# Just In Time Quick Check
## Standard of Learning (SOL) 7.1b

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**Strand:** Number and Number Sense

### Standard of Learning (SOL) 7.1b
*The student will compare and order numbers greater than zero written in scientific notation.*

### Grade Level Skills:
- Convert between numbers greater than 0 written in scientific notation and decimals.
- Compare and order no more than four numbers greater than 0 written in scientific notation.  Ordering may be in ascending or descending order.

## Just in Time Quick Check

## Just in Time Quick Check Teacher Notes

### Supporting Resources:
- VDOE Mathematics Instructional Plans (MIPS)
    - 7.1b - Scientific Notation (Word) / PDF Version
- VDOE Co-Teaching Mathematics Instruction Plans (MIPS)
    - 7.1b - Scientific Notation (Word) / PDF Version
- VDOE Algebra Readiness Formative Assessments
    - SOL 7.1b (Word) / PDF
- VDOE Algebra Readiness Remediation Plans
    - Beyond a Million (Word) / PDF
    - Index Card Game (Word) / PDF
    - Order Scientific Notation (Word) / PDF
    - Scientific Notation (Word) / PDF
- VDOE Word Wall Cards: Grade 7 (Word) | (PDF)
    - Scientific Notation
    - Comparing Numbers in Scientific Notation
- Other VDOE Resources
    - 7.1b – Scientific Notation [eMediaVA] [Slides 1 and 2]
- Desmos Activity
    - 7.1b – Scientific Notation

### Supporting and Prerequisite Supporting SOL:  6.2b, 5.2a, 5.2b

# SOL 7.1b - Just in Time Quick Check

1) Complete the table.

| Scientific Notation | Standard Notation |
|---|---|
| $3.21 \times 10^5$ | |
| $4.95 \times 10^{-3}$ | |
| | 1,540,000 |
| | 0.000206 |

2) Arrange the four numbers shown from least to greatest.

$$4.16 \times 10^{-2}, \quad 2.13 \times 10^3, \quad 3.02 \times 10^{-1}, \quad 2.62 \times 10^3$$

_____, _____, _____, _____

3) Arrange the numbers shown in descending order.

$$6.7 \times 10^5, \quad 8.2 \times 10^2, \quad 5.1 \times 10^6$$

_____, _____, _____, _____

4) Determine if the following statements are true or false.  Justify your reasoning for each statement.

| Statement | True or False | Justify Reasoning |
|---|---|---|
| $3.74 \times 10^4 < 3.3 \times 10^4$ | | |
| $6.1 \times 10^{-8} > 4.2 \times 10^{-5}$ | | |

1) Complete the table.

| Scientific Notation | Standard Notation |
|---|---|
| $3.21 \times 10^5$ | |
| $4.95 \times 10^{-3}$ | |
| | 1,540,000 |
| | 0.000206 |

*A common misconception students may have is thinking the exponent in scientific notation indicates the number of zeros in standard notation.  Another common misconception students may make is moving the decimal point the wrong direction or writing the opposite of the exponent. These misconceptions may indicate a need for a deeper understanding of powers of ten and multiplication of whole numbers and decimals. It may be helpful for teachers to guide students to rewrite the power of ten as a whole number or decimal number and then use multiplication to determine the equivalent standard notation. Students may also benefit from looking at patterns of powers of ten multiplied by the same factor. For example, $3.21 \times 10^0 = 3.21, 3.21 \times 10^1 = 32.1, 3.21 \times 10^2 = 321$ and so on.*

2) Arrange the four numbers shown from least to greatest.

$$4.16 \times 10^{-5}, \qquad 2.13 \times 10^3, \qquad 3.02 \times 10^{-4}, \qquad 2.62 \times 10^3$$

*A common misconception students may have is using the decimal numbers to order the numbers instead of looking at the exponents first. This may indicate that students have not yet developed an understanding of the relationship between scientific notation and standard notation.  A possible strategy to assist students in developing this relationship is to have students compare the exponents first and determine the correct order needed. Students would benefit from more practice converting numbers in scientific notation into standard notation; using the standard notation to compare; writing them back in scientific notation; and, then noticing patterns in the exponents once they are in order.*

*Another misconception students may have is treating all of the exponents as if they were positive and ordering the values accordingly.  Similar to the misconception above, students would benefit from converting the values to standard notation first and ordering them in standard notation.  Teachers may want to provide students with grid paper or a place value chart to ensure that students align the numbers by the appropriate place value in order to compare them. To use grid paper, stack each value in different rows and align the decimal points on one vertical line.*

3) Arrange the numbers shown in descending order.

$$6.7 \times 10^5, \qquad 8.2 \times 10^2, \qquad 5.1 \times 10^6$$

*A common misconception students may make is confusing the vocabulary words ascending and descending. If students list the values in order from least to greatest, it may indicate a need to revisit vocabulary. Consider exploring the words ascending and descending in a real world context such as when a plane takes off an ascends into the air and then descends to land.*

*A common misconception students may have is understanding the vocabulary associated with this standard (scientific notation and standard notation). Students may need more time developing the understanding that a number written in scientific notation is the product of two factors — a decimal greater than or equal to 1 but less than 10, and a power of 10. For example, students providing the scientific notation for 12,540,000 as 12,540 x 10^5 does not understand that the first term must be a decimal greater than or equal to 1 but less than 10.*

4) Determine if the following statements are true or false.  Justify your reasoning for each statement.

| Statement | True or False | Justify Reasoning |
|---|---|---|
| $3.74 \times 10^4 < 3.3 \times 10^4$ | | |
| $6.1 \times 10^{-8} > 4.2 \times 10^{-5}$ | | |

*Statement $3.74 \times 10^4 < 3.3 \times 10^4$: A common misconception students may have is thinking that 3.3 is less than 3.74 because there is one digit after the decimal compared to the two digits after the decimal in 3.74. Students may benefit from more practice comparing decimal numbers. Teachers are encouraged to refer to the Grade 6 Curriculum Framework (see SOL 6.2b). Teachers should provide students with grid paper or a place vale chart to ensure that numbers are aligned by the appropriate place value in order to compare them. Refer to the teacher notes for question 2, paragraph 2.*

*Statement $6.1 \times 10^{-8} > 4.2 \times 10^{-5}$: A common misconception students may have is thinking that -8 is greater than -5. This error may indicate a need to revisit comparing integers. Teachers are encouraged to refer to the Grade 6 Curriculum Framework (see SOL 6.3b).  Another misconception that students may make is comparing only the decimal portion of the two numbers in scientific notation thinking that the statement is true because 6.1 > 4.2.  This may indicate that students have not yet developed an understanding of the relationship between scientific notation and standard notation.  A possible strategy to assist students in developing this relationship is to have students compare the exponents first and determine the correct order needed. Refer to the teacher notes for question 2, paragraph 1.*