

Place Value of Numbers to Thousandths.

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Differentiate and Assess

Not every student will be ready to investigate this concept at this Level and so we will need to differentiate to ensure every student is learning at their leading edge.

Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding.

Intervene

Some students may not yet be ready to investigate this concept at any Level, and so we will need to provide some intervention.

PLACE VALUE OF NUMBERS TO THOUSANDTHS.

EXPLICIT TEACHING PLAN OVERVIEW PAGE

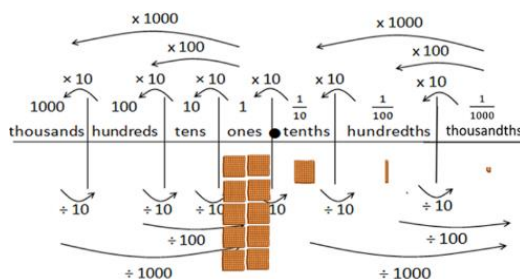
THIS PAGE IS A SUMMARY OF THE EXPLICIT TEACHING PLAN, INCLUDING STRATEGIC QUESTIONS, AND DESCRIBING THE SEQUENCE WHICH WILL OCCUR OVER MULTIPLE LESSONS.

RESOURCES: PLAYING CARDS, PENCIL, PAPER

WHAT COULD WE DO?

Children:

- create thousandths by dividing a hundredth by 10, identifying that if we multiply a thousandth by 10 we get a hundredth, if we multiply a thousandth by 100 we get a tenth, and if we multiply a thousandth by 1000 we get 1, if we divide 1 by 1000 we get a thousandth, if we divide a tenth by 100 we get a thousandth, for example,



- describe numbers to thousandths using standard and non-standard place value, recording as decimals and fractions, for example,

$$15.627 = 1 \text{ ten} + 5 \text{ ones} + 6 \text{ tenths} + 2 \text{ hundredths} + 7 \text{ thousandths}$$

$$15.627 = 1 \text{ ten} + 5 \text{ ones} + \frac{6}{10} + \frac{2}{100} + \frac{7}{1000}$$

$$15.627 = 14 \text{ ones} + 16 \text{ tenths} + 1 \text{ hundredth} + 17 \text{ thousandths}$$

$$15.627 = 14 \text{ ones} + \frac{16}{10} + \frac{1}{100} + \frac{17}{1000}$$

WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

Children

- ask one another questions about place value to thousandths, for example:
 - ▶ If we divide our hundredth by 10, what fraction will we get?
 - ▶ How many of these parts will we need to make 1?
 - ▶ Will we need 1000 to make one?
 - ▶ If we need 1000 to make one, what fraction is this part?
 - ▶ Is this part a thousandth?
 - ▶ If we multiply a thousandth by 1000, will we get 1?
 - ▶ If we divide 1 by 1000, will we get a thousandth?
 - ▶ If we multiply a thousandth by 100, will we get a tenth?
 - ▶ If we divide a tenth by 100, will we get a thousandth?
 - ▶ How could we describe 15.627 using standard place value?
 - ▶ Could we describe 15.627 using standard place value as 7 ones and 6 tenths and 0 hundredths and 3 thousandths?
 - ▶ How could we describe 15.627 using non-standard place value?
 - ▶ Could we describe 15.627 as 14 ones + 16 tenths + 1 hundredth + 17 thousandths?
 - ▶ Could we record our decimals as fractions?

PLACE VALUE OF NUMBERS TO THOUSANDTHS.

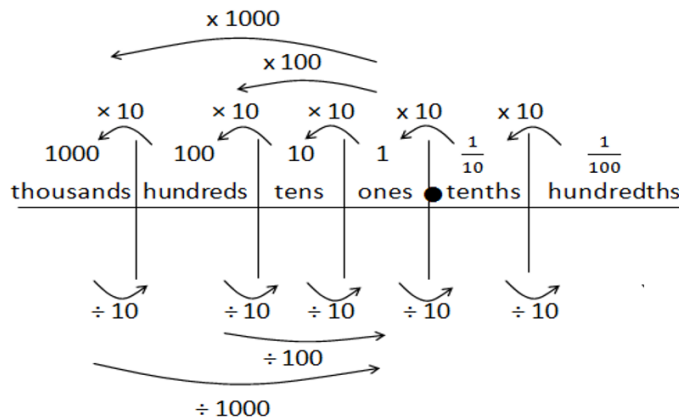
EXPLICIT TEACHING PLAN

FULL EXPLICIT TEACHING PLAN, EMBEDDING DEEP RELATIONAL UNDERSTANDING, METALANGUAGE, AND QUESTIONS THAT MAY BE USED OVER MULTIPLE LESSONS.

WHAT COULD WE DO?

Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.

Display a place value chart to hundredths, for example,



Have children make a tower from 10 connecting cubes, for example,



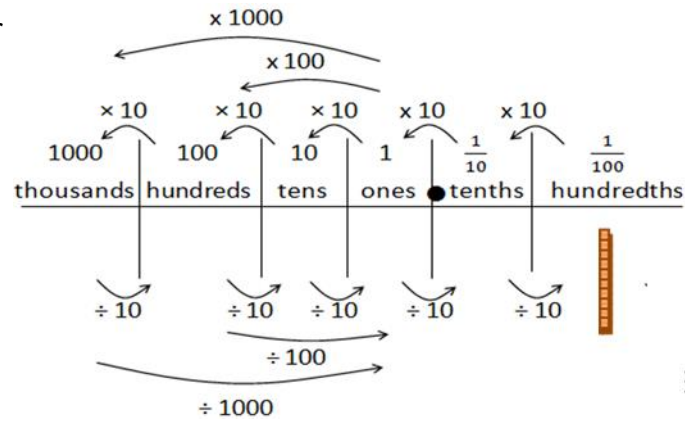
WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?

- ▶ Today brings an investigation about place value.
- ▶ What do you know about place value?
- ▶ Talk about place value with a friend.
- ▶ Is anyone ready to share what they are thinking about place value?

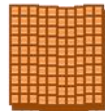
- ▶ We've investigated additive and multiplicative place value to hundredths.
- ▶ **Today we're going to investigate another value in our multiplicative place value chart!**
- ▶ Let's start by recording a place value chart to hundredths.

- ▶ Here we have 1 tower.
- ▶ What value could we give our tower?
- ▶ Could we give our tower any value?

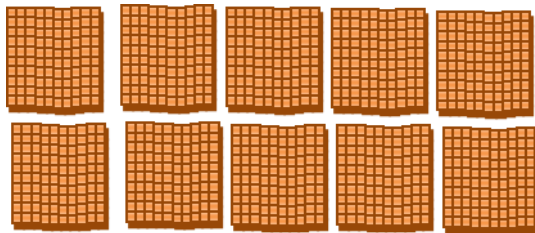
Children place their tower in their hundredths column, for example,



Collect 10 children's towers to demonstrate what a tenth would look like, for example,



Hold up the 10 hundredths – the tenth, to allow children to visualise what 1 will look like – 10 tenths

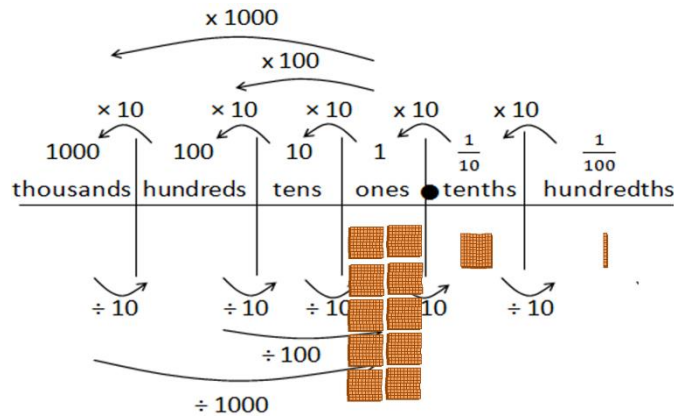



► Could we give our tower the value of a hundredth?

- If this tower has a value of hundredth, what will a tenth look like?
- Will a tenth be 10 times bigger?
- Will a tenth be 10 hundredths?

- If this tower has a value of hundredth, what will one look like?
- Will one be 100 of these towers?
- Will one be 100 times bigger?
- Will one be 100 hundredths?

