HISI - Lesson Outline

Module Title: Scoop This **LS Team:** Team Bigfoot **Grade level:** 9th

Lesson #1 Title: Measure This!	**Number of Minutes: 55 Minutes**
Mathematical purpose: To learn how to accurately measure with Standard and Metric systems of measurement	**Scientific Purpose:** To be able to accurately record data for use in lab
Materials needed: ● Standard/ Metric Capable ruler ● Document Projector ● Several three-dimensional objects of a rectangular prismic nature	**Academic vocabulary:** ● Length/Width/Height ● Fraction/Decimal ● One-eighth, one-fourth, one-half, etc. ● Area/Volume
Common Core Standards (copy and paste): **A1 NQ-1** Reason quantitatively and use units to solve problems. [Foundation for work with expressions, equations and functions] Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A1 NQ-2** Define appropriate quantities for the purpose of descriptive modeling.	**Next Generation Science Standards (copy and paste):** **N-Q.1-3** Reason quantitatively and use units to solve problems. **RST.6–8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS2-1), (MS-PS2-2), (MS- PS2-5)
When students are finished they will understand:	**What are teacher questions or prompts?**

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*Accommodations for students with special needs (See end of lesson outline)

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● The difference between major units of length From Standard to Metric ● How to calculate the area of rectangular shapes ● How to calculate the volume of rectangular prisms	● How do we calculate area and volume for rectangles and rectangular prisms, respectively? ● How many marks are there between the whole numbers? ● How many marks past the last whole number is the tip of the pencil? ● Did you include units in your answer? ● What would that answer be in Metric Units? ● What would that answer be in Standard Units?
What are questions you anticipate students will have? ● Which side of the ruler should I use? ● What do the little marks mean?	**What are misconceptions students might have?** ● That the entire world measures in feet and inches! ● Many Americans don't really understand the Metric System or the ease of conversion in its use. ● Students are often unaware that marks between whole numbers on a ruler represent fractional increments.
General outline of the lesson: **Project HISI Lesson Study: Measurement Unit Math: Units Spring 2015** This lesson aims to increase familiarity and usage with both **Metric** and **Standard** units of measurement to prepare them for the Unit Mr. Boeing is presenting in Marine Biology. **First 10 minutes:** Discussion: What do we use to measure?	

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I hope this will engage the students (mostly freshman or continuation students) by starting with a discussion about measurement and how it affects money, living conditions and clothes. I want to ask students why we call our system of measurement Standard when only a handful of the countries in the world put it to use. While the discussion continues, I will ask a few students to use their phones to nail down the countries involved.

Next 10 minutes: Student participation in measurement activities

I will use the document projector to project a ruler alongside a pencil. The ruler will be Standard side up. Students will volunteer their guesses as to the length of the pencil until someone gives a correct enough answer. This will be tricky for them because I plan to adjust the pencil to make sure eighths or sixteenths are involved. I will repeat this process a few times with different pencils to gain familiarity with the process while a student volunteer writes our answers on the board. *

Then we repeat the activity but this time the Metric side will be showing next to the original pencil. We can compare the centimeters to inches and share our thoughts. (A planned follow-up activity for the next 2 day includes measuring the height of each student in both inches and centimeters and then creating graphs, half the class with Metric, the other with Standard.) *

Next 30 minutes: Hands-on activity*

I will direct students' attention to several rectangular prisms on a table at the front of the classroom. They will pair up and calculate the volume of any two of these items. (Advanced students will be tasked more and in alternate units if necessary.) Students will be reminded of the calculation method for volume before they begin. I expect students will use Standard units at first out of familiarity. I believe the fractions will lead to frustration as they must be converted to a decimal for practical use.

Last 5 minutes: Wrap-up discussion

I will lead off this discussion by asking for a show of hands to find out who used each system. This will lead to comments about the ease or frustrations involved with using each system. I predict students will *prefer* Metric to Standard! In this way, we follow as they lead to the exact place we wanted them to go anyway.

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Supplemental files/resources will follow

* **Accommodations:** Designed to accommodate for student with Specific Learning Disabilities (SLD) with processing disorders in Auditory and/or Visual processing, SLD with processing disorder in Attention or Cognitive Abilities, and Other Health Impairments (ADD, ADHD).

Next 10 Minutes

- Provide a handout with labeled ruler with examples of measurements
- For follow-up activity, group students according to strengths and needs

Next 30 Minutes

- Pair students according to strengths and needs
- Provide example of unit conversion (visual and auditory)
- Provide unit conversion template
- Provide a calculator