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| MSP Lesson Plan – Sizing Up Solids |
| **NAME: Stephen Allen and Melissa Stephens** |
| **SUBJECT/GRADE RANGE: Math / 7th grade** |
| **TOPIC: Volume of Prisms and Cylinders** |
| **List of appropriate standards that support the lesson.**   * CCSS.Math.Content.7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. |
| **List of appropriate objectives that guide the lesson.**   * I can determine the volume of prisms and cylinders. |
| **An equipment list in table format, stating the quantity and source for each item.**   |  |  |  | | --- | --- | --- | | Equipment | Quantity | Source | |  |  |  | | Popcorn Problem Comic | 1 to be displayed under document camera |  | |  |  |  | | Models of each popcorn container (premade) | 1 set |  | |  |  |  | | Document Camera |  |  | |  |  |  | | Popcorn, Anyone? task sheets | 1 copy per student |  | |  |  |  | | 8½” x 11” sheets of both white and colored paper or cardstock | 1 sheet of each per pair of students |  | |  |  |  | | Clear Tape | 1 roll per pair of students |  | |  |  |  | | Rulers | 1 per student or 1 per pair of students |  |   \* dimensions of the prism 10” x 8” x 6”  \* dimensions of the cylinder – height of 10” and diameter of 8” |
| **List of safety requirements for your lesson. (when applicable)**   * none |

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| **A detailed plan of instruction including activities, timeline, and questions you plan to ask students.**   |  |  |  | | --- | --- | --- | | ***Engagement*** | | | | Timing | Activities | Planned Questions & Expected Answers/Misconceptions | |  | Popcorn Problem Comic – Set the stage… Present the Popcorn Problem comic. Show models of the containers. Ask, “Which popcorn container holds the most popcorn?” (prism or cylinder)  Have students predict which container they feel would hold the most popcorn. Record student responses. | - What pieces of information would you need to know to construct a more accurate conclusion?  (dimensions of each container) | | ***Exploration / Explanation*** | | | |  | | | | Timing | Activities | Planned Questions & Expected Answers/Misconceptions | |  | Pour popcorn into one container until full. (Possibly pour into the container that was most chosen by students.) Pour the popcorn from that container into the other. Compare. | - Describe why the cylinder holds more popcorn.  (Lead students to see that the cylinder has the greater volume because the area of its base is larger.) | | Define volume as the amount of space occupied by a 3-D figure as measured by cubic units. |  | | Model how to calculate the volume of the popcorn containers using the formula V = Bh (area of the base x height of the solid). | - If needed, model / practice additional examples. | | ***Elaboration*** | | | |  | | | | Timing | Activities | Planned Questions & Expected Answers/Misconceptions | |  | Students should work in pairs because they will work together to create objects and fill them with popcorn.  Students are given one of two tasks: Popcorn Prisms, Anyone? or Popcorn Cylinders, Anyone? In addition to the task sheet, each pair should be given one white and one colored sheet of paper.  Students create and measure popcorn containers according to directions defined on the task sheet. Students are then asked to predict which container will hold the most popcorn – the tall / lean or the short / wide. Record answers.  Placing the thinner solid into the wider, fill the thinner solid with popcorn. Slowly lift this solid, allowing the popcorn to spill into the wider solid. Compare.  Calculate the volume of each solid. | \* Considering time constraints, one may need to tweak the task sheet.  - Explain your thinking?  - Was your prediction accurate? How do you know? | |  |  | | ***Evaluation*** | | | | See below | | | |
| **Assessments. A copy (or description) of how you will assess whether the students have achieved your objectives along with a key showing how you will evaluate responses.** |
| **Any visual aids and handouts that you will use.** |