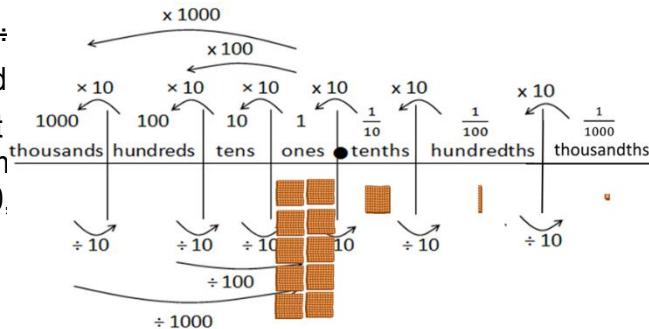
Display the place value chart demonstrating that we divide by 10 to get the value of the column on the right, and demonstrating the hundredth, the tenth and the one, for example,



Hold up a cube, identifying that we have divided the hundredth by 10 to get it, for example, 

Display the place value chart demonstrating the cube is 1000th as big as 1, that we will need 1000 cubes to make 1.

Record an arrow and \div and $\frac{1}{1000}$ or thousand the column to the right the hundredths column and an arrow and $\times 10$, example,



► So we have given the tower a value of a hundredth.

► If we divided our hundredth by 10, what fraction will we get?

► How many of these cubes will we need to make 1?

► Will we need 1000 to make one?

► If we need 1000 to make one, what fraction is this cube?

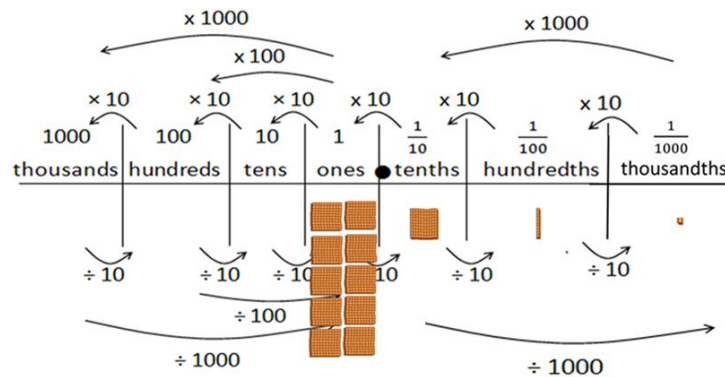
► Is this cube 1 thousandth as big as 1?

► Is this cube 1 thousandth?

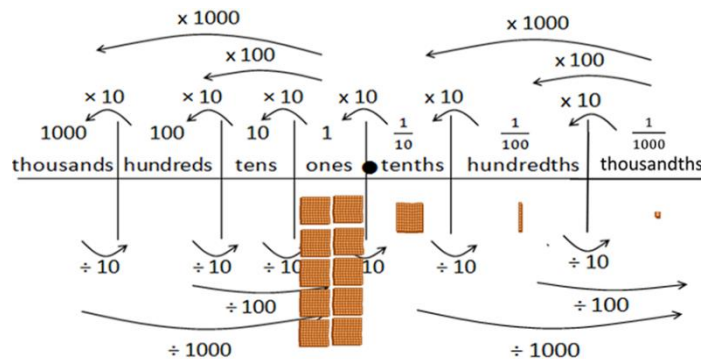
► So if we divide a hundredth by 10, will we get a thousandth?

► If we multiply a thousandth by 10, will we have a hundredth?

Record an arrow going from the thousandths column to the ones column and $\times 1000$ above it, and an arrow going from the ones column to the thousandths column and $\div 1000$ under it, for example,



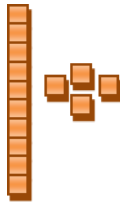
Record an arrow going from the thousandths column to the tenths column and $\times 100$ above it, and an arrow going from the tens column to the thousandths column and $\div 100$ under it, for example,



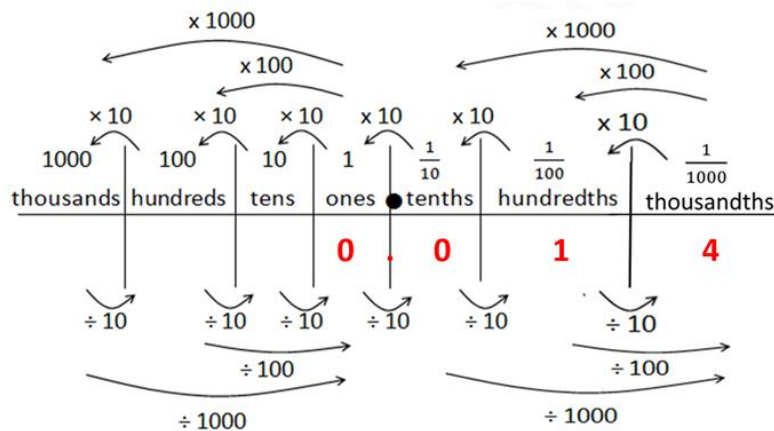
- ▶ What is the value of the column to the right of the hundredths column?
- ▶ Is the value of the column to the right of the hundredths column, thousandths because we need 1000 of them to make 1?
- ▶ If we multiply 1 thousandth by 1000, will we have 1?
- ▶ If we divide 1 by 1000, will we have 1 thousandth?
- ▶ Are fractions named by their relationship to 1?

