

## **Title:** How Many Thousandths Are in Your Box?

**Grade level/course:** 7

**Time Frame:** ~65 minutes

### **Content Objectives:**

- Students will be able to represent decimal place values through hundredths using manipulatives.
- Students will be able to represent decimal place values through hundredths pictorially.
- Students will be able to compare and contrast place values using representations.
- Students will be able to order decimal numbers through hundredths.
- Students will justify their number representations using mathematical reasoning.

### **Language Objectives:**

- Students will use appropriate mathematical terminology to describe decimal numerals through hundredths
- Students will discuss comparisons of decimal place values using academic language and accountable talk.

### **Higher Order Thinking:**

- When students justify their representations, they have the potential to practice HOT
- When student compare and contrast, they have the potential to practice HOT
- When students critically analyze others' representations, they have the potential to practice HOT

### **Materials:**

- Base ten blocks
- 100 grid paper (see attached)
- Overhead projector
- Index cards
- Exit slip (see attached)

### **Background:**

Prior knowledge – Previous representation of place value blocks was limited to use with whole numbers.

### **Initiation:**

Teacher reminds students about use of base ten blocks and their previous use. Teacher tells students that tools can be used different ways; base ten blocks are tools. Today base ten blocks are being used in a new way to describe decimals. Teacher renames what base ten blocks stand for, showing 1 single block as a hundredth, a ten rod as a tenth, and a hundred flat as 1 whole.

**Procedures:**

1. Students working pairs (previously established norm in classroom). Teacher asks students to assign a team captain within each pair. That captain is in control of the manipulatives. Each pair is given 1 index card. Teacher reminds students that this is a decimal lesson and asks each pair to write 3 decimal numbers up to 2 decimal places (hundredths) on the index card.
2. Team captain is asked to come and get blocks that could be used to represent their 3 numbers. Each pair uses the blocks to represent their numbers. Each team prepares one number to share with the class.
3. Teacher calls up 1 pair at a time, the students write their number on the projector and then represent it using the materials – setting them on the overhead (the shapes should be visible if laid flat on the overhead screen). The pair explains their representation.
4. Using established classroom norms, the students in classroom critically evaluate presenters' pictorial representation and explanations. Students discuss and offer explanations for correction/disagree/agreement using statements like, "I disagree because..." (accountable talk).
5. Teacher questions presenters and class, focusing on place value comparisons and contrast. Example questions: "How many tenths are in that number?" "How many hundredths are in that number?" "How many hundredths are in --- (a digit in the ones or tenths place)?" "How do you know that?" "How many times bigger is the value of this digit than that digit?" "How many times bigger is this number than that number?" (getting at multiplicative reasoning) "How do you know?"
6. Process continues with each pair representing one of their numbers. Repeat process, as above.
7. As a class, Teacher asks students to represent decimal numbers using 100 grid paper (see attached)– coloring in numbers. For example: 2.62 and 2.6 Check students work for understanding of how to represent using the grid paper. [This might be a good opportunity to include a "check-point" for the students. A check-point could involve either having the teacher quickly check each student's representation and/or have partners check each other's work.]
8. Students given decimal numbers to compare. For example: 0.1; .12; Students asked to represent pictorially, as above. Teacher facilitates discussion comparing decimals. Example questions: "Which decimal is greater?" "How do you know?" At least one decimal pair should include equivalent decimals such as 2 versus 2.0 versus 2.00 or 2.1 versus 2.10 versus 2.100 to allow for discussion of equivalent decimals.

(This should be setting the stage for ordering decimals in a later lesson.)

**Closure:**

- Teacher will facilitate a discussion where students will reflect on what they have learned using mathematical terminology. Possible questions to ask:  
"What did you learn today?" "How did the place value blocks and pictures help you compare the decimal values?" "How could you compare decimals if you didn't have the models?"
- Students will complete exit slip (see assessment).

