

Nanotechnology 5E Lesson Plan Template

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Topic: Nanotechnology	
Title: How big is a Nano?	Grade Level: 3, 4, 5, 6, and 7, 8 resource
Lesson Summary: The student will be able to put place value prefixes (on 3x 5 note cards) in numerical order based on the position in which they occupy in less than 2 minutes.	

Arkansas Math & Science Frameworks SLEs: NS 1.6.1 The learner will be able to verify the accuracy of observations M 2.7.3 The learner will be able to apply rules for order of operations to positive rational numbers including parenthesis, brackets, or <u>exponents</u> NO 1.5.3 The learner will be able to round and compare decimals to a given place value M 12.5.1 The learner will be able to identify and select appropriate units and tools of measurement. M 12.5.3 The learner will be able to establish through experience benchmark prefixes of milli, centi, and kilo.
Main SLE covered in this activity: M 2. 7.3 The learner will be able to apply rules for order of operation to positive (and negative) rational numbers including parenthesis, brackets, or exponents.
Objectives: The learner will 1) be able to correctly arrange metric system place value cards in order from largest to smallest 2) be able to look at the exponents and place cards in numerical order based on size 3) be able to navigate a website (www.nanozone.org) and look at pictures with specific measurements and put in correct order based on size. (nano, micro, and macro)
Essential Question: Can you put these pictures of microscopic organisms in order from greatest to smallest in 2 minutes?

<i>BACKGROUND INFORMATION</i>
Timeline: 2 class periods
Materials: 3 x 5 cards with metric prefixes and exponents 3 x 5 cards with only metric prefixes Computer Timer

Teacher Preparation:

The teacher needs to have the students watch a snip-it of the Price Is Right TV Show to get a “feel” of the sense of time and competition.

The teacher must prepare the 2 sets of cards.

The teacher will secure enough computers so the students can work individually or in pairs.

PROCEDURE**Engage:**

Watch a snip-it of The Price is Right TV game show in which contestants have to put objects’ prices in order within a given time limit. The teacher will also activate prior knowledge by reviewing what has previously been taught in place value.

Explore:

The students work in groups to challenge themselves to put the numbers with exponents (both positive and negative) in the correct order (ascending, descending, or both). They can time themselves to see how fast they can get the correct order. The students who need help could be placed with a partner.

Explain:

Once the cards are in order, the student (individual) or reporter (if in small groups) will explain the procedure used to determine the correct ranking. The teacher will review the metric system prefixes to be learned and ask students where they have heard these terms as part of other everyday words. The teacher will review exponent rules and check to be sure work is completed properly. For resource classrooms, the teacher can model how to put the cards in order based on the exponent.

Elaborate:

The teacher will discuss the uses of scientific notation in measuring large and small objects. The teacher will discuss why a standard measurement is used and why there are names for universal use. Teacher will discuss the IS units used by scientists around the world.

Evaluate:

Given a set of 3 x 5 note cards, the student will be asked to turn them face down and shuffle them. After shuffling, the student will fan out the cards, and choose one at a time and place in order by smallest to largest. The teacher will monitor to make sure the cards are in the correct order. (at this time words like smallest and largest can be discussed and the students can elaborate on words that might be a better choice). After this lesson, then the students can go to the computer to practice the game. The computer is self checking.

Note: For the first time the students should have the prefixes and the exponents on the card so they can place in order. For the second time the students would only need the prefixes to put in correct numerical order.

CROSS CURRICULAR CONNECTIONS

Math: exponents, and number value, size, scientific notation, ascending/descending order

Language Arts: vocabulary

Social Studies:

Other:

Parental Involvement:

Parent or volunteer can help make cards for the games.

Parent volunteers can videotape the segment of Price is Right where the contestant places objects in order based on price (number).

Technology Connections:

www.nanozone.org

Resources:

Notes:

Fruit or different sized balls can also be used; given a prefix, and put in order for those students who need concrete objects rather than abstract ideas.

Credits:

This lesson: X__ is original __ was adapted from _____'s original lesson.