**Lesson/Unit Title:** Bio Art - Painting at the Cellular Level with Bacteria

**Grade Level(s):** Grade 6

**Duration:** 6 weeks

**Big Idea/Unit Overview:**
Students are synthesizing and related scientific knowledge and personal experiences to make art through painting with bacteria.

**Essential Questions:**
- How do you experiment with bacteria?
- How do you grow bacteria?
- How many colors can I get to grow?
- What patterns of growth can I get with bacteria?
- How long does it take to grow a certain colors?
- What kind of picture can I make?

**Objectives/Outcomes:**
- Science and art can be integrated to create an innovative creative idea.
- Students will know artistic and scientific methods are similar.
- Students will relate artistic ideas and work with personal meaning using external context.
- Students will investigate and developing awareness of perceptions and knowledge through experiences.
- Students will be able to construct a scientific explanation based on evidence for how environmental influences can affect the growth of organisms.

**Vocabulary:**
- Antibiotic
- Bacterium or bacteria
- Bacterial colony
- Cell
- Inoculating loop
- Agar
- Microbe
- Negative space
- Petri dish
- Pigment
- Mitosis

**Materials:**
- Toothpicks
- Glass beads
- Cotton swabs
- Petri dishes
- Nutrient agar
- Rhizobium leguminosarm
- Sarcina aurantiaca
- Serratia marcescens
- Staphylococcus epidermis
- Micrococcus roseus
- Digital Microscopes
- Inoculating loop
- Microscope cameras
- Painting with bacteria kit
- Paint brushes

**Resources (websites, videos, images, books, etc.):** Google slide presentation

**Procedure:**
Through experimenting with bacteria growth, the students will produce an agar picture through growing bacteria in the way they planned.

**Introduction:**
What prior knowledge do students already have?

- Structure of bacteria cell
- Different places bacteria can be found
- Grown bacteria cultures in petri dishes
- Used microscopes and can prepare slides
- Talked about Ecoli
- Chemical interactions of bacteria in the body

**Demonstration:**

- How to handle bacteria in a safe way.
- How to document the process.

**Process:**

- Day 1 - Introduction: Review bacteria unit and use the slide presentation to define agar painting and show examples to promote motivation.
- Day 2 - Demo on setting up experiments, show how to do journals, break students into groups for experiments. During art have students brainstorm ideas for their projects.
- Day 3 - Students start working with bacteria to understand how they will grow
- Day 4 - Continue working on practice plates
- Day 5 - Analyze bacteria growth and record in journals. Finalize plan for bacteria picture
- Day 6 - Start creating bacteria picture and record bacteria used and placement in journals
- Day 7 - Check bacteria growth and determine what alterations need to be made if any. Record findings in journal
- Day 8 - Continue creating bacteria pictures and record any changes or additions made
- Day 9 - Create presentation to share including the student's process, types of bacteria used, and details on the bacteria used
- Day 10 - Continue working on presentation
- Day 11 - Share presentations with peers
- Day 12 - Continue sharing presentation with peers

**Assessment:**

- Pictures of progression of bacteria growth
- Documentation in science journals
- Brainstormed ideas of art idea
- Finished art (photo)
- Written explanations

**Standards:**

| | Grade 6 |
|---|---|
| NATIONAL CORE ARTS STANDARDS (NCAS): *(identify which art form/s)* | • Brainstorm and generate artistic ideas and works that integrate science and art.<br>• Organize and develop artistic ideas and work.<br>• Experiment with bacteria to see how bacteria grow.<br>• Refine and complete works of art.<br>• Refine artwork for presenting.<br>• Convey meaning through presented artistic work.<br>• Interpret intent meaning in artistic work.<br>• Apply criteria to evaluate artistic work.<br>• Synthesize and relate knowledge and personal experience to make art.<br>• Use science to create a work of art using bacteria as the medium. |