BIRDEE Unit 1 Lesson Plans

1.1.4. Define Problem Requirements

An engineering design problem involves systematically deriving requirements. Developing robust requirements requires both a structured process for eliciting the requirements and a structure for organizing the requirements for future evaluations and tests of design concepts. **Students will be given the problem of dirty shoes and derive requirements for this problem.**

Engage: 5 min

View: 1.1.4. BID Ideation
- You are trying to design and make underground living quarters. What could you look to in nature for inspiration?
- Come up with at least 4 organisms in nature that live underground.
- **Class Discussion** on what students brainstormed

Explain: 20 min *(Modeled Investigation)*

We are going to review requirements and the purpose of having requirements (to make sure our solution actually solves the problem). Yesterday, we reverse engineered a PRODUCT and derived the requirements that product was designed to fulfill. Today we will define requirements for our PROBLEM to make sure we design a solution that has the functions, performance, and specifications necessary to meet the user's needs and solve the user's problem.

View: 1.1.4. Problem Requirements PPT

Explore: 20 min *(Group)*

Identify Problem & Requirements

View: 1.1.2. Write a Problem Statement Image
- Share your initial 1.1.2. Problem Statements regarding dirty shoes with your group. **Choose a problem for your group to solve**.

View: 1.1.4. Requirements Analysis - Problem Organizer.
View: 1.1.4. Requirements Image
- Then with your group choose a problem and complete the 1.1.4. Requirements Analysis - Problem organizer by identifying the following:
    - Problem Statement:
    - Operational Environment:
    - Existing Products or Solution:
    - Function + Performance Requirements
    - Physical Constraints/Specifications

Because your group was not given any background information (like in the messy desk example), you will have to work as a team to think about

Student Handouts:

1.1.4. Requirements Analysis - Problem Organizer

Student Materials:

N/A

Instructional PPT's & Materials:

1.1.4. BID Ideation

1.1.4. Problem Requirements PPT

Teacher Resources:

1.1.4. Requirements Analysis TEACHER KEY

Web Resources:

1.1.4. Problem Requirements PPT

1.1.2. Write a Problem Statement Image

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the <u>functions</u> and <u>performance requirements</u> that are necessary to solve your user's problem and "how well" you want the problem to be addressed (ex: Does your user want a 100% removal of stains from white shoes? Do they want 90% removal? 30% removal? What is feasible? What does your user want?).

Evaluate: 15 min *(Group to Group)*

Now, your group will partner with another group to share requirements. Based on your peers' comments, you will revise your requirements.