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| **Lesson Plan – Nonstandard Units of Measurement****Developed by:** Jana Nicol **School:** Island View School **Date:** April 2014 **Grade level:** 2 **Subject:** Mathematics **Unit:** Measurement **Duration:** 60 minutes |

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| **Outcomes****SS2** – Relate the size of a unit of measurement to the number of units (limited to nonstandard units) used to measure length and mass (weight).**SS3** – Compare and order objects by length, height, distance around, and mass (weight) using nonstandard units, and make statements of comparison.**SS4** – Measure length to the nearest nonstandard unit by:* using multiple copies of a unit
* using a single copy of a unit (iteration process)

**SS5** – Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.**I Can Statements**I can choose a non-standard unit for measuring the length of an object and tell why it is a good choice.I can estimate the number of non-standard units needed for a measuring an object.I can explain why the number of units of a measurement will depend on what is used to measure.I can explain why overlapping or leaving gaps does not result in accurate measures.I can estimate and measure, using non-standard units, a length that is not a straight line.I can measure an object, change the orientation, re-measure and explain the results. | **Materials*** *Measurement.nbk*
* Class set of *Classroom Measurements.doc*
* 1 copy of *Classroom Measurement Directions.doc*
* *I Can Statements SS2 SS3 SS4 SS5.doc*
* *Student Progress Record - Nonstandard Units of Measurement.doc*
* *MI Matrix – Nonstandard Units of Measurement.doc*
* Meter stick
* Masking tape
* Cube links
* Box of paper clips
* Coloured tiles
* Box of new, unsharpened pencils
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| **Technology***Check all that apply* X Teacher laptop X SMART Board X LCD projector* SMART Senteos (class set)
* Computers
* iPad or tablet
* iPod or mp3 player(s)

 X Speakers | * Webcam

X Digital camera* Document camera
* Digital microscope
* Video camera
* Scanner
* Colour printer
* Calculators

X FM system |

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| **Prior Learning Connections**In grade one, students are expected to demonstrate an understanding of measurement as a process of comparing by: identifying attributes that can be compared; ordering objects; making statements of comparison; filling, covering or matching (*Grade 1 Mathematics Curriculum – SS1)*. |
| **Differentiation/Accommodations**Reduced number of assigned questions, read questions aloud, FM system. |

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| **Special Concerns**(Classroom management items, medication information, etc). |

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| **Assessment****Formative Assessments** 🡪 To be administered throughout unit on nonstandard units of measurement:* *Student Progress Record - Nonstandard Units of Measurement.doc*🡪 Throughout the unit, teacher will record students’ demonstration of understanding of the outcomes (SS2, SS3, SS4, SS5) as they complete activities, journal entries, and participate in discussions.
* Anecdotal notes 🡪 Record your observations of students’ understandings, areas of difficulty, misconceptions, etc., to guide further instruction throughout the unit.
* Confer with students to provide feedback and help them to set individualized goals.
* Peer assessments 🡪 Use manipulatives to demonstrate their learning to a classmate, and they can provide their feedback.
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| **Procedure** |
| **Before the lesson** | * Make a list of mixed-ability groupings of 3 students
* Make a class set of copies of *Classroom Measurements.doc* (1 copy per student)
* Prepare areas that students will use to measure objects:
* Put a box of paperclips on a table
* Put a box of cube links near the SMART Board
* Put a box of new, unsharpened pencils by the teacher’s desk
* Put a box of coloured tiles by the heater
* All other materials can be found around the classroom with ease (e.g. pencil boxes, chairs, students)
* Print one copy of *Classroom Measurement Directions.doc* and post around the room (e.g. post the directions for measuring a table with paperclips near the table with the paperclips on it).
* Post a copy of *I Can Statements SS2 SS3 SS4 SS5.doc* on the wall
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| **During the lesson** | **Warm-up (5-10 minutes)*** Ask students if they can explain what the word ‘measurement’ means. Invite volunteers to share their ideas.
* Tell the class that today they will be learning about measuring the length of objects.
* Open *Measurement.nbk* – go to page two and ask which of the two lines is longer and to explain how they know. Compare the two objects by lining them up to prove which is longer.
* Go to page five of *Measurement.nbk* and have students line up in order from shortest to tallest. *Optional: take a picture of students in the line and display on the SMART board and/or post it on the class website.*
* Use masking tape to make a line on the floor that is the same length as the lineup.

