

Sample Lesson:

The Order of Operations

Grade: 4-6

Concepts: Music, singing, step-by-step arithmetic

Time: 30-45 minutes

Overall Objectives: Students will use the order of operations to solve more advanced arithmetic math problems.

Specific Objectives: Students will use a rock song to memorize the order of operations.

Materials: Guitar, small amplifier and/or speakers, recording and sheet music of "Order of Operations" rock song, marker board, projector and computer optional.

Procedure:

1. Write on marker board a math problem such as $7 + 3 \times 5$ that could be interpreted in different ways (the previous will be used as an example). Say, "Today we will use a rock song to help us learn math."
2. Tell students, "Sometimes we can get two different answers for the same math problem" [demonstrate]. "So, we need to know what to do first."
3. Continue, "The order of operations helps us to know what to do first."
Write the order of operations on board in the following manner:

P: Parenthesis

E: Exponents

M: Multiply, or

D: Divide, from left to right.

A: Add, or

S: Subtract, from left to right

Group M and D together and A and S together by circling them or writing them in the same colors. Tell them, "Multiplying and dividing are both on the same level, so are adding and subtracting. We do whatever comes first, from left to right."

4. Do the previous math problem, outlining step by step, reiterating the order of operations, to arrive at the correct answer.

5. Show lyrics for song on board or projector. Play and/or perform song with students, following along with lyrics and making particular reference to steps in the order of operations.
6. Now perform simplified song (perhaps with simple chord strumming), encouraging students to clap the beat and sing along if they want. During breakdown, ask them to antiphonally answer the name of operations after you mention the letter, doing so in the rhythm of the song. For example: after singing "P," students should respond "Parenthesis" in the manner of the recording. Repeat this section of the song according to students' understanding.
7. Do a sample problem with the class, asking students what step to do next. For example: $(7 + 3) \times 4 \div 2 - 5 \times 6$ should equal -10.
8. Note that M and D are on the same level; so are A and S. "We do multiplying *or* dividing, whichever comes first from left to right. After that, we do adding or subtracting in the same way, from left to right. Illustrate this concept by doing problems such as $1 + 2 - 3 + 4 - 1 = 3$ and $4 \times 2 \div 3 \times 2 = \frac{16}{3}$.
9. **Review:** Ask students what is the order of operations, using the song to give them a hint. Provide sample problems to test:

$$2 + 3^2 \div (2 + 1)$$

$$5 - 6 \times (3 + 1)^2 - 2$$

$$(2 \times 3) \div (3 \times 2) - (5 + 1)$$
10. Repeat gist of lesson or just the song until overall objective is met.