

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Biology Virt.

Course Number: 10311

Course Prerequisites: None

Course Description: Biology is recommended for tenth grade students who have successfully completed introduction to Environmental Science. The course focuses on the study of biochemistry, cells, genetics, and evolution. The course involves additional writing, detailed content and in-depth lab analysis. Appropriate lab activities will be used including elements of scientific inquiry, concepts of models and the use of technological devices.

Suggested Grade Level: Grade 10

Length of Course: Two Semesters

Units of Credit: 1

PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:

CSPG 32

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: 03051

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.

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TEXTBOOKS AND SUPPLEMENTAL MATERIALS

Board Approved Textbooks, Software, and Materials:

Title: Miller & Levine Biology
Publisher: Pearson
ISBN #: 10:0-32-892512-8
Copyright Date: 2019
WCSD Board Approval Date: [Click or tap here to enter text.](#)

Supplemental Materials: Accelerate virtual learning

Curriculum Document

WCSD Board Approval:

Date Finalized: 4/27/2023
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

Lesson 1: The Science of Biology

Lesson 2: The Chemistry of Life

Lesson 8: Cells

Marking Period 2

Lesson 8: Cells

Lesson 9: Photosynthesis

Lesson 10: Cellular Respiration

Lesson 11: Cell Growth and Division

Marking Period 3

Lesson 12: Introduction to Genetics

Lesson 13: DNA

Marking Period 4

Lesson 14: RNA and Protein Synthesis

Lesson 17: Darwin's Theory of Evolution

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Standards/Eligible Content and Skills

Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
Apply the scientific method to solve a problem.	RST.9.3 WHST.9-10.1.a	MP 1
Explain how scientific theories are developed.	RST.9.3 WHST.9-10.1.a	MP 1
Explain how scientific attitudes develop new ideas.	RST.9.3 WHST.9-10.1.a	MP 1
Describe how the structure of water is responsible for its unique properties.	RST.9.5	MP 1
Relate carbon's bonding versatility to its ability to form biological macromolecules.	BIO.A.2.2.1 BIO.A.2.2.2 BIO.A.2.2.3	MP 1
Describe the process of dehydration synthesis and hydrolysis.	BIO.A.2.2.2	MP 1
Differentiate between the structures and functions of carbohydrates, lipids, nucleic acids, and proteins.	BIO.A.2.2.3	MP 1
Investigate the presence of specific molecules in food and the effects of environmental factors on enzyme activities.	BIO.A.2.3 BIO.A.2.3.1	MP 1
Describe the role of catalysts in chemical reactions and identify the enzymes as biological catalysts.	BIO.A.2.3 BIO.A.2.3.1	MP 1
Explain the induced fit model of enzymes.	BIO.A.2.3, BIO.A.2.3.1	MP 1
Observe cells under a microscope.	BIO.A.3.1 BIO.A.4.1	MP 1
Build a mosaic of a typical prokaryotic cell.	BIO.A.3.1 BIO.A.4.1	MP 1
Describe the function of each structure in a prokaryotic cell.	BIO.A.3.1 BIO.A.4.1	MP 1
Compare and contrast a prokaryotic cell with a eukaryotic cell.	BIO.A.3.1 BIO.A.4.1	MP 1
Compare and contrast a typical plant cell with a typical animal cell.	BIO.A.3.1.1 BIO.A.3.2 BIO.A.3.2.1	MP 1
Write an analogy for the function of each of the organelles found in a eukaryotic cell.	BIO.A.3.1 BIO.A.4.1 BIO.A.4.1.1	MP 2
Describe how the biological levels of organization are arranged in increasing order.	BIO.A.3.1 BIO.A.4.2	MP 2
Relate the structure of membrane-bound organelles to their functions in energy and transportation of materials.	BIO.A.3.1.1 BIO.A.3.2 BIO.A.3.2.1	MP 2
Describe the role of the plasma membrane in regulating cell activities and protecting the cell.	BIO.A.4.1.1 BIO.A.4.1.2 BIO.A.4.1.3	MP 2
Describe the role of ATP in photosynthesis, cell respiration, and active transport.	BIO.A.3.2.1 BIO.A.3.2.2	MP 2

