

MODIFIED UBD LESSON PLAN

COURSE: Introduction To Engineering

UNIT: What is Engineering?

EXERCISE: Stress Analysis/Data Analysis

TIME FRAME: 3-5 Hours



PREPARATION: *Summary of “to do’s” that the teacher should understand and prepare before bringing this lesson to the classroom.*

Teachers will need to ensure that the proper supplies are available for students to build their solutions.

Materials:

- -

Tools:

- Stopwatches

Additional Resources:

- Backpacks
- Whiteboard/chalkboard



SAFETY: *Summary of safety strategies in the lesson.*

Students who have limited mobility or activity restrictions should not participate in this activity.

S1

DESIRED RESULTS:

ESTABLISHED GOALS:

Problem Solving Techniques and Applications Standards:

Teachers should use the STEM Academy Standards Correlation System available in the STEM Connections area of a unit to extract specific standards and insert these standards [here](#).

TRANSFER:

Students will be able to independently use their learning to...

- Collect and analyze data
- Examine data collected for accuracy

MEANING:

UNDERSTANDINGS

Students will understand that...

- Not all data sets are accurate
- False correlations can exist in data sets

ESSENTIAL QUESTIONS

Students will keep considering...

- How does their data set compare to others
- Trends present in their data set

ACQUISITION OF KNOWLEDGE AND SKILL:

Students will know...

- The characteristics of what makes a data set either true and valid or untrue and fraudulent
- Various data trends and what they represent

Students will be skilled at...

- Constructing a valid data set
- Evaluating data, observing changes in each data set
- Contrast team data set with entire class data set

S2 EVIDENCE:

EVALUATIVE CRITERIA:

- Accurate
- Quality Analysis
-

ASSESSMENT EVIDENCE:

*Performance Task(s):***Stress Analysis – Data Analysis**

Students will learn how to collect basic data, record the data, and compare and analyze data in this activity.

Other Evidence:

- Completed on time
- Complete activity chart
- Compile data in spreadsheet format
- Complete culminating quiz questions

S3 LEARNING PLAN: *Summary of Key Learning Events and Instruction***1. Set Introduction**

Engineers and designers use data every day to guide their decision-making. You will be collecting and sharing a simple data set with your peers in class. This data will then be compared to all data collected to see how your information compares to others.

2. Present Video

Have the students open the *Cardiovascular Disease – Testing* video. This can be done as a class or individually depending on your lab set-up. Follow the video with a brief discussion of the video and the different test shown within. These materials will not be tested so students are not required to take notes.

3. Time Frame

This case study will take three to four class days to complete depending on the amount of information the teacher wants to present before the experiment.

4. Create Spreadsheet

First have students create a basic spreadsheet. This will allow for a standardized method of collecting data.

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5. Collect Data

The data collection should be done when outside conditions permit. Within the experiment and data collection, everyday backpacks and books will be used to simulate additional loads that students carry around during the day. The data will be collected using no load, with books loaded into a backpack, and with books both in a backpack and in their hands. The outline above will provide the appropriate times and distances for the experiment.

6. Exceptions

If you have any students that have physical conditions that would not allow them to participate in this experiment, you will need alternative choices. Most students carry backpacks with books in them every day, so most should be able to participate.

7. Create Classroom Set

It is a good idea to collect each group's raw data and compile it in a class spreadsheet so that averages and comparisons can be made among the groups. This is not required, rather a suggested extension of the activity.

Progress Monitoring:

- The instructor will need to monitor the classroom, checking students' work and ensuring students are on task and following directions.
- Ensure students store their projects at the end of class and leave all materials in the room.

At the end of the activity, post student projects in the room and provide appropriate feedback

DIFFERENTIATION: *Summary of Key Differentiation Techniques*

Please use this space to insert your differentiation techniques. Depending on the needs of students, various techniques might be needed in a classroom, therefore use the information below and experts in the area needed to design your plan for differentiation.

The ASCD Study Guide for Integrating Differentiated Instruction and Understanding by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe

Integrating Differentiated Instruction and Understanding by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe
ISBN-13: 978-1416602842
ISBN-10: 1416602844

Differentiating Reading Instruction
by Laura Robb.
ISBN13: 9780545022989

A Teacher's Guide to Differentiating Instruction
The Center for Comprehensive School Reform and Improvement

CAREER CONNECTIONS: *Summary of Career Opportunities Associated with this Lesson*

Engineer

Engineers are constantly testing and evaluating data

Statistician

Statisticians collect, compile and analyze data to draw conclusions

Education Administrator

Administrators use data analysis to change company operations

KEYWORDS: *Please Insert Keywords from this Lesson with their Definitions*

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CORRELATION—a mutual relationship or connection between two or more things

DATA—facts and statistics collected together for reference or analysis

STATISTICS—the practice or science of collecting and analyzing numerical data in large quantities