PETERS TOWNSHIP SCHOOL DISTRICT

CORE BODY OF KNOWLEDGE

TECHNOLOGY AND EDUCATION ENGINEERING 701

GRADE 7

For each of the sections that follow, students may be required to understand, apply, analyze, evaluate or create the particular concepts being taught.

COURSE DESCRIPTION

TEE (Technology And Engineering Education) 701 & 702, "Exploring and Applying Technology" is a twelve week course for all seventh graders. It is the first of two required courses for middle school students that spans 7th & 8th grade. Pennsylvania State Standards have been adopted for the study of "The Seven Designed Worlds" 1. Medical Technologies 2. Agriculture and Related Biotechnologies 3. Energy and Power Technologies 4. Information and Communication Technologies 5. Transportation Technologies 6. Manufacturing Technologies 7. Construction Technologies. TEE 701 & 702 is an activity-based curriculum divided into two consecutive six week classes housed in two different labs with two different instructors. Students will be introduced into the world of Technology Engineering Education by discussing the definition of technology & engineering, history, universal systems model, and impacts of technology. The students will practice working in teams to solve challenging, open-ended problems.

The Robotics Technologies lab provides students with the opportunity to build and program the NXT-G Lego Mindstorm Robot to independently perform actions and interact with its surroundings. Students will work in teams of two or three applying STEM (Science, Technology, Engineering, Mathematics) concepts by building, programming and testing their robot. Students will utilize the NXT Video Trainer 2.0 and NXT Lego Mindstorms Programming 2.1 software in order to learn and program their robot for different problem solving challenges. These challenges will in turn help students appreciate how the concepts covered can be used to explore real world applications.

STUDY SKILLS

- Bring TEE folder/notebook to class daily
- Maintain an organized Tech Ed folder-notebook
- Prepare for quizzes and exams through the development of study skills
- Incorporate the 8 Habits of Highly Successful People

MAJOR UNIT THEMES:

1. **DEFINITION OF TECHNOLOGY**

   - Write the definition of technology
   - Identify career opportunities

2. **THE EVOLUTION OF TECHNOLOGY**

   - Identify historical events in the evolution of technology
   - Describe the exponential growth rate of technology
   - Identify possible future developments in technology

3. **IDENTIFYING INVENTIONS AND INNOVATIONS**

   - Describe the difference between an invention and an innovation of an invention
   - Identify famous inventors and their inventions

4. **THE IMPACTS OF TECHNOLOGY**

   - Describe why trade-offs must be made when using technology
   - Identify the positive and negative impacts of technology

5. **UNIVERSAL SYSTEM MODEL**

   - List the components of the universal system model
   - Graphically apply the system model to a technology learning activity (TLA)

6. **THE SEVEN DESIGN WORLDS OF TECHNOLOGY**

   - Identify the seven designed worlds of technology
   - List examples of each designed world

7. **CLASSROOM/LAB SAFETY**

   - Develop a sense of responsibility
   - Demonstrate and practice computer etiquette
   - Demonstrate the safe use of applicable tools, machines, and materials
   - Identify potentially hazardous conditions and actions in the lab

8. PROBLEM SOLVING MODEL

- Describe the problem-solving model
- Apply the problem-solving model using a sample problem

9. EXPLORING ROBOTICS

- Write the definition of a robot
- Navigate between two robotics software programs
    - NXT Video Trainer
    - LEGO Mindstorm Education Programmer 2.1
- Calculate the distance a robot needs to travel by degree, rotation and time
- Apply Boolean logic methods of less than (<) or greater than (>)
- Apply problem solving skills in order to program a solution to robotic challenges
- Relate real world concepts to concepts learned with the LEGO Mindstorms Robot
- Identify and explain the impact that a specific medical advancement has had on society (60 minutes - robotic arm etc.)
- Explain transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting
- Identify and explain the workings of several mechanical power systems
- Model and explain examples of vehicular propulsion, control, guidance, structure and suspension
- Explain the limitations of land, marine, air and space transportation systems
- Apply knowledge of different measurement systems to measure and record objects properties
- Apply computer software to specific problems
- Explain a conditional statement
- Write pseudo code for larger programs

10. CAREERS

- Discuss careers in four of the seven design worlds of technology
- Describe how renewable energy has impacted the job market

11. ENVIRONMENTAL CONCERNS

- Identify the environmental impacts of four of the seven design worlds of technology
- Discuss and list potential positive and negative impacts

MATERIALS

- PC Computer Lab
- In Focus Projector
- Chalkboard
- Dry Erase Board with Markers
- Select Student Handouts
- Review Sheets 1-4
- Intro to TEE Test
- Robotics Test
- NXT Video Trainer 2.0 Software
- LEGO Mindstorm Education Programmer 2.1 Software
- Robot Maze Challenges
- Masking Tape
- Electrical Tape
- DVD - The Great Robot Race
- https://www.youtube.com/watch?v=xW-MhoLImqg
- https://www.youtube.com/watch?v=W1czBcnX1Ww
- http://www.cbsnews.com/news/the-robot-waltz-an-appreciation
- https://www.youtube.com/watch?v=6rloSSqiUCM

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