

WARREN COUNTY SCHOOL DISTRICT

VIRTUAL PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Space Exploration

Course Number: 10382

Course Prerequisites: None noted

Course Description: See attached

Suggested Grade Level: Grades 9-12

Length of Course: One Semester

Units of Credit: .5

PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:
CSPG 40

To find the CSPG information, go to <https://www.education.pa.gov/Educators/Certification/Staffing%20Guidelines/Pages/default.aspx>

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:

To find the State Course Code, go to <https://nces.ed.gov/forum/sced.asp>, download the Excel file for SCED, click on SCED 6.0 tab, and chose the correct code that corresponds with the course.

TEXTBOOKS AND SUPPLEMENTAL MATERIALS

Supplemental Materials: Accelerate Education

Curriculum Document

WCSD Board Approval:

Date Finalized: 9/19/2019

Date Approved: 11/4/2019

Implementation Year: 19-20

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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).

ASSESSMENTS

PSSA 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: Lesson quizzes, projects, discussion boards, and module exams

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

Course Description:

From the history of rockets to the potential explorations of humans beyond Earth, this course introduces students to space exploration. Students will study the history of space flight from manned and unmanned flights and what it means to launch, explore, and land using spacecraft.

Major Concepts:

- The Space Race
- Launch and Landing Systems
- Spacecraft Systems – Part 1
- Spacecraft Systems – Part 2
- Manned Spaceflight
- Unmanned Spaceflight
- Low Earth Orbit
- Beyond Earth Orbit

Module	Lesson Title	Objectives
Module 1	Dr Robert Goddard	1. Identify key achievements in rocketry of Dr. Robert Goddard.
	The V2 Rocket	1. Explain the importance of the development of the V2 rocket.

Module	Lesson Title	Objectives
Module 1	The Cold War	1. Explain why the Cold War increased the rate of rocket and space development.
	The Creation of NASA	1. Explain why NASA was created.
	The Race to the Moon	1. Explain the U.S. plans for landing on the moon. 2. Describe the first moon landing.
	Détente in Space	1. Explain how cooperation in space symbolized political developments on Earth.
Module 2	Rocketry	1. Explain how a rocket motor works.
	Location of Launch Sites	1. Describe the issues to be considered in choosing a launch complex location.

Module	Lesson Title	Objectives
Module 2	Launch Systems	1. Describe the facilities needed at a launch complex.
	Orbits and Rendezvous	1. Explain some basic principles of orbital mechanics.
	The Moon	1. Explain the stages of travelling from Earth to the Moon.
	Reentry and Landing	1. Explain the issues to be dealt with in returning to Earth.
Module 3	Power Systems	1. Describe the requirements for spacecraft power systems. 2. Identify various power sources that are utilized on spacecraft.
	Temperature Control and Radiation Protection	1. Describe the situations that affect temperature in a spacecraft. 2. Explain the passive and active measures that spacecraft designers use to maintain a relatively constant temperature inside a spacecraft. 3. Identify the types and sources of dangerous radiation in space. 4. Describe measures that spacecraft designers and flight crews take to minimize radiation exposure.

Module	Lesson Title	Objectives
Module 3	Communications and Tracking	<ol style="list-style-type: none"> 1. Explain how radios work and how they can be adapted to carry more information over longer distances. 2. Identify specific technologies that NASA currently utilizes to communicate with the ISS, satellites, and distant spacecraft such as Voyager 1 and 2.
	Attitude and Alignment	<ol style="list-style-type: none"> 1. Explain the concept of spin stabilization. 2. Describe various technologies used to detect spacecraft attitude and alignment. 3. Describe various technologies used to stabilize or alter spacecraft attitude and alignment.
	Air, Water, Food, and Waste	<ol style="list-style-type: none"> 1. Describe the requirements for sustaining human life in space. 2. Identify and describe technologies used to maintain a breathable environment inside a spacecraft. 3. Describe how spacecraft systems are designed to meet the food, water, and waste needs of humans.
	Micro-Gravity & Spacesuits	<ol style="list-style-type: none"> 1. Define micro-gravity and explain its effects on spacecraft systems and human health. 1. Explain how spacecraft systems are adapted for use in spacesuits.
Module 4	Vostok, Voshkod, Mercury, Gemini, and Soyuz	<ol style="list-style-type: none"> 1. Describe the major features of the Vostok, Voshkod, and Mercury spacecraft 2. Describe the major features of the Gemini and Soyuz spacecraft.

