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| **TEAM Lesson Plan Template** | |
| Teacher: Dr. Jason DeVito | |
| Subject/Grade: Expressions and Equations, Grade 6 | |
| Lesson Title: 2000 Calories. Adapted from “What Does 2000 Calories Look Like?” © 2014 Glenrock Consulting [Robert Kaplinsky's Website](https://robertkaplinsky.com/work/what-does-2000-calories-look-like/). Used by permission. | |
| **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.** Reason abstractly and quantitatively.  **SMP3.** Construct viable arguments and critique the reasoning of others.  **6.EE.B.7** Solve real-world mathematical problems by writing and solving one-step equations of the form *x + p = q* and *px = q* for cases in which *p*, *q*, and *x* are all nonnegative real numbers.  **6.EE.B.8** Interpret and write an inequality of the form *x > c* or *x < c* which represents a condition or constraint in a real-world or mathematical problem. Recognize that inequalities have infinitely many solutions; represent solutions of inequalities on number line diagrams.  **Health Education Standards for grades 6-8, Standard 5**: The student will understand the relationship of nutrition to healthy living. | |
| **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 can use rational equations and rational inequalities to count calories and plan a healthy diet. | |
| **MATERIALS AND RESOURCES** | **Content-related:** Clearly supports lesson objective(s); rigorous & relevant; Incorporates multimedia & resources beyond the textbook. |
| **Activities & Materials**  \_x\_ Laptop/Computer; \_x\_ Projector; \_x\_ Assorted food labels; \_x\_Calculators; \_x\_ Worksheet per student;  \_x\_ Pictures of food with number of items providing 2000 calories.  \_x\_Internet Resource Robert Kaplinsky’s website <https://robertkaplinsky.com/work/what-does-2000-calories-look-like/https:/robertkaplinsky.com/work/what-does-2000-calories-look-like/>  (optional) USDA Food Composition Database <https://ndb.nal.usda.gov/ndb/search/list>  **What if the technology is not working?** Skip the video; use the worksheet and food labels to conduct the lesson.  **Routine for distributing materials.** Pass out. | |
| **ACCOMMODATIONS/ADAPTATIONS** | **Learning styles and interests.** Anticipate learning difficulties, regularly incorporate student interests & cultural heritage; differentiate instructional methods. |
| **Modifications/Plans for Diverse Learners**  **Differentiation**  **----- Content** Most students will work with whole numbers. For students who find the whole numbers too easy, use foods that require fractions. For example, 6.6 donuts or 2.27 cinnamon rolls to make 2000 calories.  **----- Process** Most students will use standard algebraic techniques to solve equations. Some may use repeated addition instead. Some students may benefit from additional pictures. That is, instead of a single picture of 42 nuggets representing 2000 calories, provide cutouts of individual nuggets representing about 47 calories each. They can manipulate individual nuggets to assist with solving equations.  **-----Product** Most students will complete a written worksheet. Some students may need to answer questions orally and have a peer or the teacher record their answers.  **----- Tiered Assignments**  **Accommodations**  **\_\_\_ Preferential Seating \_\_\_ Extended Time \_\_\_ Small Group \_\_\_ Peer Tutoring**  **\_\_\_ Modified Assignments \_\_\_ Other**  **Early Finishers:** | |

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| **MOTIVATING STUDENTS/ANTICIPATORY SET** | **“Hook”: Engage students’ attention and focus on learning.** Personally meaningful and relevant. |
| Pass around a variety of nutrition labels.  Ask students to find the number of calories on which the label is based. 2000 is considered a normal or average number of calories for a person to eat each day. Some people may need a little more, some people may need a little less.  Ask students to explain what a calorie is. Ask what happens if someone eats too many calories. Ask what happens if someone does not eat enough. There are a variety of answers, but neither too much nor too little is a good strategy for a healthy lifestyle.  Show Robert Kaplinsky’s video, “What Does 2000 Calories Look Like?” | |
