of Matter
    - Chemical Reactions
    - Information Processing

Marking Period 2

- Chemical Reactions and Matter
    - Structure and Properties of Matter
    - Chemical Reactions
    - Information Processing
- Chemical Reactions and Energy
    - Chemical Reactions
    - Developing Possible Solutions
    - Optimizing the Design Solution
- Contact Forces
    - Forces and Motion
    - Definitions of Energy
    - Developing Possible Solutions
    - Optimizing the Design Solution
    - Information Processing
    - Conservation of Energy and Energy Transfer
    - Relationship Between Energy and Forces

Marking Period 3

- Contact Forces
    - Forces and Motion
    - Definitions of Energy
    - Developing Possible Solutions
    - Optimizing the Design Solution
    - Information Processing

  - Conservation of Energy and Energy Transfer
  - Relationship Between Energy and Forces
- Sound Waves
  - Wave Properties

Marking Period 4

- Sound Waves
  - Wave Properties
- Forces at a Distance
  - Types of Interactions
  - Definitions of Energy
- Rocketry (If time and building funds permit)
  - History and Principles
  - Rocket Parts/Assembly
  - Newton's Laws of Motion
  - Launch Procedures and Safety
  - Rocket Day

Standards/Eligible Content and Skills

Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
Develop a model that predicts and describes the changes in state that occur with variations in temperature.	3.2.6-8.B	MP 1
Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	3.2.6-8.O	MP 1
Conduct an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of an object. Do not include calculations of energy.	3.2.6-8.O	MP 1
Individually and collaboratively 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 particles as measured by the temperature of the sample.	3.2.6-8.M	MP 1
As part of a planned investigation, identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.	3.2.6-8.M	MP 1
Make logical and conceptual connections between evidence and explanations.	3.2.6-8.M	MP 1
Apply scientific ideas or principles to design, construct, and test a design of a device that either minimizes or maximizes thermal energy transfer.	3.2.6-8.N	MP 1
Determine design criteria and constraints for a device that either minimizes or maximizes thermal energy transfer.	3.2.6-8.N	MP 1
Develop and use models to describe the movement of waves in various materials.	3.2.6-8.N	MP 1
Test design solutions and modify them on the basis of the test results in order to improve them.	3.5.6-8.M (ETS)	MP 1
Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.	3.5.6-8.M (ETS)	MP 1
Develop a model of a simple molecule.	3.2.6-8.A	MP 1 MP 2
Use the model of the simple molecule to describe its atomic composition.	3.2.6-8.A	MP 1 MP 2
Develop a model of an extended structure.	3.2.6-8.A	MP 1 MP 2
Use the model of the extended structure to describe its repeating subunits. *[Boundary: The substructure of atoms and the periodic table are learned in high school chemistry.]*.	3.2.6-8.A	MP 1 MP 2
Analyze and interpret data to determine similarities and differences from results of chemical reactions between substances before and after they undergo a chemical process.	3.2.6-8.D	MP 1 MP 2

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
Analyze and interpret data on the properties of substances before and after they undergo a chemical process.	3.2.6-8.D	MP 1 MP 2
Identify and describe possible correlation and causation relationships evidenced in chemical reactions.	3.2.6-8.D	MP 1 MP 2
Make logical and conceptual connections between evidence that chemical reactions have occurred and explanations of the properties of substances before and after they undergo a chemical process.	3.2.6-8.D	MP 1 MP 2
Use physical models or drawings, including digital forms, to represent atoms in a chemical process.	3.2.6-8.E	MP 1 MP 2
Use mathematical descriptions to show that the number of atoms before and after a chemical process is the same.	3.2.6-8.E	MP 1 MP 2
Gather, read, and synthesize information from multiple appropriate sources about sensory receptors' response to stimuli.	3.1.6-8.H	MP 1 MP 2
Assess the credibility, accuracy, and possible bias of each publication and methods used.	3.1.6-8.H	MP1 MP 2
Describe how publications and methods used are supported or not supported by evidence.	3.1.6-8.H	MP1 MP 2
Undertake a design project, engaging in the design cycle, to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	3.2.6-8.F 3.5.6-8.M (ETS)	MP 2
Specific criteria are limited to amount, time, and temperature of a substance.	3.2.6-8.F 3.5.6-8.P (ETS) 3.5.6-8.N (ETS)	MP 2
Analyze and interpret data for the amount, time, and temperature of a substance in testing a device that either releases or absorbs thermal energy by chemical processes to determine similarities and differences in findings.	3.2.6-8.F 3.5.6-8.N (ETS)	MP 2
Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.	3.5.6-8.P (ETS)	MP 2
Develop a model to generate data for testing a device that either releases or absorbs thermal energy by chemical processes, including those representing inputs and outputs of thermal energy.	3.5.6-8.M (ETS)	MP 2
Track the transfer of thermal energy as energy flows through a designed system that either releases or absorbs thermal energy by chemical processes.	3.5.6-8.N (ETS)	MP 2
Apply Newton's third law to design a solution to a problem involving the motion of two colliding objects.	3.2.6-8.G	MP 2 MP 3
Define a design problem involving the motion of two colliding objects that can be solved through the development of an object, tool, process, or system and that includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.	3.2.6-8.G	MP 2 MP 3
Evaluate competing design solutions involving the motion of two colliding objects based on jointly developed and agreed-upon design criteria.	3.2.6-8.G	MP 2 MP 3

