MODIFIED UBD LESSON PLAN

STEM 101

COURSE: Middle School		
UNIT: Medical Technologies Level 1	**EXERCISE:** Bacteria is Everywhere	**TIME FRAME:** 2 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:

- Tryptic soy agar
- Petri Dishes
- Sharpie Marker
- Cotton swabs
- Eye droppers

Additional Resources:

- Computer (not provided)
- Digital Camera (not provided)
- Tryptic soy agar MSDS (Located in Teacher Resource section)

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

Please refer to the Tryptic soy agar MSDS for safety precautions

S1 DESIRED RESULTS:

ESTABLISHED GOALS:

TRANSFER:

Students will be able to independently use their learning to…

- Describe the potential roles of bacteria in our lives

MEANING:

UNDERSTANDINGS

Students will understand that...

- Bacteria are unicellular organisms that reproduce by binary fission
- Bacteria are prokaryotic organisms, meaning they have no nucleus
- Bacteria can grow in a wide range of different environments including those without sunlight

ESSENTIAL QUESTIONS

Students will keep considering...

- How soaps could be more effective and kill more bacteria
- How everyone could better prevent the spread of bacteria
- Why bacteria spreads and the ways in which it does

ACQUISITION OF KNOWLEDGE AND SKILL:

Students will know...

- The best way to keep bacteria from their hands
- Where bacteria can be found and what they need to survive

Students will be skilled at...

- Washing their hands
- Understanding the environments in which bacteria can grow, especially in the human body

- How different techniques of washing hands have varying effectiveness
- Developing systems to reduce bacterial transfer

S2 EVIDENCE:

EVALUATIVE CRITERIA:

- Graded rubric

- Thoughtful, clear, thorough
- Graded on accuracy, multiple choice questions
- Completed on time

ASSESSMENT EVIDENCE:

Performance Task(s):

Bacteria is Everywhere
In this activity, you will study three different conditions under which bacteria are found and compare the growth of the individual bacteria from each source.

Other Evidence:

- Online end of unit test

S3 LEARNING PLAN: *Summary of Key Learning Events and Instruction*

Pre-Assessment:
Medical Technologies Design Pre-Test

Outline:

1. Discuss bacteria and how they survive. (See Background)
2. Prepare agar in petri dishes, three per group. (Groups of 4) Also label the dishes, one unwashed, one sanitizer, and one soap and water.
3. Introduce activity to students
4. Hand out petri dishes and walk students through how to collect samples
5. Store samples for 4 days in a warm, well-ventilated environment.
6. Take them out and have the students photograph them
7. Store two more days then photograph them again.
8. Analyze the data
   1.1 Print out one page for each group, arranging the petri dish pictures like a 6 domino.
   1.2 Have the students compare relative quantities of bacteria and estimate how much of the petri dish is covered.
9. Set students onto reflection questions.

Learning Experiences:

1. In this activity, a lot of emphasis should be placed on the relationship between the presence of bacteria and the importance of washing hands.

2. Collecting data in this way may be a completely new experience for the students. Performing a new kind of task and having success at it is very important.

3. This activity will teach the students about the ways bacteria can be tested for and will give them a heightened understanding of the way bacteria grows.

Progress Monitoring:

Teacher observes students and provides on-going feedback during the activity. While introducing the unit, the teacher will pause and ask for questions to make sure everyone understands.

Students will complete self-assessment and brainstorm how they could improve their skills in the future. At the end of the unit, there will be a quiz to measure their overall understanding.

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 Understating by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe

Integrating Differentiated Instruction and Understating 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*

Please use this space to insert careers that might be connected to this lesson. This section will need continuous updating as new careers and emerging technologies change the opportunities available in the workforce.

Good sources for career connections:

Occupational Outlook Handbook
http://www.bls.gov/ooh

The National Career Clusters® Framework
http://www.careertech.org/career-clusters

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

Please use this space to insert keywords and their definitions
Use resources like dictionary.com to find definitions to your keywords