| **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**  We have looked at Equations like *x + 3 =5* and 3*x = 6*. We have also looked at inequalities like x < 5 and x 5. Today we will look at a way that these equations happen in a real life situation, planning a healthy diet.  **Motivating Students**  \_x\_ Verbal Reinforcement as students progress through the worksheet \_x\_ Relate to Real World  **Presenting Instructional Content**  \_x\_ Hands-On with real food labels  \_x\_ Work Examples as required to assist students  \_x\_ Modeling students will model food consumption with equations  ***Instructional strategies:***  **Modeling and Guided Practice *–*** After the introduction, arrange students in groups of 3. Assign the following roles: Reader/Task Focuser, Calculator, and Time Keeper. Pass out one worksheet per student. Pass out one of the prepared food cards per group. Explain that each student will prepare an individual worksheet, but the group should cooperate and discuss the answers. Explain that the worksheet is two-sided. Announce that students should take 20 minutes to answer through question number 8. Ensure that time keepers have noted the time.  Monitor student work, using questions from the Questioning section of this plan to guide students.  At 18 minutes, verify that students are done or nearly done through question 8. If not, have them make a quick copy of the information from their food card. At 20 minutes have students trade food cards with another group. Tell students that they have 20 minutes to finish the worksheet.  Five minutes before the end of the time allotted for the activity, collect worksheets and conduct the conclusion of the exercise.  **Check for Understanding (CFU) –**  ***What am I doing for students that progress at different rates?*** Monitor student work during the activity. Provide leading questions. Encourage students within groups to help each other.  ***What do I do if they get it?*** Have food labels available. Show students a label and ask how many servings of that item they could eat and not exceed 2000 calories AND ALSO not exceed 2300 mg of sodium (or 50g of fat). Still getting it fine? Ask if they can eat only that food, not exceed 2000 calories, AND ALSO get at least 25 g of fiber.  ***What do I do if they don’t get it?*** If a few students are not getting it, work with small groups. If most students are not getting it, regain the attention of the whole group. Work through the snickers/hot dog example:  "The total amount of calories in 8 snickers bars is 2000".  (*Note that 8 is a factor of 2000, so the total calorie count for a snickers bar will work out to be an integer. The complete factor list for 2000 is 1,2,4,5, 8,10, 16, 20, 25, 40, 50, 80, 100, 125, 200, 250, 400, 500, 1000, 2000 so any of these numbers makes the calories count per item an integer. You could, for example, give a more advanced group a non-factor. Something like "the total amount of calories in 22 apples is 2000.")*  Question 1. How many calories are in one of your item? (2000/8 = 250)  Question 2: How many calories are in three snickers bars? (250\*3 = 750)  Question 3: If you only wanted to eat 1750 calories today, how many snickers bars could you have? (1750 = 250x, so x = 1750/250 = 7).  Question 4: If you only wanted to eat 1400 calories today, what is the largest number of whole snicker bars you could have? (1400 = 250x, so x = 1400/250 = 28/5 = 5 and 3/5, so you could have 5 whole snicker bars)  Question 5: If you wanted to have at most 1000 calories come from snickers bars, how many could you eat? (250 x <=1000, so x <= 1000/250, so x <=4. Note that x >=0 automatically.  Question 6: Suppose I want to have 1000 calories in snickers bars and I have already eaten 1. How many more should I eat? (1000 = 250(x+1), so 4 = x+1, so 3 = x)  After trading, assume the second food is hot dogs, with 20 hotdogs making up 2000 calories.  Question 7: Suppose you have already eaten a snickers bar for lunch and you want to eat at most 1000 calories for lunch. How many whole hot dogs can you have? (First, each hotdog is 2000/20 = 100 calories. Then 250(1) + x\*100 <= 1000, so x\*100 <= 750 so x <= 7.5. So you can have any number of hot dogs between 0 and 7.)  Question 8: How does the answer to question 7 change if we don't require the hotdogs be whole? (You can eat any amount from zero to seven and one half hot dogs.) | |