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.	3.2.6-8.G 3.5.6-8.M (ETS)	MP 2 MP 3
Analyze and interpret data to determine similarities and differences in findings.	3.2.6-8.G 3.5.6-8.N (ETS)	MP 2 MP 3
Plan an investigation individually and collaboratively to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	3.2.6-8.H	MP 2 MP 3
Design an investigation and identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.	3.2.6-8.H	MP 2 MP 3
Make logical and conceptual connections between evidence and explanations.	3.2.6-8.H 3.5.6-8.P (ETS)	MP 2 MP 3
Examine the changes over time and forces at different scales to explain the stability and change in designed systems.	3.2.6-8.H	MP 2 MP 3
Construct and interpret graphical displays of data to identify linear and nonlinear relationships of kinetic energy to the mass of an object and to the speed of an object.	3.2.6-8.L	MP 2 MP 3
Gather, read, and synthesize information from multiple appropriate sources about sensory receptors' response to stimuli.	3.1.6-8.H	MP 2 MP 3
Assess the credibility, accuracy, and possible bias of each publication and methods used.	3.1.6-8.H	MP 2 MP 3
Describe how publications and methods used are supported or not supported by evidence.	3.1.6-8.H	MP 2 MP 3
Use mathematical representations to describe and/or support scientific conclusions about how the amplitude of a wave is related to the energy in a wave.	3.2.6-8.Q	MP 3 MP 4
Use mathematical representations to describe a simple model.	3.2.6-8.Q	MP 3 MP 4
Develop and use models to describe the movement of waves in various materials.	3.2.6-8.R	MP 3 MP 4
Conduct an investigation and evaluate an experimental design to produce data that can serve as the basis for evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	3.2.6-8.K	MP 4
Identify the cause-and-effect relationships between fields that exist between objects and the behavior of the objects.	3.2.6-8.K	MP 4
Ask questions about data to determine the effect of the strength of electric and magnetic forces that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles.	3.2.6-8.I	MP 4
Perform investigations using devices that use electromagnetic forces.	3.2.6-8.I	MP 4

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
Collect and analyze data that could include the effect of distance and magnetic force.	3.2.6-8.I	MP 4
Develop a model to describe what happens to the amount of potential energy stored in the system when the arrangement of objects interacting at a distance changes.	3.2.6-8.P	MP 4
Use models to represent systems and their interactions, such as inputs, processes, and outputs, and energy and matter flows within systems. Models could include representations, diagrams, pictures, and written descriptions.	3.2.6-8.P	MP 4
Develop models to describe the atomic composition of simple molecules and extended structures.	3.2.6-8.A	MP 4
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	MP 4
Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.]	3.2.6-8.H	MP 4
Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	3.2.6-8.G	MP 4
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)	MP 4
Cite specific textual evidence to support analysis of science and technical texts.	CC.3.5.6-8.A.	MP1 MP2 MP3 MP4
Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	CC.3.5.6-8.B.	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
Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	CC.3.5.6-8.E.	MP1 MP2 MP3 MP4

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	CC.3.5.6-8.F	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
Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	CC.3.5.6-8.H.	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
By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	CC.3.5.6-8.J.	MP1 MP2 MP3 MP4
Write arguments focused on discipline-specific content. • Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. • Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. • Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. • Establish and maintain a formal style. • Provide a concluding statement or section that follows from and supports the argument presented.	CC.3.6.6-8.A	MP1 MP2 MP3 MP4
Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. • Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. • Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. • Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. • Use precise language and domain-specific vocabulary to inform about or explain the topic. • Establish and maintain a formal style and objective tone. • Provide a concluding statement or section that follows from and supports the information or explanation presented.	CC.3.6.6-8.B.	MP1 MP2 MP3 MP4

Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
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
With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	CC.3.6.6-8.D	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
Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	CC.3.6.6-8.G.	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: Lab reports, tests, district marking period assessments