

**Lesson Topic: Unit 1The Practice of Science**

**Grade level: 8th**

**Length of lesson: 3-4 Weeks**

**Content Standards**

**MSETS1-1.** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

**MSETS1-2.** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

**MSETS1-3.** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

**MSETS1-4.** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

**Big Ideas:**

Students will understand

- Lab safety awareness is essential
- The scientific method can be used to create and design experiments that answer questions
- Making accurate measurements help to ensure accurate results
- Document and interpret scientific language/text.

**Essential Question(s):**

- Why is it important to have lab safety awareness?
- How can the scientific method be used to make informed decisions?
- What is the difference between experimental repetition and experimental replication?
- Some statements in science called laws and some called theories. Why?
- What information is important to include in a scientific paper?

**Student objectives (outcomes):**

Students will be able to:

- Understand Lab Safety Procedures
- Pass a Lab Safety Test with 100% Proficiency
- Use the Scientific Method to design an experiment to answer a question
- Make accurate measurements with various tools and lab ware
- Record and interpret scientific data and text.

## Assessment Evidence

### Performance Task(s):

- Tower Building Contest
- Lab Safety Pamphlets
- Lab Safety Test
- Labware Test
- Measurement Activities
- Density Lab

### Other Evidence:

- Microscope Review Activities
- Lab ware Identification Activities

## Learning Plan

### Learning Activities:

Tower Building Contest with Report  
Lab Safety Unit  
Lab ware Unit  
Microscope Unit  
Measurement Activities  
Sediment Lab

### Resources:

Use the SMART Exchange for lessons and ideas on Scientific Method, Inquiry,  
The Science Spot <http://sciencespot.net/>  
Puzzle Makers <http://www.puzzlemakers.net/samples.html>  
Bozeman Science Videos on YouTube:

Practice 1 - Asking Questions and Defining Problems

Practice 2 - Developing and Using Models

Practice 3 - Planning and Carrying Out Investigations

Students who demonstrate understanding can:

- MSETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MSETS1-2.** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MSETS1-3.** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- MSETS1-4.** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*

<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>