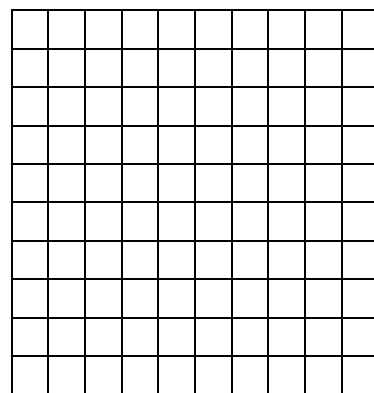
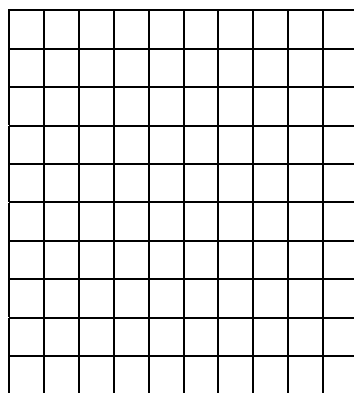
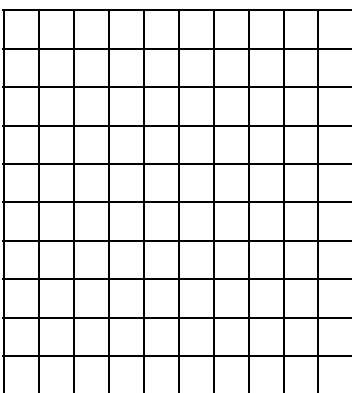
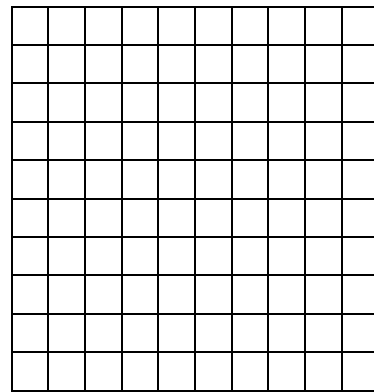
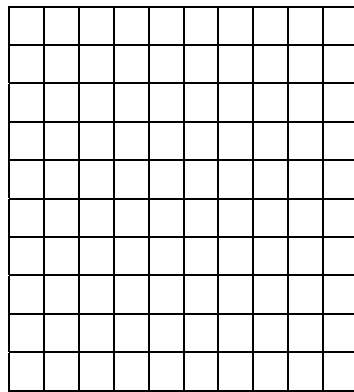
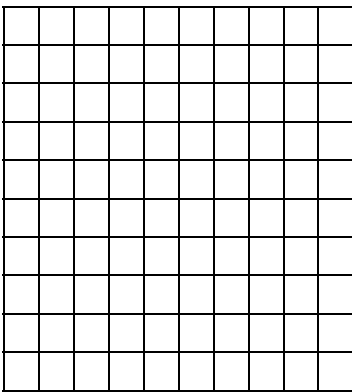
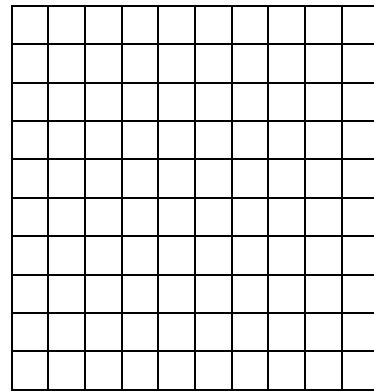
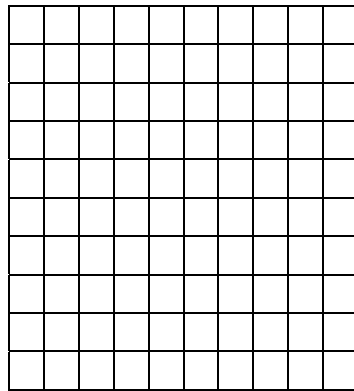
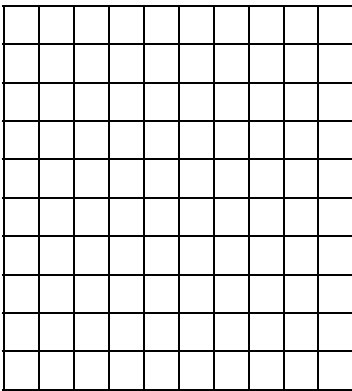
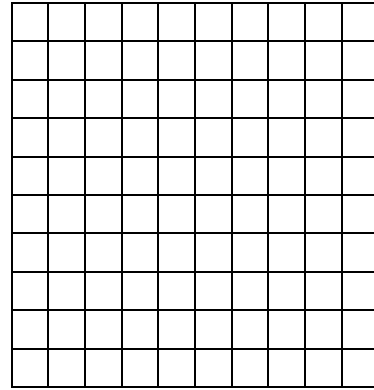
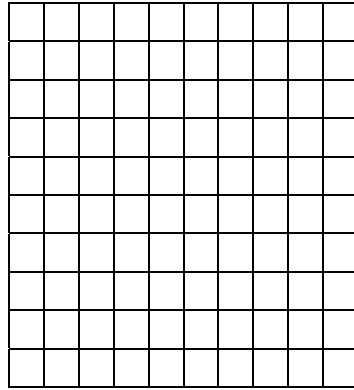
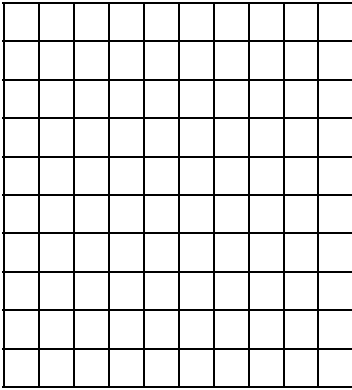
**Student Work Products:**

