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| **TEAM Lesson Plan Template** | |
| Teacher: Dr. Amanda Niedzialomski | |
| Subject/Grade: Mathematics (measurement) Second Grade | |
| Lesson Title: Box for a ball | |
| **STANDARDS** | **Identify what you intend to teach.** State, Common Core, ACT College Readiness Standards and/or State Competencies; Enduring Understandings and Essential Questions. |
| SMP1. Make sense of problems and persevere in solving them  SMP2. Attend to precision  SMP5. Use appropriate tools strategically  2.MD.A.1 Measure the length of an object in whole number units by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.  **2.MD.A.3** Estimate lengths using whole number units of inches, feet, yards, centimeters, and meters. | |
| **OBJECTIVE(s)/Sub-Objectives** | **Connect prior learning to new learning.** Clear, Specific, Observable, Demanding, High Quality, Measurable, Aligned to Standard(s), and Integrated with other subjects, build on prior student knowledge  Student-Friendly (I Can Statement) |
| I understand that a reason to measure is so that we can build or make something.  I can measure the width of a round object (ball).  I can build a box large enough to hold a ball. | |
| **MATERIALS AND RESOURCES** | **Content-related:** Clearly supports lesson objective(s); rigorous & relevant; Incorporates multimedia & resources beyond the textbook. |
| **Materials**  Box for a Ball activity sheet; Templates for boxes  Note: It is possible to replace “ball” throughout this lesson with “cube.” All of the objectives and procedures are the same except that there is no need to use calipers to measure a round object. This point is made again in the differentiation section.  For each pair of students: scissors; tape and/or glue; calipers; ruler; a ball (bouncy ball, ping-pong ball, or other similarly sized ball), two craft sticks  Optional: Markers or colored pencils to decorate boxes.  **What if the technology is not working?** This is a low-tech activity.  **Routine for distributing materials:** Place the materials except for the box templates on tables where the students will work in pairs. Each table should also have one template for a small box. Keep the rest of the box templates in separate stacks in a central location. After measuring, one student from each pair will have to go to the central location to select a template. | |
| **ACCOMMODATIONS/ADAPTATIONS** | **Learning styles and interests.** Anticipate learning difficulties, regularly incorporate student interests & cultural heritage; differentiate instructional methods. |
| **Modifications/Plans for Diverse Learners *(NOTE: Clearly identify where you will use each of these in your lesson; do not just check the box!)***  **Differentiation**  **\_\_x\_\_ Content** A goal of the activity is to use a box with a snug fit, a box that is just big enough. This calls for a precise measurement of the diameter of the ball. For some students it may be more appropriate to create a box that is large enough. These students will not find the width of the ball instead finding a whole number measurement at least as large as the width of the ball. For example, for the picture shown, the student would call the length “3 inches.” (This principal can be applied regardless of the shape of the ball. The picture shows a football because that is what was available as this lesson plan was being typed).  A blue ball on a wooden surface  Description automatically generated with low confidence    If the task is too easy for some students, then ask them to use a more complicated shape. Rather than a spherical ball, build a box to hold a football, or a D-cell battery.  If the task is too difficult, replace the students’ ball with a cube, such as a Mathlink® Cube or a cube made of Lego® bricks.    **\_\_x\_\_ Process** For some students it may be necessary to provide them with several lidless boxes rather than having them build their own boxes. They will still measure the ball and measure the box to choose the correct one, but they will not have to fold, cut, and glue to build the box.  For other students, it may be possible to show them how a template folds into a box and then ask them to predict, just by looking at the template, whether the ball will fit into the box.  A more challenging task is to have students create their own box template from a blank piece of paper. This is well beyond the standard, but could provide a challenge if a student gets bored.  **Accommodations**  **\_\_x\_ Small Group** With students working in pairs, their skills can complement each other  **Early Finishers:**  Have early finishers decorate their boxes. | |

