Arkansas CTE

Design and Modeling (399120): Grades 6-8 (2024)

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs/wants. 1.0

1 **Evaluating problems for constraints.** 1.1

1 Evaluate problems to identify constraints. 1.1.1

2 Use engineering processes to identify qualitative and quantitative problem criteria. 1.1.2

2 **Evaluate solutions using qualitative and quantitative methods.** 1.2

1 Use mathematical processes to evaluate solutions. 1.2.1

2 Compare solutions to societal needs and wants. 1.2.2

Design a solution to a complex real-world problem by breaking it down into manageable problems that can be solved through engineering. 2.0

1 **Design solutions to complex problems.** 2.1

1 Use qualitative and quantitative methods to design solutions to problems. 2.1.1

2 Identify design solutions and use engineering methods to determine feasibility. 2.1.2

2 **Analyze simple problems through the engineering process.** 2.2

1 Critically analyze simple solutions to real world problems. 2.2.1

2 Compare simple solutions to design a more complex solution. 2.2.2

Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. 3

1 **Critically analyze criteria and constrains of a design solution.** 3.1

1 Prioritize criteria related to design solutions. 3.1.1

2 Determine solution constraints. 3.1.2

2 **Evaluate solutions in relation to criteria and constraints.** 3.2

1 Use engineering processes to evaluate solutions that account for cost, safety, reliability, and aesthetics. 3.2.1

2 Use engineering processes to evaluate solutions that account for social, cultural, and environmental impacts. 3.2.2

Use a computer sin im

1 **Model complex real-world problems.** 4.1

Create computer simulations that model engineering solutions. 4.1.1

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solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. 4.0

2 Evaluate the effective use of models to simulate real-world problems. 4.1.2

2 Evaluate proposed solutions using models. 4.2

1 Apply constraints to models to investigate the impact of proposed solutions. 4.2.1

5 Use quantitative and qualitative methods to evaluate solutions. 4.2.5