NCTM 2018 Session 503
Unit Assessment Plan

Subject Area	Math
Grade Level	10
Topic	Measurement
Length of Unit (days)	15

Stage 1 – Desired Results

Established Goals:

General Outcome:

Develop spatial sense and proportional reasoning.

Specific Outcomes:

1. Solve problems that involve linear measurements, using: SI and imperial units of measure, estimation strategies, and measurement strategies.
2. Apply proportional reasoning to problems that involve conversions between SI and imperial units of measure.
3. Solve problems, using SI and imperial units, that involve the surface area and volume of 3-D Objects, including: right cones, right cylinders, right prisms, right pyramids, and spheres.

Understandings:

Students will understand that…

- SI and imperial units have their strengths and weaknesses.
- Conversions are "constants" in math.
- We can convert between units at any point during our problem solving.
- Different estimation strategies have different strengths.
- Different measurement strategies have different strengths.
- Formulas are consistent.

Essential Questions:

Content Specific….

- How are spatial sense and proportional reasoning related?
- Why do we apply measurement to shapes, objects, and space?

Knowledge:

Students will know…

- The different types of SI and imperial units (mm, cm, m, etc. and in, ft, yd, etc.)
- Multiple estimation and measurement strategies.
- What units to apply when measuring different objects/things.
- What conversions allow us to go between different types of SI and imperial units.
- What formulas relate to surface area and volume for each object.

Skills:

Students will be able to…

- Apply multiple estimation and measurement strategies.
- Apply appropriate units when measuring objects/things.
- Convert between the different types of SI and imperial units.
- Apply surface area and volume formulas to problems.
- Decipher what a problem is asking for involving surface area and volume.

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Understandings:	**Understandings:**
Prior understandings… - Rate and ratio - Surface area of prisms and cylinders - Volume of prisms and cylinders - Surface area of composite 3-D shapes - Scale diagrams	*Where does this lead…* - Application of rates - Scale diagrams - Understand the relationships among scale factors, areas, surface areas, and volumes of similar 2-D shapes and 3-D objects - Conversions between SI and imperial units - SI and imperial linear measurements - Area and surface area with SI and imperial measurements - Surface area, volume and capacity in SI and imperial units

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Learning Outcomes	**Assessments**								
	Name	**Concept Map**	**"Real Life" Assignment (2S)**	**Work Sheet (1S)**	**If, Then**	**Daily Problem and Checklist**	**Daily Observation /Discussion**	**Jeopardy Review**	**Show Me What You Know**
	Type (F/S)	**Pre-Assess**	**F/S**	**F/S**	**F**	**F**	**F**	**F**	**S**
	Weight	**-**	**40**	**20**	**-**	**-**	**-**	**-**	**60**
1. Solve problems that involve linear measurements, using: SI and imperial units of measure, estimation strategies, and measurement strategies.			**X**	**X**	**X**	**X**	**X**	**X**	**X**
2. Apply proportional reasoning to problems that involve conversions between SI and imperial units of measure.			**X**	**X**	**X**	**X**	**X**	**X**	**X**
3. Solve problems, using SI and imperial units, that involve the surface area and volume of 3-D objects, including: right cones, right cylinders, right prisms, right pyramids, and spheres.			**X**	**X**	**X**	**X**	**X**	**X**	**X**

Based on *Understanding by Design*, Wiggins and McTighe (2005),
Adapted by Richelle Marynowski (2018)

