Science
Unit 4: Metric Unit

Essential Understandings	▪ Scientists use appropriate tools and units of measure to observe natural phenomena. ▪ Scientists design and conduct scientific investigations that include controlled experiments and systematic observations to explore the natural world. ▪ There is a direct relationship between density and buoyancy. ▪ Scientists collect and analyze data and draw conclusions fairly. ▪ Scientists distinguish between ideas that can and cannot be supported by science. ▪ Scientific ideas can be supported by using a variety of scientific evidence.
Essential Questions	▪ How do scientists design a fair experiment? ▪ What are variables and how do they impact an experiment? ▪ What is the most reasonable way to analyze data? ▪ How can data be interpreted? ▪ Which kind of evidence can be used to support scientific claims? ▪ How can we use scientific tools to collect information? ▪ Why is accurate measurement so important? ▪ Why do scientists focus on natural explanations? ▪ How are density and buoyancy related?
Essential Knowledge	▪ For data to be meaningful experiments must be designed fairly and data needs to be collected accurately. ▪ Scientists identify independent, dependent and constant variables in an experiment. ▪ Scientific ideas need to be supported with evidence collected fairly. ▪ Buoyancy and density can be calculated with scientific tools. ▪ Scientists must strive to eliminate bias. ▪ Scientific ideas can be distinguished from non-scientific ideas. ▪ Data can be interpreted in several ways.
Vocabulary	▪ <u>Term Categories</u>: o Types of variables o Metric system, prefixes and scale o Scientific methodology
Essential Skills	▪ Use appropriate tools to make accurate measurements. ▪ Identify variables in an experiment. ▪ Identify evidence that can support a scientific claim. ▪ Design and conduct a scientific investigation. ▪ Collect and analyze data as it relates to a claim. ▪ Use appropriate grade level math to make calculations.

Science
Unit 4: Metric Unit

Related Maine Learning Results	Science A. Unifying Themes A4.Scale Students use scale to describe objects, phenomena, or processes related to Earth, space, matter, and mechanical and living systems. a. Describe how some things change or work differently in different scales. b. Use proportions, averages, and ranges to describe small and large extremes of scale. B. The Skills and Traits of Scientific Inquiry and Technological Design B1.Skills and Traits of Scientific Inquiry Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments. a. Identify questions that can be answered through scientific investigations. b. Design and safely conduct scientific investigations including experiments with controlled variables. c. Use appropriate tools, metric units, and techniques to gather, analyze, and interpret data. d. Use mathematics to gather, organize, and present data and structure convincing explanations. e. Use logic, critical reasoning and evidence to develop descriptions, explanations, predictions, and models. f. Communicate, critique, and analyze their own scientific work and the work of other students. C. The Scientific and Technological Enterprise C1.Understanding Inquiry Students describe how scientists use varied and systematic approaches to investigations that may lead to further investigations. a. Explain how the type of question informs the type of investigation. b. Explain why it is important to identify and control variables an replicate trials in experiments.
Sample Lessons And Activities	▪ Write a lab report. ▪ Use scientific tools of measurement to collect data (i.e. density cubes, triple-beam balances, graduated cylinders, over-flow containers, etc.) ▪ Conduct a scientific investigation involving density. ▪ Communicate finding to others using a multi-media format.
Sample Classroom Assessment Methods	▪ The Density Dilemma Common Assessment ▪ Gummi Bear Lab

Science
Unit 4: Metric Unit

Sample Resources	▪ Other Resources: ○ Tools of measurement (balances, thermometers, stopwatches, density cubes, etc)