

Unit 1 Energy and Power, Lesson 1.4 Design Problem: Renewable Electrical Energy Lesson Plan

COURSE:

Principles Of Engineering (Honors)

TEACHER:

Jason D. Redd

DURATION:

5 Days

STANDARDS:

This course connects to standards in the following:

- Common Core State Standards

Understandings

Students will understand that:

- Design problems can be solved by individuals or in teams.
- Engineers use a design process to create solutions to existing problems.
- Design briefs are used to identify the problem specifications and to establish project constraints.
- Working in a team requires effective communication, clear responsibilities, and attention to interpersonal relationships.
- Design teams conduct research to develop their knowledge base, stimulate creative ideas, and make informed decisions.
- Effective presentations are the result of preparation, are tailored to suit the purpose and audience, and are improved by attending to posture, gestures, appearance, eye contact, and time constraints.

Knowledge and Skills

Knowledge: Students will:

- Know the purpose of each part of a design brief.
- Describe a step-by-step, iterative design process.

Skills: Students will:

- Brainstorm and sketch possible solutions to an existing design problem.
- Create a decision-making matrix for their design problem.
- Select an approach that meets or satisfies the constraints provided in a design brief.
- Create a detailed pictorial sketch or u]TJ(-)JTJ5r u]TJ(-)JTJ5r u]TJ(-)JTJ5r u]TJ(-)JTJ5r u]TJ(-)JTJ5r u]iCreate a d

- Provide an overview of assignments that will be worked on throughout the lesson.
- Demonstrate expectations / skills.
- Provide access to the PowerPoint presentations called “Introduction to Design Briefs”, “Teamwork”, and “Decision Matrix”.
- Provide instructions for *Project 1.4.1 Renewable Electrical Energy Design (VEX)*.
- Provide access to the *Decision Matrix Template*.
- Review and provide access to the *Project 1.4.1 Renewable Electrical Energy Design (VEX) Rubric*.
- Assess student presentations/work.
- Provide instructions for the *Lesson 1.4 Test*.

Guided Practice

The teacher will:

- Review agenda, learning objectives, and essential questions daily.
- Lead students to recall prior knowledge / experience to make connections to new content.
- Introduce content to be learned.
- Clarify and check for understanding by asking open-ended questions (or by some other type of formative assessment) throughout instruction. Reteach material as needed.
- Pace the classroom instruction to clarify misunderstanding and provide opportunities for student feedback.
- Introduce new content to be learned and how it connects to learning objectives and answers some (or all) of the essential questions.
- Demonstrate skill practices students will gain from this lesson.
- Demonstrate assignment(s) outcome expectations.
- Review resources and equipment needed to problem-solve student assignments.
- Share safety instructions to students. *Safety Instructions: Students should only utilize equipment they have been fully trained to use.*
- Provide review material / resources for students to prepare for summative assessments.

Transition

- ☒ Classroom Expectations / Routines
- ☒ Review Questioning
- ☒ Stimulus or Signal (Example: “Pencil Drop”, “Eyes on Me”, etc.)
- ☒ Student Reflection
- ☒ Timer

Independent Practice (Varied Learning)

The students will:

- Participate in teacher-led discussions / presentations.
- Complete assigned assignment(s) in class.
- Complete assigned homework assignment(s) outside of class.
- Provide feedback by demonstrating skills.

Closure

The following techniques may be utilized:

- The teacher will lead a classroom discussion to check for understanding and clarify misunderstandings.
- The teacher may ask students to reflect on the outcomes from the lesson.
- The teacher may ask students if they met and how they met the learning objectives for the lesson.
- The teacher may ask students to demonstrate what was learned.
- Teacher and students may play Kahoot! (or some other type of game) to check for mastery.
- Student will share why the lesson is important via guided questions.

- Student will complete some sort of exit ticket.

Assignments and Assessments

The students will:

- Practice active listening skills while observing the teacher-led PowerPoint presentations.
- Complete *Project 1.4.1 Renewable Electrical Energy Design (VEX)*.
- Complete the *Lesson 1.4 Test*.

Homework

The students will:

- Complete assignments that were not completed in class.
- Conduct research as needed for assignments.
- Review the lesson/unit concepts, content, and skills as needed to prepare for lesson/unit assessments.