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| **NC.5.MD.4****Measure a Box** |
| **Domain** | **Measurement and Data** |
| **Cluster** | **Understand concepts of volume.** |
| **Standard(s)** | **NC.5.MD.4** Recognize volume as an attribute of solid figures and measure volume by counting cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.  |
| **Materials** | Paper and pencil, various rectangular boxes, centimeter cubes, inch cubes, other cubic units for measuring volume.  |
| **Task** | Choose a box. Use cubic units to measure the volume of the box. What difficulties did you encounter when you were measuring the volume of your box? Choose a different unit and make a prediction about what the volume will be when you measure with this unit. Then measure the same box using the new unit. How is this volume different? How does the size of the unit relate to the volume of the box? Which unit gives a more precise measurement?  |

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| **Rubric** |
| **Level I****Not Yet** | 1. **Level II**
2. **Progressing**
 | **Level III****Meets Expectations** |
| * Student needs assistance to measure the volume of the box.
* Student is unable to discuss the difficulties of measuring the box.
* Student does not demonstrate any understanding of the compensatory principle.
* Student does not demonstrate an understanding of why the smaller unit will result in a more precise measurement.
 | * Student successfully measures the volume of the box using various units.
* Student discusses some of the difficulties in measuring the volume of the box.
* Student may have some foundational knowledge of the compensatory principle but is unable to clearly explain.
* Student is unable to identify which unit is more precise, or student identifies that the smaller unit is more precise but is unable to explain why.
 | * Student successfully measures the volume of the box using various units.
* Student clearly explains some of the difficulties in measuring the box (may not have enough cubes, may not be able to fill completely, etc.)
* Student is able to explain that a larger unit results in a smaller volume – it takes fewer units to fill the same space (compensatory principle)
* Student is able to explain that a smaller unit will be more precise. Since the units are smaller, you will be closer to filling the box as “full” as possible.
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| **Standards for Mathematical Practice** |
| 1. Makes sense and perseveres in solving problems. |
| 2. Reasons abstractly and quantitatively. |
| 3. Constructs viable arguments and critiques the reasoning of others. |
| 4. Models with mathematics. |
| **5. Uses appropriate tools strategically.** |
| **6. Attends to precision.** |
| **7. Looks for and makes use of structure.** |
| 8. Looks for and expresses regularity in repeated reasoning. |

**Measure a Box**

Choose a box. Use cubic units to measure the volume of the box.

What difficulties did you encounter when you were measuring the volume of your box?

Choose a different unit and make a prediction about what the volume be when you measure with this unit. Then measure the same box using the new unit. How is this volume different?

How does the size of the unit relate to the volume of the box? Which unit gives a more precise measurement?