Pequea Valley School District
Technology Education

Unit: Robotic Devices **Course: Robotics 1** **Grade: HS**

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s)
How do autonomous and radio controlled robotic devices impact society?

Keystone Eligible Content/PA Core Standard
3.1.10-B. Analyze how humans ingenuity and technological resources satisfy specific human needs and improve the quality of life
3.1.10-C. Evaluate possibilities consequences and impacts of scientific and technological solutions

Pacing: Approximate number of class sessions per unit
15 Days

Tier 3 Vocabulary (Content specific vocabulary)
Robot, Autonomous, Radio control, mechanical, Sensor

Know - What do students need to **know** in order to be able to do and understand? ***List concepts, such as facts, formulas, key vocabulary and knowledge "nuggets".***

- Characteristics of a robotic device
- Advantages and Disadvantages of robotic devices
- What defines an autonomous and radio controlled device

Understand - What do students need to **understand**? What is the **big idea**? ***List broad concepts or "big ideas" in a statement of enduring understanding.***

- How robotic function impact society
- How tasks are completed using robots
- How jobs are impacted

Learning Outcome - What do students need to be able to **accomplish** by the unit's end? ***List skills and competencies.***

- Learners will complete a robotics presentation: Each learner will pick a robotic device of their choice and explain the characteristics, function, autonomous control, radio control, advantages/disadvantages, and impacts on society.

Literature:

Software/Resources:

Pequea Valley School District
Technology Department

Unit: Radio Control Devices **Course: Robotics 1** **Grade: HS**

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s)
How do radio controlled devices work?

Keystone Eligible Content/PA Core Standard
3.1.10-B. Analyze how humans ingenuity and technological resources satisfy specific human needs and improve the quality of life
3.1.10-C. Evaluate possibilities consequences and impacts of scientific and technological solutions

Pacing: Approximate number of class sessions per unit
20 days

Tier 3 Vocabulary (Content specific vocabulary)
Electromagnetic, crystal, resonance, frequency, wavelength, amplitude, period, transmitter, antenna

Know - What do students need to **know** in order to be able to do and understand? ***List concepts, such as facts, formulas, key vocabulary and knowledge "nuggets".***

- The parts of a radio controlled device and their function
- How radio controlled devices work
- How to calculate frequency and period

Understand - What do students need to **understand**? What is the **big idea**? ***List broad concepts or "big ideas" in a statement of enduring understanding.***

- How radio controlled devices are properly used
- How to use antennas, transmitters and the environment to achieve the best possible signal

Learning Outcome - What do students need to be able to **accomplish** by the unit's end? ***List skills and competencies.***

- Learners will complete a signals lab: Learners will use a radio controlled device to collect data related to frequency transmission length. They will use their knowledge gained to make an antenna that will be tested for practicality and performance.

- Unit assessment

Literature:

Software/Resources:

Pequea Valley School District
Technology Education

Unit: Transmitter Programming **Course: Robotics 1** **Grade: HS**

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s)
How is a radio controlled transmitter programmed and used?

Keystone Eligible Content/PA Core Standard
3.6.12-B. Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and decoding

Pacing: Approximate number of class sessions per unit
15 days

Tier 3 Vocabulary (Content specific vocabulary)
Configuration, Reverse, Scaling, Linear, Exponential, Edit PT, Trim, P. Mix

Know - What do students need to **know** in order to be able to do and understand? ***List concepts, such as facts, formulas, key vocabulary and knowledge "nuggets".***

- How to navigate through the transmitter programming windows
- The definition of each menu
- How to program each of the menus

Understand - What do students need to **understand**? What is the **big idea**? ***List broad concepts or "big ideas" in a statement of enduring understanding.***

- The function and application of each of the transmitter menus
- Which menu needs to be programmed/manipulated to solve a technological problem

Learning Outcome - What do students need to be able to **accomplish** by the unit's end? ***List skills and competencies.***

- Learners will take a demonstration assessment. They will need to program their transmitters to solve a specific function
- Learners will use a video editing software to make a "how to" programming video. (each group of students have a different menu)

Literature:

Software/Resources:

Pequea Valley School District
Technology Education

Unit: Mechanical Advantage **Course: Robotics 1** **Grade: HS**

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s)
How can a mechanical advantage be created to increase the performance of a robotics device?

Keystone Eligible Content/PA Core Standard
3.1.12-A. Apply Concepts of Systems, Subsystems, feedback and control to solve complex Technological problems.
3.2.11-D. Identify and apply the technological design process to solve problems
3.4.10-C. Distinguish among the principles of force and motion
3.7.10 - A. Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions

Pacing: Approximate number of class sessions per unit
25 Days

Tier 3 Vocabulary (Content specific vocabulary)
Mechanical Advantage, Torque, Speed, RPM, Driver gear, Follower gear, Idle gear, Worm gear, Gearing up, Gearing Down, Output, Gear Box, Center of Gravity, Ratio

Know - What do students need to **know** in order to be able to do and understand? ***List concepts, such as facts, formulas, key vocabulary and knowledge "nuggets".***

- Basic vocabulary
- Building techniques
- How to calculate a gear ratio

Understand - What do students need to **understand**? What is the **big idea**? ***List broad concepts or "big ideas" in a statement of enduring understanding.***

- How mechanical advantage can be created and properly used
- The Design Process and how it is used to solve a technological problem

Learning Outcome - What do students need to be able to **accomplish** by the unit's end? ***List skills and competencies.***

- Learners will create a machine that properly uses gears to gain a mechanical advantage. This device must successfully solve a specific design challenge.

Literature:

Software/Resources:

Pequea Valley School District
Technology Education

Unit: Intro to Autonomous Programming **Course: Robotics 1** **Grade: HS**

Planning the Focus Based on the Desired Result
What do you want all students to know, understand and do by the end of the unit?

Unit Essential Question(s)
How is syntax based programming used to autonomously program a robotic device?

Keystone Eligible Content/PA Core Standard
3.1.12-A. Apply Concepts of Systems, Subsystems, feedback and control to solve complex Technological problems.
3.2.11-D. Identify and apply the technological design process to solve problems

Pacing: Approximate number of class sessions per unit
15 Days

Tier 3 Vocabulary (Content specific vocabulary)
While loop, Syntax, Pushbutton, Task Main, Infinite loop, BlueTooth

Know - What do students need to **know** in order to be able to do and understand? ***List concepts, such as facts, formulas, key vocabulary and knowledge "nuggets".***

- How to use the Robotc Programming software
- How to program the bluetooth transmitter
- How to operate the bluetooth

Understand - What do students need to **understand**? What is the **big idea**? ***List broad concepts or "big ideas" in a statement of enduring understanding.***

- How syntax based programming languages can be used to communicate with a robotic device .
- How while loops are used to write code

Learning Outcome - What do students need to be able to **accomplish** by the unit's end? ***List skills and competencies.***

Learners will create a program using the Robotc software. This program will require learners to use syntax based programming and bluetooth to communicate with a robotic device.

Literature:

Software/Resources: