



# **Interactive Session: Mathematics**

How well do mathematics activities  
align with content standards?



# Learning Goal: Equivalent Number Forms

Use, interpret, and compare numbers in several equivalent forms such as integers, fractions, decimals, and percent.

*Benchmarks for Science Literacy 12B 6-8 #2*



# Clarifying the Learning Goal



- *Science for All Americans*
- *Benchmarks for Science Literacy*
- Chapter 15: Research Base in *Benchmarks*
- NCTM's *Principles and Standards for School Mathematics*
- *Atlas of Science Literacy*



# Learning Goal:

## Equivalent Number Forms

Includes:

- Multiple meanings and models
- Comparing number forms
- Translating between number forms

Does not include:

- Formal solutions of “proportions” with cross multiplication
- Slope (not expressible in multiple forms)
- Similarity in geometric context
- Computations (e.g., adding fractions)



# Prerequisites to equivalent number forms



Students should understand :

- base ten place value.
- zero in relationship to decimal point.
- the fractional form.
- that a number can be written in more than one way.
- the relationship of parts to whole.



# Common student misconceptions related to equivalent number forms

- Multiplication makes larger/division diminishes
- $a/b + c/d$  is not usually equal to  $(a+c)/(b+d)$  or other “buggy algorithms”
- More digits implies a larger number
- If numerators are equal, the larger fraction is the one with the larger denominator
- There is no relationship between fractions and decimals
- Decimals and fractions must be changed from one representation to another within a problem



# Content Alignment Questions



- Does the activity address the key idea(s) of the learning goal or is there only a topical match?
- Does the activity reflect the level of sophistication of the learning goals or does the activity target a learning goal at an earlier or later grade level?
- Does the activity address the entire learning goal or only a part of the learning goal?



# Sample activity: Is it aligned?



During class, students consider whether a #10 auger bit (which is  $\frac{5}{8}$  of an inch wide) would be able to make a hole at least 0.7 inch wide. Then students are asked to find the ratio of the auger bit to the size of the hole needed.





# Sample activity: Is it aligned?



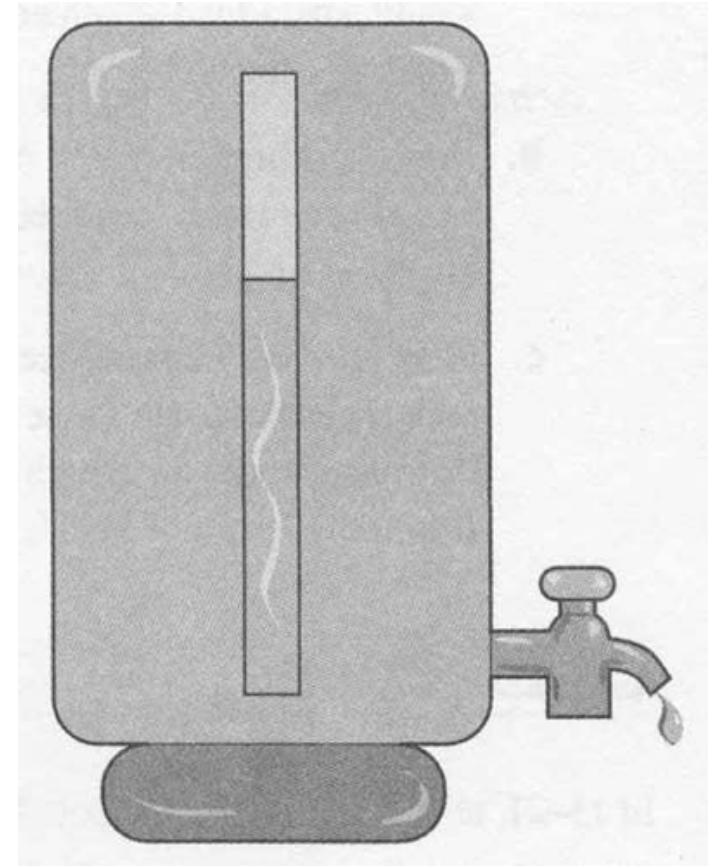
How many equal parts in a whole would I have if each part was a fifth?

# Sample activity: Is it aligned?



Students consider the amount of water in a office water cooler, as pictured. The gauge on the side of the container shows the amount of water remaining in the container. The full container holds 120 cups of water.

Students are asked: what fraction of the container is filled? How many cups of water are still in the container? What percentage of cups is missing from the cooler?





# Sample activity: Is it aligned?



Students find the decimal estimates for fractions using a visual model to help them understand that the same quantity can be represented with 2 different symbol systems. Students are asked to name two fractions whose decimal equivalent is 0.40. They are to explain their answer and draw a picture to explain their thinking.



# Sample activity: Is it aligned?



Write five thirds as a fraction.