**Expressions and Equations**

**Standard 8**: Write an inequality of the form x>c or x<c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x>c or x<c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

**Vacation Task I for EE 8**

Your family went on a vacation. Entry fees for the entire family for an amusement park for Thursday totaled $275.00. How much money could the family have spent that day?

**Vacation Task II for EE 8**

We just found out that Dad set a budget of $500.00 for the day. Do his solutions look different than ours?

**Vacation Task III for EE 8**

The park will close if temperatures are over 110 degrees Fahrenheit. At which temperatures will the park be open?

The park will also close if wind speeds reach higher than 30 mph. At what wind speeds will the park be open?

What temperatures and wind speeds will the park remain open?

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| **PART 1: SELECTING AND SETTING UP A MATHEMATICAL TASK** | |
| What are your mathematical goals for the lesson? (i.e., what do you want students to know and understand about mathematics as a result of this lesson?) | Students will recognize that infinity refers to a set of numbers that has no end, but may not include all numbers.  Students will recognize that a variable can stand for an infinite number of solutions when used in inequalities.  Students will recognize that a constraint or a condition in an inequality refers to the boundary defined in the solution set.  Students will write an inequality that represents real-world mathematical problems containing a constraint or a condition (<,>).  Students will represent inequalities on a number line. |
| What are your expectations for students as they work on and complete this task?   What resources or tools will students have to use in their work that will give them entry into, and help them reason through, the task?   How will the students work—independently, in small groups, or in pairs—to explore this task?   * How will students record and report their work? | * No physical tools are required. Students will need to use their prior knowledge of money, vacations, and creative problem solving to reason through the task. (gas money, food, souvenirs, special rides, photos, sunglasses, sunscreen, and any other creative possibilities). * Students will initially work independently as the teacher monitors progress. The teacher will then transition into a whole class discussion. * Students will record and report their work in their Math Journals/ Notebooks. The teacher will have several students share their records. * This task could be solved with specific numerical answers (e.g. $600, $1200) or statements describing $275 or more (>). Students could possibly discuss budget or limit amounts. |
| How will you introduce students to the activity so as to provide access to *all* students while maintaining the cognitive demands of the task?  What is the prior knowledge students must have before beginning this task? | Personalize the vacation story.   * The meaning of equality (x = 5 means that the value of x is equal to 5; therefore, 5=5) * What means to not be equal (3+2=6) |

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| **PART 2: SUPPORTING STUDENTS’ EXPLORATION OF THE TASK** | |
| As students work independently or in small groups, what questions will you ask to—   help a group get started or make progress on the task?   focus students’ thinking on the  key mathematical ideas in the task?   assess students’ understanding of  key mathematical ideas, problem- solving strategies, or the representations?   advance students’ understanding  of the mathematical ideas? | * As the teacher monitors students’ written responses, the teacher could possibly use the following questions: “Why do you have $600.00 written down?”   “How did you get that answer?” Are there other answers that would work? Why or why not? What are other possibilities? I can see you don’t have anything written down yet. Describe what you’re thinking.  Watch for students that may have an answer less than $275. What is their reasoning? Were coupons used, canned food drive discounts, or does the student have a relative that works at the amusement park? |
| How will you ensure that students remain engaged in the task?   What assistance will you give or what questions will you ask a  student (or group) who becomes  quickly frustrated and requests more direction and guidance is  solving the task?   What will you do if a student (or group) finishes the task almost  immediately? How will you  extend the task so as to provide additional challenge? |  |

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| **PART 3: SHARING AND DISCUSSING THE TASK** | |
| How will you orchestrate the class discussion so that you accomplish your mathematical goals?   Which solution paths do you want to have shared during the  class discussion? In what order will the solutions be presented? Why?   What specific questions will you ask so that students will—  1. make sense of the mathematical ideas that you want them to learn?  2. expand on, debate, and question the solutions being shared?  3. make connections among the different strategies that are presented?  4. look for patterns?  5. begin to form generalizations?  What will you see or hear that lets you know that *all* students in the class understand the mathematical ideas that you intended for them to learn? | Begin the discussion, by asking a student with a one number answer. (How did you get $600.00 for your answer?) Ask the class if this is a possible answer. (Yes – after listening to the reasoning)  Go to a second student with a one number answer (Your answer is different. Describe HOW you got your answer.) (Yes – after listening to the reasoning)  Go to a student that has $275.00 as their answer. (Be aware of justification that can be used as some families can go to the amusement park and not spend additional money (packing a picnic lunch). (Yes – after listening to the reasoning)  We have multiple answers. Are there others? (Have students share that have answers of more than $275, or an inequality)  \*\*This is where we want to have a student note there are infinite possibilities. (Realistically someone wouldn’t spend a million dollars at an amusement park, but is it possible?)  Can you think of a way to show that anything more than $275 is a possible answer?  Each student will share five additional possible infinite solutions with their partner. Students will explain to their partner what an infinite solution is.  Take a minute with your partner and list at least five numbers that are not solutions for this problem?  \*\*Just as there are an infinite number of solutions to this question, there are an infinite number of responses that are not solutions.  How would you describe the solution? (more than $275, greater than or equal to $275)  \*\*At this point, bridge to the next task which is focused on notation. If a student used notation, have that student share their record.  Would there be a notation or a visual representation to model our solution of more than $275? (Money spent >$275) |