**Lesson (15-20 minutes)*** Tell students they are going to learn about measuring objects with nonstandard units. Explain that there are standard units of measurement for length, such as centimeters and meters (which you can show them with a meter stick), but that for now they are going to practice measuring things with nonstandard units of measurement (familiar objects such as pencils, paperclips, people, etc).
* Introduce the I-Can statements for nonstandard units of measurement.
* Go to page six of *Measurement.nbk* and model how to measure the line using the ants.
* Tell the class that they should always make estimates before measuring (e.g. I think this line will be 15 ants long).
* Show students how when measuring, one must always: choose a single unit of measurement (only use ants… not a mixture of ants, pencils, and erasers), each unit of measurement should be the same size, choose one end to begin measuring from, line up objects next to each other without leaving gaps between them, avoid overlapping objects, and count how many objects are lined up to get an accurate measure.
* Line up the ants to show students that the line is just over 20 ants long.
* Ask students the following questions about what they have just observed, and discuss as a class:
* Why should I only use one unit of measurement? Why shouldn’t I use a combination of ants, pencils, and erasers to measure this line?
* What would happen if I left gaps between the ants?
* What would happen if I started measuring partway through the line, not at the beginning?
* What would happen if I overlapped the ants?
* If I used pencils to measure this line, would I need more pencils than ants, or more ants than pencils? Explain.
* Show the Nonstandard Units of Measurement Video on page seven of *Measurement.nbk*.

**Activity (20-25 minutes)*** Tell students they will be working in groups, and they will measure different objects in the room using different units of measurement, and that they will record their findings on a worksheet (*Classroom Measurements.doc*). Groups can choose any 5 of the 7 objects to measure. If time permits they can measure all of the objects.
* Display *Classroom Measurements.doc* on the SMART board. Model how to fill it in.
* Tell class they will measure objects in the classroom in groups, using different units of measurement.
* #1 – Measure the width of a table using paperclips
* #2 – Measure the width of the SMART board using cube links
* #3 – Measure the length of the class line (marked by masking tape) using chairs
* #4 – Measure the height of the tallest student in your group using pencil boxes
* #5 – Measure the length of the classroom using the shortest student in your group
* #6 – Measure the width of the teacher’s desk using pencils
* #7 – Measure the width of the door using coloured tiles
* Hand out *Classroom Measurements.doc* to all students and post the groupings. Give all students a moment to get a pencil, record their name on their sheet, and join their group (sit with their group on the floor).
* Before students begin measuring, communicate the expectations for behaviour for group work: work the entire time, keep voices down, remain on task, “ask three then come to me” if you need help.
* Students can get into their groups and begin measuring objects around the room. They may choose any 5 of the 7 objects to measure in any order of their choosing (provided that they try to avoid gathering multiple groups at a single area, and that they move to a different object to measure as soon as they finish measuring and recording their findings).
* Observe students and take anecdotal notes. Take note of which students appear to easily grasp the concept, and those who seem to be struggling to guide further instruction. Use the *Student Progress Record – Nonstandard Units of Measurement.doc* to record their progress.

**Share/Reflect (5 minutes)*** After students have had a chance to measure and record the measurements of at least five objects, have the whole class will meet on the floor.
* Ask students who are willing to tell the class a fact they have learned about measurement.
* Have students show their understanding through a quick ‘thumb survey’. Students will close their eyes and participate in the thumb survey. Thumbs up means they really get it, thumbs to the side means they kind of get it, and thumbs down means they don’t quite get it yet.
 | **UDL Guidelines**3.1 Activate or supply background knowledge4 Provide options for physical action8.3 Foster collaboration & community7.2 – Optimize relevance, value & authenticity4.2 Optimize access to tools and assistive technologies3.2 Highlight patterns, critical features, big ideas, & relationships3.4 Maximize transfer & generalization5.3 Build fluencies with graduated levels of support for practice & performance2.5 Illustrate through multiple media1.2 Offer alternatives for auditory information7.1 – Optimize individual choice & autonomy2.1 Clarify vocabulary and symbols5.2 – Use multiple tools for construction & composition6.3 Facilitate managing information & resources9 Provide options for self-regulation4 Provide options for physical action9.2 Facilitate personal coping skills & strategies8.4 Increase mastery-oriented feedback5.3 Build fluencies with graduated levels of support for practice & performance9.3 Develop self-assessment & reflection |
| **After the lesson** | **10-15 minutes –** Students will choose one of the following prompts and respond to it in their Math journals, and use words numbers and pictures to explain their ideas:* Would I need more paperclips or markers to measure the SMART board? How do you know?
* What would be longer, 10 shoes or 10 book bags? Explain your thinking.
* Explain how to measure something with as many details as you can.
* Would moving or rotating an object change its measurement? Explain.
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| **Notes/Reflections** |