Odysseyware®

CURRICULUM OVERVIEW

Science and Mathematics in the Real World

Career and Technical Education Series

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Science and Mathematics in the Real-World Course Overview

Science and mathematics are part of the STEM (Science, Technology, Engineering, and Mathematics) multi-dimensional strategy that can effectively sustain our twenty-first century knowledge-based economy. STEM careers provide a wide variety of opportunities to understand and address global issues. The most pressing issues of this generation include overpopulation, environmental degradation, pollution, and global warming. These are all subjects of intense and dedicated research by STEM professionals in very diverse fields. In this course, students will focus on how to apply science and mathematics concepts to the development of plans, processes, and projects that address real world problems, including sustainability and "green" technologies. This course also highlights how science and mathematics and the applications of STEM will be impacted due to the development of a greener economy. The course exposes students to a wide variety of STEM applications and to real world problems from the natural sciences, technology fields, and the world of sports, and emphasizes the diversity of STEM career paths. The importance of math, critical thinking, and mastering scientific and technological skill sets is highlighted throughout. Challenging and enjoyable activities provide multiple opportunities to develop critical thinking skills and the application of the scientific method, and to work on real world problems using STEM approaches.

- **Introduction to Science and Mathematics All Around Us:** In Unit 1, students learn about basic scientific and mathematical applications that can be encountered all around us in the real world.

- **Making Connections:** Math and Science in Context: In Unit 2, students learn about the use of mathematics as a technological tool and the role of science in our environment, as reflected in the variety of problems, fields, and approaches that characterize the STEM fields.

- **Designing and Conducting an Experiment:** In this unit, students will go through a progressive analysis of converting a research question into an actual, feasible research design. While each major aspect they could encounter will be explained separately, the analysis throughout is focused on practical applications in exemplary situations.

- **The Data: Evaluating Results and Drawing Conclusions:** This unit looks at data: how data are collected, analyzed, and evaluated. There is an overview of statistical analysis and the related concept of statistical significance. Very basic statistical tests are covered, including the chi-square test, Student's t-test, and the use of contingency tables.

- **Reporting your Findings:** This unit illustrates the fact that the entire scientific research process is always distilled into a publishable report of a very specific type.

Science and Mathematics in the Real World

Unit 1: Introduction to Science and Mathematics All Around Us

Assignments

1. Course Overview
2. The Importance of Science and Mathematics in Our Society
3. Exploring Science and Math Through Everyday Problem Solving
4. Project: Discerning Data
5. Engaging Science and Mathematics with Global Issues
6. Project: Scientists as Problem Solvers: Drawing Conclusions about Ocean Populations

7 Quiz 1: Introduction

8. The STEM Careers and STEM Career Paths
9. Critical Thinking and Other Core Skills in the STEM Careers
10. Project: Case Study: The Benefits of Compact Fluorescent Lamps
11. STEM Careers as Explained by STEM Professionals
12. Project: Meet the Experts
13. Quiz 2: Developing and Applying Science, Mathematics, and Critical Thinking Skills in the Real World
14. Special Project*
15. Test
16. Course Project Part 1: Formulating the Question and Conducting Research*
17. Glossary and Credits

Science and Mathematics in the Real World

Unit 2: Making the Connection: Math and Science in Context

Assignments

1. Temperature Changes in Our Environment
2. Mathematics in Our Weather
3. Project: Calculating Temperature Based on Elevation
4. Temperature Comparisons: Charts, Graphs, and Conversions
5. Project: Adopt a Weather Buoy
6. Quiz 1: Technology as a Mathematical Tool
7. Discovering Environmental Issues
8. Understanding Environmental Data
9. Project: Predictions, Climate Data, and Effective Communication
10. Carbon Footprint: Using STEM to Quantify Environmental Impact
11. Project: Calculating Your Carbon Footprint
12. Quiz 2: Science in Our Environment
13. Special Project*
14. Test
15. Course Project Part 2: Writing the Review of Literature and Formulating a Hypothesis*
16. Glossary and Credits

Science and Mathematics in the Real World

Unit 3: Mathematics and Science in the World of Sports

Assignments

1. Baseball: Averages and Projectiles
2. Project: Mathematics and Baseball
3. Swimming: Drag and Lift
4. Running: Probability and Biomechanics
5. Project: Feeling the Burn: Determining Your Caloric Needs
6. Quiz 1: Winning the Game - How Mathematics and Science Play a Part
7. STEM Technologies: Changing How We View and Play Sports
8. How Technology Has Improved Sports Performance
9. Project: Identifying STEM Applications in Sports Technologies
10. STEM Careers in Sports
11. Project: STEM and Sports Careers
12. Quiz 2: Sports and Technology â€“ How New Developments Have Changed the Game
13. Special Project*
14. Test
15. Course Project Part 3: Materials, Methods, and Procedures*
16. Glossary and Credits

Science and Mathematics in the Real World

Unit 4: Greening Our Environment Using Science and Mathematics

Assignments

1. Recycling - The Economic Impact
2. Clean Water - Using and Conserving Fresh Water Resources
3. Project: Calculating Your Household Water Usage
4. The Oil Spill - What is the Impact?
5. Project: STEM and Restoration Efforts in the Gulf of Mexico
6. Quiz 1: Cleaning Up Our Environment - How Science and Mathematics Play a Part
7. Solar Energy
8. Water and Power: Hydroelectric Technologies
9. Project: Building a Waterwheel and a Turbine
10. Wind and Energy
11. Project: Calculating Alternative Energy Needs
12. Quiz 2: The Science of Alternative Energy
13. Special Project*
14. Test
15. Course Project Part 4: Conducting the Experiment and Recording Data*
16. Glossary and Credits

Science and Mathematics in the Real World

Unit 5: Science and Mathematics Inside Population Growth

Assignments

1. Aging and the Effect on Global Population
2. Populations and Natural Disasters - What Are the Effects?
3. Project: Mapping Earthquakes
4. Poverty and Population Growth
5. Project: Ending Global Poverty by 2030: Possible or Not?
6. Quiz 1: Linking Population, Science, and Our Environment
7. Demographic Data and Trends
8. Project: Global Population: Challenges and Opportunities
9. Demographics: Graphing Populations
10. Probability and Statistics in Human Populations
11. Project: Lifestyle and Life Expectancy Predictions
12. Quiz 2: Population in Motion: Mathematics and Development
13. Special Project*
14. Test
15. Course Project Part 5: Analyzing Your Data*
16. Glossary and Credits

Unit 6: Course Project, Review, and Exam

Assignments

1. Course Project Part 6: Interpreting and Presenting Your Findings*
2. Review
3. Exam

(*) Indicates alternative assignment