07 Rover

Content Area: **Technology**
Course(s):
Time Period: **Full Year**
Length: **5 Week**
Status: **Published**

General Overview, Course Description or Course Philosophy

This full-year course continues to emphasize the application of integrated STEM (Science, Technology, Engineering and Mathematics) principles and the design method introduced in the 1st year technology course. This course is taught on the foundations of technology education having students invent solutions to real-world problems through robotic applications. Students will identify problems, research, design and fabricate solutions. Problem solving, critical thinking and design skills are taught through various activities. Hands-on themes include structural and robotic systems, as well as system control technology. This course provides all students with valuable skills such as: problem solving, design, creative thinking, systems thinking, teamwork, documentation, programming, and computer applications.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

How to apply new and previously learned knowledge in order to design and build a working tethered rover, with specific requirements.

CONTENT AREA STANDARDS

TECH.8.2.12.D.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

CRP.K-12.CRP2	Apply appropriate academic and technical skills.

STUDENT LEARNING TARGETS

Declarative Knowledge

students will know:

- List engineering log requirements.
- List orthographic drawing requirements.
- Identify the rules associated with lab, eye, and machine safety.
- Identify how to use safety equipment, hand tools, and all machines.
- Identify errors when processing material.
- Describe the proper soldering technique.
- Describe proper hot wire cutter and foam core material processing techniques.
- Identify different types of gears.
- Define the purpose of different types of gears.
- Explain when and how to utilize different types of gears.
- State the formula for calculating mechanical advantage.
- Identify and describe electronic components.

Procedural Knowledge

Students will be able to:

- Utilize a variety of methods to research possible solutions.
- Sketch, compare and contrast possible rover solutions.
- Select the best solution for the rover, and defend rationale for final chosen solution.
- Create and format an engineering log.
- Create and annotate an orthographic drawing.
- Select, rationalize and calculate mechanical advantage.
- Properly utilize lab tools and equipment to build the following systems: a tethered remote, rover structure, drivetrain and wheels.
- Test the rover and research methods to improve issues with: Power, friction, mechanical advantage, traction and others.
- Research, propose and document what would happen if changes were made to the vehicle

EVIDENCE OF LEARNING

Formative Assessments

Weekly log check(s).

Orthographic drawing check.

Mechanical advantage in gears check.

Soldering/electronics components check.

Remote structure/plywood/foam core processing check.

Vehicle structure check.

Wheel design check.

Initial testing and evaluation

Summative Assessments

Final Testing of Rover

Final Grading of Engineering Log

Unit Test

RESOURCES (Instructional, Supplemental, Intervention Materials)

Teacher notes on Engineering Logs.

Former student log examples.

Panasonic Challenge Engineering Log notes and examples.

INTERDISCIPLINARY CONNECTIONS

Educational Technology: Use of Google resources

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.