



Subject Area: Mathematics
Unit Title: Applying the Order of Operations
Grade Level: 6-8
Lesson Number: 1 of 10

Duration: 60 minutes
Date: March 10, 2023
Teacher: Ms. Smith
Room: 101

Curriculum Standards Alignment

Content Standards:

- Apply the order of operations to solve mathematical expressions
- Use real-world scenarios to apply mathematical concepts

Skills Standards:

- Critical thinking and problem-solving
- Communication and collaboration

Cross-Curricular Links:

- Science: applying mathematical concepts to scientific problems
- English: communicating mathematical ideas through writing

Essential Questions & Big Ideas

Essential Questions:

- How can we apply the order of operations to solve real-world problems?
- What are the benefits of using mathematical models to solve problems?

Enduring Understandings:

- The order of operations is a set of rules that dictates the order in which mathematical operations should be performed
- Mathematical models can be used to solve real-world problems

Student Context Analysis

Class Profile:

- Total Students: 25
- ELL Students: 5
- IEP/504 Plans: 3
- Gifted: 2

Learning Styles Distribution:

- Visual: 40%
- Auditory: 30%
- Kinesthetic: 30%



Pre-Lesson Preparation

Room Setup:

- Arrange desks in pairs
- Prepare whiteboard and markers

Technology Needs:

- Computers with internet access
- Math software

Materials Preparation:

- Printed worksheets
- Pencils and pens

Safety Considerations:

- Ensure students are seated safely
- Avoid any hazardous materials

Detailed Lesson Flow

Introduction (10 minutes)

- Introduce the concept of the order of operations
- Use real-world scenarios to illustrate the importance of the order of operations

Direct Instruction (20 minutes)

- Explain the rules of the order of operations
- Use examples to illustrate the application of the order of operations

Engagement Strategies:

- Think-pair-share
- Group discussion

Guided Practice (20 minutes)

- Provide students with worksheets to practice applying the order of operations
- Circulate around the room to assist students

Scaffolding Strategies:

- Provide additional support for struggling students
- Offer challenges for advanced students

Independent Practice (20 minutes)

- Provide students with a real-world scenario to apply the order of operations
- Allow students to work independently



Closure (10 minutes)

- Review the key concepts covered in the lesson
- Provide feedback and guidance



Differentiation & Support Strategies

For Struggling Learners:

- Provide additional support and scaffolding
- Offer one-on-one instruction

For Advanced Learners:

- Offer challenges and extensions
- Provide opportunities for leadership and peer teaching

ELL Support Strategies:

- Provide visual aids and graphic organizers
- Offer bilingual resources and support

Social-Emotional Learning Integration:

- Encourage self-awareness and self-regulation
- Foster a growth mindset and perseverance

Assessment & Feedback Plan

Formative Assessment Strategies:

- Quizzes and worksheets
- Class discussions and observations

Success Criteria:

- Students can apply the order of operations to solve mathematical expressions
- Students can use real-world scenarios to apply mathematical concepts

Feedback Methods:

- Verbal feedback
- Written feedback

Homework & Extension Activities

Homework Assignment:

Complete the worksheet on applying the order of operations to real-world problems

Extension Activities:

- Research and create a presentation on a real-world application of the order of operations
- Design and create a mathematical model to solve a real-world problem

Parent/Guardian Connection:

Teacher Reflection Space

Pre-Lesson Reflection:

- What challenges do I anticipate?
- Which students might need extra support?
- What backup plans should I have ready?

Post-Lesson Reflection:

- What went well?
- What would I change?
- Next steps for instruction?



Introduction to the Order of Operations

What is the Order of Operations?

The order of operations is a set of rules that dictates the order in which mathematical operations should be performed.

Why is the Order of Operations Important?

The order of operations is important because it helps us to solve mathematical expressions and equations in a logical and consistent manner.

The Rules of the Order of Operations

Rule 1: Parentheses

Evaluate expressions inside parentheses first.

Rule 2: Exponents

Evaluate any exponential expressions next.

Rule 3: Multiplication and Division

Evaluate any multiplication and division operations from left to right.

Rule 4: Addition and Subtraction

Finally, evaluate any addition and subtraction operations from left to right.



Applying the Order of Operations to Mathematical Expressions

Example 1:

Evaluate the expression: $2 + 3 \times 4$

Solution:

Using the order of operations, we first evaluate the multiplication operation: $3 \times 4 = 12$. Then, we add 2: $2 + 12 = 14$.

Practice Problems

Problem 1:

Evaluate the expression: $5 - 2 + 3 \times 2$

Problem 2:

Evaluate the expression: $10 \div 2 + 3 - 1$



Real-World Applications of the Order of Operations

Example 1: Finance

A person invests \$1000 in a savings account with a 5% interest rate. How much will they have after 1 year?

Solution:

Using the order of operations, we first calculate the interest: $\$1000 \times 0.05 = \50 . Then, we add the interest to the principal: $\$1000 + \$50 = \$1050$.

Interactive Scenarios

Scenario 1: Shopping

A person buys 2 shirts for \$15 each and 1 pair of pants for \$20. What is the total cost?

Scenario 2: Travel

A person travels 200 miles in a car that gets 25 miles per gallon. How much gas will they use?



Glossary of Key Terms

Order of Operations:

A set of rules that dictates the order in which mathematical operations should be performed.

PEMDAS:

An acronym that stands for Parentheses, Exponents, Multiplication and Division, and Addition and Subtraction.

Real-World Problems:

Problems that are relevant to everyday life, such as calculating the cost of a meal or the area of a room.



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Worksheets and Quizzes

Worksheet 1:

Applying the Order of Operations to Mathematical Expressions

Quiz 1:

Assessing Student Knowledge and Understanding of the Order of Operations



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Real-World Scenarios and Interactive Activities

Scenario 1:

Calculating the Cost of a Meal

Activity 1:

Order of Operations Scavenger Hunt



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Assessment and Evaluation Rubrics

Rubric 1:

Assessing Student Knowledge and Understanding of the Order of Operations

Rubric 2:

Assessing Student Ability to Apply the Order of Operations to Real-World Problems



Conclusion and Next Steps

Conclusion:

In conclusion, applying the order of operations to real-world problems and interactive scenarios is a crucial skill for students to master.

Next Steps:

Our next steps will be to build on the learning progressions from this lesson and provide students with opportunities to apply the order of operations to more complex mathematical expressions and real-world problems.



References

National Council of Teachers of Mathematics.

(2014). Principles to Actions: Ensuring Mathematical Success for All.

Common Core State Standards Initiative.

(2010). Common Core State Standards for Mathematics.



Appendices

Appendix A:

Glossary of Key Terms

Appendix B:

Worksheets and Quizzes

Appendix C:

Real-World Scenarios and Interactive Activities

Appendix D:

Assessment and Evaluation Rubrics



Applying the Order of Operations to Real-World Problems and Interactive Scenarios

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Order of operations, PEMDAS, real-world problems, interactive scenarios

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Index of Real-World Scenarios and Interactive Activities:

Scenario 1, Activity 1

Index of Assessment and Evaluation Rubrics:

Rubric 1, Rubric 2



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