- Grid paper representations, exit slip, physical models

**Assessment:** Exit slip comparing decimals pictorially

**Differentiation:** Number differentiation, advanced numbers / pictures for those who have mastered content.

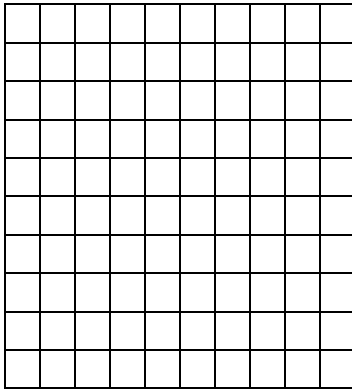
Use these grids to model decimal numbers.



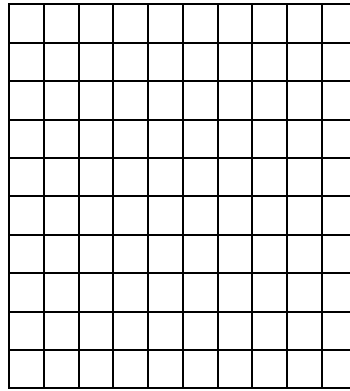
## EXIT SLIP

Use the grids to represent and compare each of the numbers.

0.1



0.12

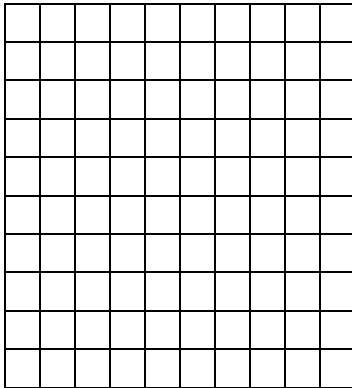


Is 0.1 greater than, less than, or equal to 0.12? \_\_\_\_\_

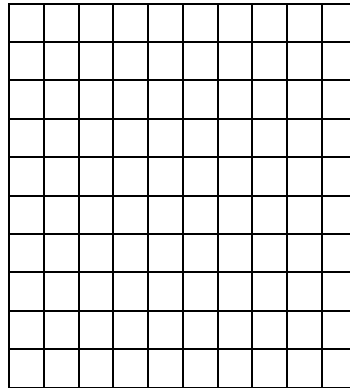
Explain your answer. \_\_\_\_\_

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0.7



0.70



Is 0.7 greater than, less than, or equal to 0.70? \_\_\_\_\_

Explain your answer. \_\_\_\_\_

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### Challenge:

Compare **0.67** with **0.674** *without pictures*.

Explain how you know which is greater. \_\_\_\_\_

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