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| **MOTIVATING STUDENTS/ANTICIPATORY SET** | **“Hook”: Engage students’ attention and focus on learning.** Personally meaningful and relevant. |
| Show students a jewelry box or a cereal box. Point out that boxes come in different sizes, but each box must be large enough for the thing we want to put inside it. | |
| **INSTRUCTIONAL PROCEDURES** | **Step-by-Step Procedures-Lesson Sequence: Basic to Complex.** Lesson includes visuals, modeling, logical sequencing and segmenting (beginning, middle, ending); essential information; concise communication; grouping strategies; differentiated instructional strategies to provide intervention & extension; seamless routines; varied instructional strategies; key concepts & ideas highlighted regularly. |
| ***Introductio*n**  With the whole group’s attention, show students a ball in a lidless box just large enough to hold the ball. Show students the box templates. Ask each pair of students to follow along with their (too small) template and show them how to build a box from the template. Emphasize the step at which they have to put the ball in the box. Tell them that they need to build a box that is big enough to hold the ball. Ask them to measure the ball and use the measurement to choose a template.  **Middle**  Let students work in pairs. Monitor students as they complete the activity. Ask questions to prompt them as necessary. Suggest the use of craft sticks or calipers to measure the ball as indicated in the activity sheet. Once they have a measurement, have one student from each pair select a template from a stack in the room. Each pair should then build a box enclosing their ball.  **End/Closure**:    Regain the whole group’s attention. Ask students to show off the boxes they made. Ask if their ball fits snugly in the box or if the ball can move around in the box.  Clean up any glue or tape mess. If students are returning the balls, have students return the boxes to a central location.  **Motivating Students**  \_x\_ Relate to Real World Most students are familiar with boxes containing consumer goods.  \_x\_ Verbal Reinforcement The teacher will monitor students’ work throughout the activity to provide reinforcement.  **Presenting Instructional Content**  \_x\_ Hands on Students will measure the ball and build the box.  \_x\_ Modeling Show students how to fold, cut, and glue a template to build a box.    ***Instructional strategies:***  **Modeling and Guided Practice *–*** The teacher will monitor students’ work and ask questions to prompt them if they are stuck.  **Check for Understanding (CFU) –**  ***What am I doing for students that progress at different rates?***  Encourage students to help each other. If students are falling behind, help them build the box after they choose one.  ***What do I do if they get it?***  If students handle the activity smoothly, expose them to non-cubical boxes or non-spherical balls (small football, D-cell battery, six pencils) and ask them to determine the size of a box which would hold the object.  ***What do I do if they don’t get it?***  First make sure that students can measure the ball. If that is not the issue, offer students prepared lidless boxes made from various templates so that students can try putting the ball in each box. Then show students the template for the box that works and compare the ball measurement to the length of a side of a square on the template. | |
| **QUESTIONING/THINKING/PROBLEM SOLVING (embedded throughout)** | **Balanced mix of question types.** Utilizes Blooms Taxonomy/Webb’s Depth of Knowledge; high frequency; purposeful & coherent; require active responses; balance based on volunteers/non-volunteers, ability, & gender; lead to further inquiry & self-directed learning.  **Implement four types of thinking (Analytical, Practical, Creative, & Research-based) & Teach/Reinforce problem-solving types**. Provide opportunities for students to generate ideas & alternatives; analyze, evaluate & explain information from multiple perspectives& viewpoints. |
| **Questioning** These questions will occur throughout the activity as prompts based on groups’ or individual students’ progress.  **Knowledge:**  What shape is the box we will build? (cube)    **Comprehension:**  Does the color of the ball matter?  Which template will create the largest box?  Which template will create the smallest box?  **Application:**  How many sides does a cube have? How many squares are on the template? How can both of these answers be true? (Some of the squares overlap to form sides of the cube where we use glue)  If the ball will fit in a box, will it fit in a larger box? (Yes; for the teacher, notice the connection to transitivity of inequality: If a > b and b > c, then a > c).  **Analysis:**  Which box is best for the ball? (The point of this question is for students to realize that the ball will fit snugly in one box, but will move around inside the larger boxes. Opinions may vary regarding which of those situations is better).  **Synthesis:**  **Evaluation:**  **Thinking**    \_x\_ **Practical** – We use boxes to hold things every day.  \_x\_ **Creative**– Students can decorate their boxes.  \_\_ **Analytical** –  \_x\_ **Research-based** – Students are personally observing the ball and the boxes.  **\*What am I going to do to give Students an opportunity to?**  **1. Generate variety of ideas:**  **2. Analyze problems from multiple viewpoints:**  **Problem Solving *Note: Teach 2 or more types of problem solving (NOTE: Clearly identify where you will use each of these in your lesson; do not just check the box!)***  **\_x\_\_** **Observing and Experimenting** Students observe the ball and take measurements. They hypothesize about which template will work, and test their hypothesis by building a box around the ball.  **\_x\_\_ Predicting Outcomes** Students have the opportunity to predict which template will lead to a box which will hold the ball.  **\_\_\_ Improving solutions**  **\_\_\_ Creating and Designing** | |

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| **GROUPING** | **Maximize student understanding & learning** Varied group composition (race, gender, ability, & age); clearly understood roles, responsibilities & group work expectations; accountability for group & individual work; student opportunities for goal setting, reflection & evaluation of learning. |
| * Pairs * Product. Students will create a paper box containing a ball. | |
| **ASSESSMENT** | **Formative and/or summative assessment.** A variety of assessments, including rubrics, measure achievement of objectives and informs instruction. |
| ***Assessments: aligned with state stds; measurement criteria; measure student performance in more than 2 ways (project, experiment, presentation, essay, short answer, multiple choice test) (NOTE: Clearly identify where you will use each of these in your lesson; do not just check the box!)***  **\_\_x\_ Teacher Made Test** A future test or worksheet may reproduce this activity with pictures. Show a circle and some templates. Ask students to mark the templates which will create a box large enough to hold the circle.  **\_\_x\_ Observation** The teacher will directly observe if the students’ boxes hold a ball at the end of the activity  *\****Students should achieve \_\_\_\_\_% mastery of this objective: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | |
| **CLOSURE** | **Reflection/Wrap Up.** Summarizing, reminding, reflecting, restarting, connecting. |
| * ***Review/Summary: wrap up what has been learned and accomplished in the lesson (even if they are in the middle of an exercise, it is still important to summarize to the point where they are now). Ideally involve students in this synthesis.*** * ***Preview for next lesson: link what they did to day with where they are going next.*** * ***Upcoming assignments: remind them of any upcoming assignments.***   ***Today we…. Turn to your partner and…. Let’s review our I Can statements……***  **Here is your exit ticket for today**:  **Follow-up Activities/Extension *These may be designed to create a longer or more intense lesson. For example, if the class is able to cover the material in a lesson much faster than expected, extensions may prove helpful. Extensions may also be useful in various parts of a lesson where the teacher (and class) decides they should spend more time on a skill or topic.***  ***Reflection: You must reflect on every lesson you teach.*** | |

**NOTES:**

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