*Moriah smith*

*Chapter 23 Developing concepts of exponents, integers and real numbers*

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| **Representative TN State Curriculum Standards**  **Fifth Grade**  **GLE’s**  GLE 0506.1.1 Use mathematical language, symbols, and definitions while developing mathematical reasoning.  GLE 0506.3.1 Understand and use order of operations.  **State Performance Indicators**  SPI 0506.3.1 Evaluate algebraic expressions involving decimals and fractions using order of operations.  **Sixth Grade**  **GLE’s**  GLE 0606.1.8 Use technologies/manipulatives appropriately to develop understanding of mathematical algorithms, to facilitate problem solving, and to create accurate and reliable models of mathematical concepts.  GLE 0606.3.3 Extend order of operations to include grouping symbols and exponents.  **State Performance Indicators**  SPI 0606.2.8 Locate integers on the number line.  SPI 0606.3.2 Use order of operations and parentheses to simplify expressions and solve problems. | |
| **Time: 6 minutes** | **The Number Devil** (A Mathematical Adventure)   * Read excerpts in the book about how to understand exponents   (pg. 38-41)   * Then go over the powers of ten using the base-ten blocks and writing out them out on the board. Ask students if they notice a pattern. * Have them try a problem before going onto the next section. * Read the next section about understanding cubed numbers. (pg. 102-104) * Then have the students do the activity in the book. (pg.103) * Then briefly discuss the activity. |

**Virtual Manipulatives Time: 5 minutes**

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| Operation Order Algebra Game  [**http://www.funbrain.com/algebra/index.html**](http://www.funbrain.com/algebra/index.html)  Students have to determine which numbers in the problem make up the answer. They are given each operation in the order that it is given in the problem and the number that is equivalent to those numbers and operations. It sounds confusing, but students can use a piece of paper to help them calculate if they cannot do it in their head. It can be put on easy, medium, or hard. |
| Rational and Irrational Numbers Game  <http://www.math-play.com/rational-and-irrational-numbers-game/rational-and-irrational-numbers-game.html>  Students have to determine if the numbers are rational or irrational. They have to be quick in order to get them in the basket before they roll off the screen so it is crucial they can recognize the difference between the two. This is a game that should# be played after rational and irrational number have been introduced and practiced for a while. |

**Activities from the textbook**

**Materials needed:** thermometers, calculators, smart pals, and worksheet

1. Activity 23.2 Entering Expressions (pg. 474-475); 4 minutes

A. Topic: Order of operations

2. Figure 23.5 Thermometers used for exploring positive and negative numbers (pg. 476); 5 minutes

A. Topic: Positive/negative numbers

B. Use smart pals to figure out answers to the worksheet with a partner

3. Activity 23.7 Edges of Squares and Cubes (pg.488); 4 minutes

A. Topic: Exponents

4. Activity 23.9 How Close is Close? (pg.489); 4 minutes

A. Topic: Rational numbers

**Additional Activity: Number Line Time** 7 minutes

**Materials:** Whiteboard and dry erase makers

Create a number line on the whiteboard only labeling it by 5’s. Then have students come up and place the number (rational or irrational) on the spot where it should be located on the number line. Be sure to use fractions, decimals, and other symbols on the number line to help them review and be able to recognize that a number can be expressed in more than one way.

**Lesson Plan**

Order of Operations Bingo

This is a really fun game to use to reinforce the order of operations rules. Instead of calling out numbers, you call out expressions to be evaluated for the numbers on the bingo cards.

<http://illuminations.nctm.org/LessonDetail.aspx?id=L730>

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Positive/Negative Math Review

1. If the temperature outside is 37°F on Thursday morning and then it drops 40 degrees by Thursday night, what is the temperature outside by Thursday night? Show your work.

2. If the temperature outside is -17°F and then drops another 2 degrees, what is the temperature now? Show your work.

3. If the temperature outside on Monday is 60°F and then drops 78 degrees by Friday, what is the temperature on Friday? Show your work.