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Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
Compare energy transfer during photosynthesis and cell respiration.	BIO.A.3.2.1 BIO.A.3.2.2	MP 2
Compare the various mechanisms of passive and active transport.	BIO.A.4.1.2	MP 2
Identify and describe the three main stages in the cell cycle.	BIO B.1.1 BIO B.1.1.1 BIO B.1.1.2	MP 2
Identify the changes and events that occur in cells before and during mitosis.	BIO B.1.1 BIO B.1.1.1 BIO B.1.1.2	MP 2
Identify the changes and events that occur in cells before and during meiosis.	BIO B.1.1 BIO B.1.1.1 BIO B.1.1.2	MP 2
Differentiate between mitosis and meiosis.	BIO B.1.1, BIO B.1.1.1, BIO B.1.1.2, BIO 1.2, BIO 1.2.2, RST.9.1, RST.9.2	MP 2
Create a model to demonstrate the process of mitosis or meiosis.	BIO B.1.1 BIO B.1.1.1 BIO B.1.1.2	MP 2
Calculate surface area to volume ratio and explain how it limits cell size.	BIO B.1.1 BIO B.1.1.1 BIO B.1.1.2	MP 2
Explain how cancer cells differ from normal cells.	BIO B.1.1, BIO B.1.1.1, BIO B.1.1.2, BIO 1.2, BIO 1.2.2, RST.9.1, RST.9.2, WHST.9.10.2c	MP 2
Determine the relationship between alleles and genes.	BIO.B.2.1, BIO B.2.1.1, BIO.B.2.2., BIO.B.2.2.1, BIO.B.2.2.2., BIO.B.2.3, BIO.B.2.3.1, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, RST.9.10.1.c, WHST.9-10.2	MP 3
Describe and predict various patterns of inheritance.	BIO.B.2.1, BIO B.2.1.1, BIO.B.2.2., BIO.B.2.2.1, BIO.B.2.2.2., BIO.B.2.3, BIO.B.2.3.1, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, RST.9.10.1.c, WHST.9-10.2	MP 3
Summarize the events of DNA replication and explain the result of replication.	BIO.B.2.1, BIO B.2.1.1, BIO.B.2.2., BIO.B.2.2.1, BIO.B.2.2.2., BIO.B.2.3, BIO.B.2.3.1, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, RST.9.10.1.c, WHST.9-10.2	MP 3
Explain the roles of DNA, genes, alleles, and chromosomes in inheritance.	BIO.B.2.1, BIO B.2.1.1, BIO.B.2.2., BIO.B.2.2.1, BIO.B.2.2.2., BIO.B.2.3, BIO.B.2.3.1, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, RST.9.10.1.c, WHST.9-10.2	MP 3
Compare and contrast Mendelian and non-Mendelian patterns of inheritance.	BIO.B.2.1 BIO B.2.1.1 BIO.B.2.2. BIO.B.2.2.1 BIO.B.2.2.2.BIO.B.2.3 BIO.B.2.3.1 RST.9.1 RST.9.2 RST.9.3 RST.9.4 RST.9.5 RST.9.7 RST.9.10.1.c WHST.9-10.2	MP 3
Explain the process of transcription, translation, and protein modification	BIO.B.2.1, BIO B.2.1.1, BIO.B.2.2., BIO.B.2.2.1, BIO.B.2.2.2., BIO.B.2.3, BIO.B.2.3.1, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, RST.9.10.1.c, WHST.9-10.2	MP 3
Identify and explain how genetic information is expressed.	BIO.B.2.1, BIO B.2.1.1, BIO.B.2.2., BIO.B.2.2.1, BIO.B.2.2.2., BIO.B.2.3, BIO.B.2.3.1, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, RST.9.10.1.c, WHST.9-10.2	MP 3
Explore the relationships between advancements in technology and innovative biological studies.	BIO.B.2.1, BIO B.2.1.1, BIO.B.2.2., BIO.B.2.2.1, BIO.B.2.2.2., BIO.B.2.3, BIO.B.2.3.1, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, RST.9.10.1.c, WHST.9-10.2	MP 3
Describe the mechanisms that lead to the development of new species.	BIO 3.1.B.C3	MP 4
Explain how genetic mutations can result in changes in a population's genotypes and phenotypes.	BIO.B.3.1.3	MP 4
Describe how living organisms affect the survival of one another.	BIO.B.4.1, BIO.B.4.2, RST.9.1, RST.9.2, RST.9.3, RST.9.4, RST.9.5, RST.9.7, WHST.9-10.1.c, WHST.9-10.1- 10.6	MP 4
Explain the biotic and abiotic parts of an ecosystem and their interactions.	BIO.B.4.1, BIO.B.4.2, RST.9.1, RST.9.2 RST.9.3, RST.9.4, RST.9.5, RST.9.7, WHST.9-10.1.c, WHST.9-10.1- 10.6v	MP 4

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Performance Indicator	PA Core Standard and/or Eligible Content	Marking Period Taught
Predict how limiting factors such as physical, biological, chemical factors, etc. can affect organisms.	BIO.B.4.1,BIO.B.4.2,RST.9.1,RST.9.2 RST.9.3, RST.9.4, RST.9.5, RST.9.7, WHST.9-10.1.c, WHST.9-10.1- 10.6	MP 4
Use evidence to explain how patterns in populations affect natural systems.	BIO.B.4.1,BIO.B.4.2,RST.9.1,RST.9.2RST.9.3,RST.9.4,RST.9.5, RST.9.7, WHST.9-10.1.c, WHST.9-10.1- 10.6	MP 4
Explain how energy moves through trophic levels in ecosystems	BIO.B.4.1,BIO.B.4.2,RST.9.1,RST.9.2, RST.9.3,RST.9.4,RST.9.5,RST.9.7, WHST.9-10.1.c, WHST.9-10.1- 10.6	MP 4
Describe predator-prey relationships in ecosystems.	BIO.B.4.1,BIO.B.4.2,RST.9.1,RST.9.2 RST.9.3,RST.9.4, RST.9.5, RST.9.7, WHST.9-10.1.c, WHST.9-10.1- 10.6	MP 4
Investigate how limiting factors affect populations.	BIO.B.4.1,BIO.B.4.2,RST.9.1,RST.9.2, RST.9.3 RST.9.4 RST.9.5 RST.9.7 WHST.9-10.1.c WHST.9-10.1- 10.6	MP 4
Compare cycles of matter with conservation of energy in ecosystems.	BIO.B.4.1,BIO.B.4.2,RST.9.1,RST.9.2, RST.9.3,RST.9.4,RST.9.5,RST.9.7, WHST.9-10.1.c, WHST.9-10.1- 10.6	MP 4

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: Benchmark assessments, study guides, and quizzes.

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: Semester Exams and Unit Tests