Arkansas CTE

Design Applications in Engineering and Technology Education II: Grade 9

Adopted 2015

Design Applications of Energy, Power and Transportation Technologies

1.1 Recognize basic alternating current (AC) and direct current (DC) electric principles, concepts, and systems.

1. Illustrates ideas and concepts related to energy and power technologies. 1.1.1
2. Illustrates ideas and concepts related to energy and power. 1.1.2

1.2 Recognize how AC and DC electricity is generated, distributed, and consumed through circuitry.

1. Illustrates ideas and concepts related to the planning process in energy and power technologies. 1.2.1
2. Illustrates ideas and concepts related to the planning process in energy and power technologies. 1.2.2

1.3 Recognize how basic circuitry is represented on paper.

1. Draws to scale. Visualizes a finished product. 1.3.1
2. Applies rules and principles to a new situation. 1.3.2
3. Determines quantities/measurements in English and metric units. 1.3.3

1.4 Understand how DC motors and generators are constructed and how they operate.

1. Draws to scale. 1.4.1
2. Reads Measurements from common measuring devices. 1.4.2
3. Constructs model to depict basic concept of energy and power systems. 1.4.3
4. Creates new design by applying specified criteria. 1.4.4

Design Applications of Manufacturing Technologies

2.1 Recognize the components of modern manufacturing systems.

1. Illustrates ideas and concepts related to the components of modern manufacturing systems. 2.1.1
2. Illustrates ideas and concepts related to systems thinking. 2.1.2

2.2 Describe the need for mass production of goods in a global society.

1. Illustrates ideas and concepts related to product life cycle. 2.2.1
2. Illustrates ideas and concepts related to product life cycle. 2.2.2
3. Illustrates ideas and concepts related to product life cycle. 2.2.3

2.3 Recognize the importance of planning and communication during the process of product design.

1. Constructs geometric figures. 2.3.1
2. Uses basic geometric symbols, terms, principles, and formulas. 2.3.2
3. Visualizes a finished product. 2.3.3

2.4 Identify the need for criteria and constraints within the designed world.

1. Identify the constraints and limitations of an engineering design problem. 2.4.1
2. Uses logic to draw conclusions from available information. 2.4.2

2.5 Define the materials and processes used in the manufacturing enterprise.

1. Identify and categorize resources into people, materials, tools, processes, energy, and information. 2.5.1
2. Applies the appropriate materials and processes to the design of a product. 2.5.2

2.6 Identify, design, and produce a product to serve a need in the community

1. Identify a need for a product within the community. 2.6.1
2. Uses logic to draw conclusions from local/community oriented information (i.e. newspaper articles, government publications or television news stories.) 2.6.2

Design Applications Safety

3.1 Describe the need for safe work environments in the Engineering and Technology Educational classroom and laboratory.

1. Imagines the flow of work activities from narrative descriptions and applies new knowledge and skills to safety. 3.1.1
2. Makes connections between seemingly unrelated ideas and pays close attention to details. 3.1.2

3.2 Describe and follow specific procedures such as reporting illness, injuries, safety violations and use of appropriate and required personal protection equipment.

1. Listens and follows directions. 3.2.1
2. Devises and implements a plan of action to resolve a problem. 3.2.2

3.3 Demonstrates machine and tool safety practices and procedures.

1. Demonstrate the ability to safely use common tools and machines found in given industrial settings. 3.3.1
2. Demonstrate the ability to pass given safety tests that show evidence of personal safety competence on given tools and machinery. 3.3.2
3. Uses standard occupational resource materials and Follows safety guidelines. 3.3.3
4. Participates in conversation, discussion, and group presentations regarding safety specific to activities and areas that need to be addressed. 3.3.4
5. Illustrates ideas and concepts related to machine and tool safety. 3.3.5