

LESSON PLAN TEMPLATE

LESSON PLAN Ref:

Unit 3 – 3.3A

Course Ref:

PLTW - IED

Subject / Course:

Introduction to Engineering Design

Topic:

Linear Measurements Extra Assignment

Lesson Title:

Cookie Press Plate Design

Level:

Middle to High

Lesson Duration:

3.0 Hours

Lesson Objectives:

Students will show problem solving skills while utilizing the design process, sketching, dimensioning, precision measurement, research skills, and CAD modeling. Students will provide a solution while documenting the entire process and give a detailed description of their solution as well as the process. Students will then evaluate their solutions, test the created parts for accuracy and tolerances, and recommend corrections to their designs.

Summary of Tasks / Actions:

Students will be given a sample disc from a cookie press. They will then be asked to follow the Engineering Design Process to create a new cookie press disc that will demonstrate their school spirit and pride. They will design the new disk in a CAD software and save as a .STL file to be printed on the 3D printer. After parts are printed, they will be measured for tolerances and tested to see if they fit and/or make accurate cookies to the design goals. Students will document results then recommend changes and enhancements to their designs. Student should also explain how they could have better approached the problem and why they were successful or failed.

An attached rubric will be used for assessment. The process, sketches, measurements, dimensioning, reflection, and documentation will be the focus more than the cookie disk result.

Materials / Equipment:

- Dial Calipers
- Cookie Press & Sample Disks
- Design Process example
- Engineering Journal and pen or pencil
- Computer with CAD Software
- 3D printer and filament

References:

See attached pictures and examples

Take Home Tasks:

None

Cookie Press Project (Application of the Engineering Design Process)

Teacher Name: **Robinson**

Student Name: _____

CATEGORY	A=4 points	B=3 points	C= 2 points	D=1 point	F=0 points
Identify the Problem/Challenge	Identified the need as well as all constraints. What is the problem to be solved? Who is it for? What is the goal? What are the requirements? What are the limitations?	Identified the need and the requirements, but no constraints.	Identified the need only.	Indicated the requirements.	Problem was not identified.
Research/Explore the Problem	Gathered information to inform design using three or more sources. (Testing with models, interviews, textual resources, internet search, and conferences). Indicates how each source essential in the design.	Gathered information to inform design using two source. (testing with models, interviews, textual resources, internet search, conferences) Indicates how each source essential in the design.	Gathered information to inform design using one source. (testing with models, interviews, textual resources, or internet search) Indicates how each source essential in the design.	Indicates research was conducted, but does not tell how it informed design or where the information came from.	No research to inform design was conducted.
Design/Brainstorm	*Developed a list of possible solutions *Made a sketch or virtual model. *Utilized the identified constraints during the brainstorm by recording reasons why some suggestions will work while others will not. *Identified primary design. Tells what trade-offs were made in the chosen design. Dimensions are clearly shown.	Developed a list of possible solutions, made a sketch or virtual model. Utilized and identifies constraints during the brainstorm, but did not record or note reasons for primary choice. Dimensions are clearly shown.	Developed a list of possible solutions, made a sketch or virtual model.	Developed a list of suggested solutions.	Development of possible solutions is not indicated.
Create a Model/Prototype	A successful model of the chosen design was created. Dimensions and Measurements were accurate	A working model of the chosen design was created with minor design flaws.			No model was created.
Test/Try it out	Model was used in test and qualitative and quantitative data was collected. Identified the causes of any problems.	Model was used in test only qualitative or quantitative data was identified but not both. Identified the causes of any problems.	Model was used in test only qualitative or quantitative data was identified, but not both. Causes of any problems were not identified.	Model was created and used for testing no data was collected.	No model was created.
Make improvements	Identified problems were fixed and a new and improved design was created. Identifies how the improvement was made, new tests were conducted and data collected.	Identified problems were fixed and an improved design was created. Tell how the improvement was made, new test was conducted but no data to support it.	Identified problems were fixed and an improved design was created. Does not tell how, just that it "worked". New test was conducted, but no data to support it.	Identified problems were fixed and an improved design was created. Does not tell how, no new test was conducted or data collected.	No problem were identified.
Communicate the Solution/ Findings	Tells how the design fits the solution, explain how it works and why. Tells what constraints were utilized and trade-offs made. Picture of final design provided.	Tells how the design fits the solution but not how it works. Tells what constraints were utilized and trade-offs made. Picture of final design provided	Tells how the design fits the solution, but not how it works. Tells what constraints were utilized but not the trade-offs. Picture of final design provided.	Tells how the design fits the solution and a picture is provided.	No presentation of finding provided, orally or written. No picture provided.

