Scientific Notation

Lesson Overview

In this lesson, students will use Socratic Seminar to discuss an article about Scientific Notation and will learn to convert numbers in standard form to scientific notation.

Standards Addressed

7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

Disciplinary Literacy Best Practices

Socratic Seminar
Gallery Walk
Exit Ticket

Lesson Plan

Time Required: One 60-minute Class Period

Disciplinary Vocabulary: scientific notation

Materials Needed:

- Highlighters
- Copies of article or access online (http://www2.franciscan.edu/academic/mathsci/mathscienceintegation/MathScienceIntegation-98.htm)
- Chart Paper and Markers

Assessment:

Exit Ticket

Engage

- Students are given the following prompt: "You are nearing the end of your payment period and only have one text left before you go over the limit! Shorten this message to your teacher so you won't exceed your limit. The shortest text wins a prize. Message: "Hello, Mrs. Walmsley, please help me! I don't know what time school starts tomorrow. I need to make sure I am on time! Thanks!"
- Students shorten the message to create the shortest text message possible. Abbreviations are okay. Students share their shortened messages.
- Discussion: if we shorten a message, we must do it in a way that is useful, easy to understanding or standard/universal. In mathematics, we often use abbreviations. One way we shorten math messages is using scientific notation.

Explore

- Students read the article on scientific notation (http://www2.franciscan.edu/academic/mathsci/mathscienceintegation/MathScienceIntegation-98.htm).
- Students highlight important information and write at least two questions they have about scientific notation on index cards.

Explain

- Students are seated in circles for a Socratic Seminar discussion. The questions identified during the reading are used to begin dialogue.
- Possible questions:
  - Why do we use scientific notation?
  - Who uses scientific notation?
  - What is the purpose of exponents?
  - What is meant by a power of 10?
  - How do we change really big or really small numbers to scientific notation?
- After dialogue, teacher will explain scientific notation:
  - Remember this number: 4690000 and start talking about this summer…
  - WHAT WAS THE NUMBER WE SHOWED EARLIER? 469000, 46900, or 4690000?(1min)

- We can simply move the decimal point to represent multiplying or dividing by a power of 10
- The decimal always comes after the first number that is not zero. Then we count how many times we moved the decimal point… that answer is our exponent!
- Answers are always written in the form _____x10
  - So 4690000 becomes 4.690000
  - We moved the decimal 6 places, so our exponent is 6.
  - 4.690000x10^6
  - Lastly, drop the unnecessary zeros (only keep if they are placeholders)
  - So 46,90000 is 4.69x10^6
- Is there a way to check it? From our background knowledge of exponents, we know 10^6 means 10x10x10x10x10x10 which is 1,000,000. What is 4.69 x 1,000,000?
- The mass of a proton is approximately 0.00000000000000000000000016726 grams
- Anyone remember that number? NOPE!
- Move the decimal behind the first non-zero. 00000000000000000000000001.6726
- How many times did you move the decimal? That's the exponent so 00000000000000000000000001.6726 x 10^24.
- Drop unnecessary zeroes. 1.6726 x 10^24. Check: 16726000000000000000. That's not what we started with! We need to have a small number, so that exponent should be a negative.
- 1.6726x10^-24
- So if it was a really small number the exponent should be _____. Big number should have a _____ exponent. (10min)

Extend

- With your team, write a story where someone would need either the number 17000000 or 0.0082 in scientific notation, correctly converting standard form to scientific notation.
- Share stories via gallery walk.

Exit Ticket: Convert 0.00043 to scientific notation

Teacher Biographical Information

Lesson Author:

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