Module	Lesson Title	Objectives
Module 4	Apollo & the Space Shuttle	<ol style="list-style-type: none"> 1. Describe the history of the Apollo missions. 2. Describe the developments in manned spacecraft that occurred throughout the Apollo program and the major features of the Apollo spacecraft. 3. Describe the major features of the Space Shuttle. 4. Explain the benefits of the Space Shuttle compared to previous vehicles for manned spaceflight.
	Astronauts and Selection	<ol style="list-style-type: none"> 1. Explain how astronauts were chosen historically and how they are chosen today.
	China	<ol style="list-style-type: none"> 1. Describe China's spaceflight programs and recent developments in their spacecraft technology.
	GPS & Weather Satellites	<ol style="list-style-type: none"> 1. Describe how the GPS system works. 2. Describe the functions and orbits of the GOES and POES satellites.
	Communication Satellites	<ol style="list-style-type: none"> 1. Identify the major commercial and military uses of communication satellites 2. Describe the purpose of the ITU. 3. Explain how satellite communication technology in orbit and on the ground allows for delivery of specific signals, such as television channels, and to individual users.

Module	Lesson Title	Objectives
Module 4	Space Telescopes and Earth Mapping	<ol style="list-style-type: none"> 1. Describe the obstacles to space observation from Earth and the benefits of space telescopes. 2. Describe Kepler's purpose and how it works. 3. Explain how satellites are used for geological mapping.
Module 5	Space Stations	<ol style="list-style-type: none"> 1. Identify the benefits of having space stations. 2. Identify specific problems associated with running a space station.
	Skylab	<ol style="list-style-type: none"> 1. Describe the development of Skylab and its function.
	ISS Assembly and Components	<ol style="list-style-type: none"> 1. Describe the development and construction of the International Space Station.
	International Space Station - ISS Scientific Research	<ol style="list-style-type: none"> 1. Describe the types of research being conducted aboard the ISS.
	International Space Station - ISS Operations	<ol style="list-style-type: none"> 1. Understand the systems and manpower involved in running the ISS.

Module	Lesson Title	Objectives
Module 5	Commercial Flights	<ol style="list-style-type: none"> 1. Explain the interest in commercial space activities. 2. Describe the relationships between NASA and new space technology companies.
Module 6	Flexible Path	<ol style="list-style-type: none"> 1. Explain the interest in commercial space activities. 1. Describe the relationships between NASA and new space technology companies.
	SLS, Orion and Ion Propulsion	<ol style="list-style-type: none"> 1. Explain the interest in commercial space activities. 2. Describe the relationships between NASA and new space technology companies.
	Missions Plans	<ol style="list-style-type: none"> 1. Explain the interest in commercial space activities. 1. Describe the relationships between NASA and new space technology companies.
	Technology Challenges	<ol style="list-style-type: none"> 1. Explain the interest in commercial space activities. 2. Describe the relationships between NASA and new space technology companies.

Module	Lesson Title	Objectives
Module 6	Mars Exploration Missions	<ol style="list-style-type: none"> 1. Explain the interest in commercial space activities. 2. Describe the relationships between NASA and new space technology companies.
	Exploring the World and the Universe	<ol style="list-style-type: none"> 1. Explain the interest in commercial space activities. 2. Describe the relationships between NASA and new space technology companies.
Semester Exam		