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Assessment Tool Overview

Assessment Tool Name	**Brief Description**	AFL	AAL	AOL
Concept Map	This is a pre-assessment tool that I will use to see what students already know about measurement. Students will receive a mostly blank concept map with only the main bubble (Measurement) and three sub-bubbles (Units of Measure; How to Convert Measurements; and, Formulas for Area and Volume) filled in. This allows me to see what they already know about the concepts, as well as show them the important concepts that they will be learning in this unit. It is something that I would take in after the first class to see what they know. I would encourage them to use this, or a fresh copy, to review for their final assignment.	**X**		
"Real Life" Assignments	These assignments will be completed with each outcome, but each one will be different. For SLO1, the students will measure different things/aspects (length of the whiteboard, width of a desk, etc.) of the classroom with nonstandard units of measure (thumb, foot, arm span, etc.) to create estimations, then again with standard units of measure (both types), and record it on an assignment sheet. This would be assessment OF learning as I would take it in for marks and assess it based on what nonstandard units they chose to use, and how accurate their measurements were. For SLO2, the students would work on converting heights of famous people (athletes, actors/actresses, etc.) between the two types of units and converting distances between cities between the two types of units. For SLO3, the students would complete a worksheet with different situations on it that they would have to decipher to figure what the problem is asking and then solve it. They would also be asked to create and solve a problem of their own.	**X**		**X**
Worksheets	There are simple worksheets that will be completed for the second and third outcome, both of them different. For SLO2, the students will complete a worksheet that has them working on converting measurements either within or between units. These will then be given a simple context (i.e., the sun is ##km from the earth; how many miles is it?) and the students will have to apply their knowledge. For SLO3, the students will complete several worksheets that refresh their use of formulas for surface area and volume with no context, as well as with context. It is important to look at these formulas without context to make sure students can work with the numbers and units without a "story" to work through.	**X**		**X**
If, Then	There are several of these in-class assignments that would take place. They could be done in groups, or they could be completed	**X**		

	on whiteboards as a whole class activity. A sample question for SLO1 would be "If you have to measure a pencil, what unit would you use, and why?" A sample SLO2 question is, "If I'm measuring in cm but I want to be in feet, what do I do?" A sample SLO3 question would be, "Given a sphere with diameter 10 cm, what would the volume be?" These are simple questions that could be completed by the student in a short period of time.			
Daily Problem and Checklist	The daily problem is something that would occur at the beginning of every class. There would be a problem on the board for students to complete based on what was learned the day before as well as a priming questions for the current lesson. The daily checklist is something that would be completed every few days at the end of class. The checklist would have the outcomes, broken down into student friendly language and unpacked so that they are smaller in size. The students would take a few minutes to writes the date at the top and then go down the column and place an emoji (happy, meh, or sad) or an N/A depending on how confident they are with the concept and if we have covered it yet.	**X**	**X**	
Daily Observation/ Discussion	Throughout each class, there will be multiple opportunities to observe what students are doing or listen to them speak about the topic. This includes whiteboard problems, working through problems as a class, discussion with the teacher, hearing student-student conversation, gauging how students are doing (give me fingers 1-5 on how comfortable you are), etc.	**X**		
Jeopardy Review	This is a review game that would take place before the exam. Students would be working in teams to answer each question on a whiteboard. The topics they can choose from are: Estimation, Proportional Reasoning (what unit, and why), Conversion, Surface Area, and Volume. A sample question would be: these are the two types of units that I would use to measure the Eiffel Tower.	**X**		
Show Me What You Know	This is a test that will be "fun" because it will be called "Show Me What You Know!" The test will consist of: - A selection of fill-in-the-blanks for estimating size of objects (SLO1) - Short answer questions for what unit they would choose and why (SLO2) - Several multiple choice questions about converting between units (SLO2) - Several multiple choice questions asking students to solve the surface area or volume of 3-D objects in both types of units, both in problems and just on their own (SLO3) - Long answer (see below) (all specific outcomes) For the long answer, students will have the option to choose to create a plan to build one of three objects: right cone, sphere, or right pyramid. They will be asked to answer a selection of questions about the object they choose: (1) what SI/Imperial			**X**

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	units are you using? (cm, m, km, in, ft, mi, etc.); (2) Estimate the area of the base of the object (if they choose the sphere, they would answer: NO BASE); (3) What is the surface area? Convert it to imperial/SI; (4) What is the volume that the material encloses? Convert it to imperial/SI; and, (5) what would you use this object for? An example of a short answer question would be: what imperial unit would you choose to measure the length of an airplane, and why? (2 marks)			