| **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** Some of these questions appear on the worksheet. Use others to guide students as they complete the worksheet.  **Knowledge:**  What is a calorie?  **Comprehension:**  What is a typical number of calories that a person should eat during a day?  **Application:**  How many calories are in one of your item?  How many calories are in three of your item?  What happens if someone eats too many calories?  How can you express the words in the worksheet question as an equation? . . . as an inequality?  **Analysis:**  Suppose you have already eaten two of your first food and you want to eat at most 2000 calories today. How many whole units of your second food can you eat? (answer should include 0 )  Suppose you have already eaten two of your first food and you want to eat at most 2000 calories today. How much of your second food can you eat if you can cut it into parts? (answer should include 0)  Do you have to eat that many to stay under 2000 calories? ( no, eating none stays under 2000)  What is an answer that you know is too large?  What is an answer that you know is too small?  What is your best guess?  **Synthesis:**  How do you know that your answer to question \_\_\_ is right?  **Evaluation:**  **Thinking*(NOTE: Clearly identify where you will use each of these in your lesson; do not just check the box!)***    \_x\_ **Practical** – Students use/apply/implement real life scenarios  \_x\_ **Analytical** – Students compare calorie contents of different foods and must explain how they know how much of a combination of foods they can eat and remain under a certain number of calories.  **\*What am I going to do to give Ss opportunity to?**  **1. Generate variety of ideas:** The initial question to read the food label to find a typical number of calories can generate ideas. Reading the very bottom of several food labels shows the number 2000 several times, but the labels do not actually read “this is the normal number of calories for someone to eat.” What would make the “right” number of calories per day different for different people?  **2. Analyze problems from multiple viewpoints:** Students might consider how the questions to ask might differ based on whether a person wants to lose weight (less than or equal to) or whether the person needs to carry enough food to climb Mount Everest (greater than or equal to), for example.  **Problem Solving**  \_x\_ **Abstraction** introduction of a variable is a significant move toward abstraction for students  **\_x\_ Drawing conclusions/Justifying Solutions** Students have to provide written explanations  **\_x\_ Predicting Outcomes** ( If I have eaten so many of food one, how many of food two may I eat to remain under 2000 calories)  **\_x\_ Observing and Experimenting** Students may use trial and error (experiment) as part of their problem solving process. | |

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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. |
| * Students work in heterogeneous groups of three. * Roles are Reader/Task Focuser, Calculator, and Timekeeper. * Teacher assigns roles verbally upon moving students into groups. * Each student completes an individual worksheet based on the group discussion. | |
| **ASSESSMENT** | **Formative and/or summative assessment.** A variety of assessments, including rubrics, measure achievement of objectives and informs instruction. |
| ***Assessments:***  **\_x\_\_ Teacher Made Test** At a later date, a written test can ask students the same questions that appear on the worksheet but for a new food  **\_x\_\_ Group Assignment** Students work in groups to complete a worksheet which will be assessed after completion.  **\_x\_\_ Questions/Answers** Students are prompted with questions throughout the activity. | |
| **CLOSURE** | **Reflection/Wrap Up.** Summarizing, reminding, reflecting, restarting, connecting. |
| * ***Review/Summary:*** Today we used a variable to represent the amount of food we could eat without exceeding a daily calorie count. * ***Preview for next lesson:*** The wonderful thing about variables and equations is that we can apply them to so many situations. This problem was about the calorie content of food, but we might also be concerned about the sodium content, or the fat content, or the cost of the food. We might be asking questions about the amount of steel to use in a car. In any of these situations, the equations can take the same form. * ***Upcoming assignments: remind them of any upcoming assignments.***   Turn to your partner and explain what you learned today. Now (a few selected with equity cards) partners, tell us what your partner learned today.  **Follow-up Activities/Extension** Use actual food labels and ask questions about fat content (keep daily intake less than 50g, for example), or sodium content. Alternatively, if students have internet access, refer students to the USDA Food Composition Database <https://ndb.nal.usda.gov/ndb/search/list> and have them put together a weekly menu of breakfast, lunch, and dinner that is varied but achieves the 2000 calorie per day goal.  ***Reflection: You must reflect on every lesson you teach.*** | |

**NOTES:**

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