Grade Level	Content Area	Course Title *(For 9-12 Samples Only)*	Unit Title
8th grade	Science		How Big is the Universe?

Length of Unit	Time of Year Taught	Expected Prior Knowledge
5 days- 40 minutes/day	1st quarter	Strand 1: inquiry process: Concept 2: scientific PO 1. Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry. PO 2. Design a controlled investigation to support or reject a hypothesis. PO 3. Conduct a controlled investigation to support or reject a hypothesis.

Unit Description: In this unit, students will begin to comprehend the size of the universe by comparing microscopic organisms to celestial bodies using standard U.S. customary measurement and metric system measurements through conversions. Students will demonstrate mastery by choosing appropriate scientific measurement tools to perform measurements.

Standards: See instructions on page 15.	Strand 1: inquiry process: Concept 2: scientific testing - PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).
Summative Assessment *In addition to the description, include a copy of the summative assessment in the application package.*	Students will demonstrate mastery by choosing appropriate scientific measurement tools to perform measurements on a quiz.
Scoring for Summative Assessment *In addition to the description, include a copy of the answer key and scoring rubric (if applicable) for the summative assessment in the application package.*	Students will get one point for each correct answer for a total of 18 points. Students will answer questions about measurement tasks with appropriate tools. 13 out of 18 will demonstrate mastery which is at least a 70%.
Materials/Resources Needed *Include all items for the entire unit.*	Ruler with metric and U.S. customary measurements, yard stick, meter stick, microscope, telescope, pencils, colored pencils, paper (white and lined), prepared microscope slides of single celled organisms, *Powers of 10* video, assessment

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Instruction and Timeline	Objective: Students will determine which tool is most appropriate to measure each item. Anticipatory Set: Teacher will review of U.S. customary measurement and metric system measurement. Instructional Input/Modeling: Teacher will demonstrate each system with measurement of common classroom item. Guided Practice: Teacher gives directions for group pairing and collection of required materials. Independent Practice: In pairs, students will measure 5 common classroom items with either a ruler, yard or meter stick. Students will determine within the pair which tool is most appropriate for each item and will record data in a chart/table with two trials, one representative of each student's	Objective: Students will demonstrate the use of the most appropriate tools including microscopes. Anticipatory Set: Students review prior days results from each group with synthesis of group data and tool choice. Instructional Input/Modeling: Teacher will introduce microscopic measurement (mm, nm, um) Guided Practice: Teacher will review of microscope handling and care with demonstration. Independent Practice: With partner, students will use a microscope to measure multiple, single celled organisms at different powers in cm and mm increments. Students will draw microscope view and label measurements. Each student will have drawings with	Objective: Student will demonstrate using the most appropriate measurement including customary and metric measurement. Anticipatory Set: Review of microscopic measurements with students collected data. Instructional Input/ Modeling: Teacher introduction to measurement conversion. Guided Practice: teacher asks students to give examples of conversion from U.S. customary to metric. Teacher models examples of scaling in metric system to measure distances on models and convert to actual distances. Independent Practice: Students will practice conversions for U.S. customary to metric. Students will practice model measurement and scaling to achieve actual	Objective: Students will demonstrate the use of the most appropriate tools including telescopes. Anticipatory Set: Review of model measurements and conversions. Instructional Input/ Modeling: Teacher introduction to telescope and how it works different from microscope. Show the *Powers of 10* Video of universe travel from cellular level to celestial body level. Guided Practice: Students will discuss measurement with a partner and how it impacts their daily lives. Students will share in a class discussion of the importance of measurement in science and accuracy in choosing the correct tool for the job. Independent Practice: Students will each view	Objective: Students will measure using appropriate tools including a ruler and a yard stick and units of measure. Anticipatory Set: Provide conclusion and review of measurement systems, conversion, and measurement tools. Instructional Input/ Modeling: Directions for assessment. Students will measure objects with appropriate increment choice. Students will convert between systems of measurement and from model to actual scale. Closure: Why is it important to know customary vs metric measurement?

	measurement. Each student in the pair will complete a data table and complete measurements. Closure: Students will return required materials and save data table for discussion.	measurements. Closure: Students will return materials. Ask students to name what mm and cm means.	measurements. Students will check model vs. actual measurements through actually measuring larger objects and comparing (such as paper scale of a pencil vs. a real pencil). Closure: Give an example of a metric measurement. Give an example of a customary measurement.	a distant location on campus through a telescope. Closure: What else can you measure with a telescope?	

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Student Activities and Timeline	In pairs, students will measure 5 common classroom items with either a ruler, yard or meter stick. Students will determine within the pair which tool is most appropriate for each item and will record data in a chart/table with two trials, one representative of each student's measurement. Each student in the pair will complete a data table and complete measurements. Students will return required materials and save data table for discussion.	With partner, students will use a microscope to measure multiple single celled organisms at different powers in cm and mm increments. Students will draw microscope view and label measurements. Each student will have drawings with measurements. Students will return materials.	Students will practice conversions for U.S. customary to metric. Students will practice model measurement and scaling to achieve actual measurements. Students will check model vs. actual measurements through actually measuring larger objects and comparing (such as paper scale of a pencil vs. a real pencil).	Students will discuss measurement with a partner and how it impacts their daily lives. Students will share in a class discussion of the importance of measurement in science and accuracy in choosing the correct tool for the job. Students will each view a distant location on campus through a telescope.	Students will each demonstrate measurement tool choice for presented scenarios. Students will measure objects with appropriate increment choice. Students will convert between systems of measurement and from model to actual scale.

Grade 8 Assessment for Measurement

Given the following situations, determine whether you would choose a microscope or telescope.

1. single-celled organism_____
2. plant leaf_____
3. planet_____
4. mountain_____
5. bird nest_____
6. bird feather_____

Which would you choose to measure with, a ruler or yard/meter stick?

7. tree _____
8. flower_____
9. dog_____
10. whale_____

11. Measurement of classroom table:_____

12. Measurement of science book:_____

13. Measurement of doorway:_____

Please measure the image below and then measure the pencil provided by your teacher. Record both below.

14. Model: _____
15. Actual:_____
16. What is the scale:_____

17. Convert 2 inches to centimeters.

18. Convert 1 foot to meters.

Grade 8 Assessment for Measurement (Answer Key)

Given the following situations, determine whether you would choose a microscope or telescope.

1. single-celled organism_____microscope_____
2. plant leaf_____microscope_____
3. planet_____telescope_____
4. mountain_____telescope_____
5. bird nest_____telescope_____
6. bird feather_____microscope_____

Which would you choose to measure with, a ruler or yard/meter stick?

7. tree _____yard stick_____
8. flower_____ruler_____
9. dog_____yard stick_____
10. whale_____yard stick_____
11. Measurement of classroom table:___yard stick_____
12. Measurement of science book:_____ruler_____
13. Measurement of doorway:_____yard stick_____

Please measure the image below and then measure the pencil provided by your teacher. Record both below.

14. Model: ___4 inches_____
15. Actual:_____8 inches_____
16. What is the scale:_1:2_____

17. Convert 2 inches to centimeters.

5 cm

18. Convert 1 foot to meters.

0.3048 meters

Score: _____/18

Each correct answer worth one poins. 13 out of 18 points is the minimum needed for mastery (70%).

Number correct:	Percent:	
0-8	10% -49%	Falls Far Below
9-12	50%-69%	Approaches
13-18	70%-100%	Meets Mastery Level