- ▶ What if we multiply a thousandth by 100?
- ▶ Is a thousandth times 100, a tenth?
- ▶ Is a tenth divided by 100, a thousandth?

Children collect 14 connecting cubes and join 10 into a tower of 10, and leave the remaining 4 as ones, for example,



Record 1 hundredth and 4 thousandths, and zero tenths and zero ones in a place value chart, for example,



Record, for example, 0.014

► **Let's investigate recording numbers to thousandths using standard and non-standard place value.**

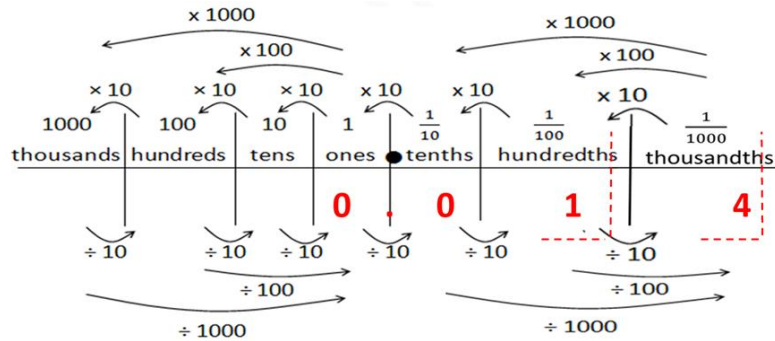
- Please collect 14 cubes and group them using place value into towers of 10 and individual ones.
- What value could we give the tower?
- Could we give our tower any value?
- Let's give our tower the value of a hundredth.
- If the tower has the value of a hundredth, what is the value of one cube?
- Is the value of one cube, a thousandth?
- How many hundredths do we have?
- Do we have 1 hundredth?
- Let's record that we have 1 hundredth in the hundredths column.
- How many thousandths do we have?
- Do we have 4 thousandths?
- Let's record that we have 4 thousandths in the hundredths column.
- Do we have any tenths?
- Let's record that we have 0 tenths.
- Do we have any ones?
- Let's record that we have zero ones.

- How could we record this number without the place value chart?
- Would we record this number as zero point zero one four?
- What does the decimal point tell us?
- Does the decimal point tell us where the ones column is?

Record, for example, $0.014 = 1 \text{ hundredth} + 4 \text{ thousandths}$

Record, for example, $0.014 = \frac{1}{100} + \frac{4}{1000}$

Children record a dotted line going from the 1 to the hundredths label, and from the 4 to the thousandths label, for example,



Record $0.014 = 14 \text{ thousandths}$

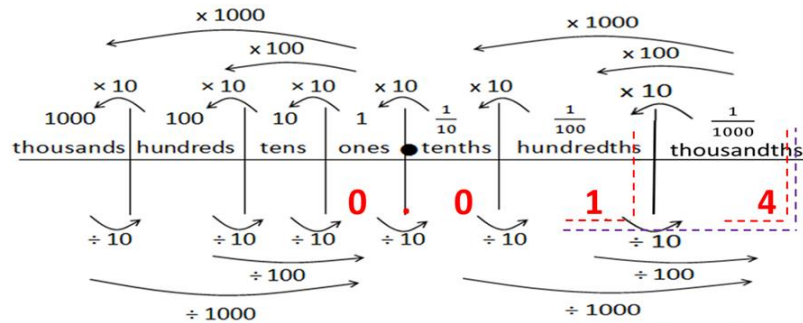
Record, for example, $0.014 = \frac{14}{1000}$

- ▶ If we know where the ones column is, can we work out the value of every other column?
- ▶ How could we describe 0.014 using standard place value?
- ▶ What is the value of the 1?
- ▶ Is the value of the 1, 1 hundredth?
- ▶ What is the value of the 4?
- ▶ Is the value of the 4, 4 thousandths?
- ▶ Could we describe 0.014 using standard place value as 1 hundredth and 4 thousandths?
- ▶ Could we record our decimals as fractions?
- ▶ Do we have 2 ways to record fractions?

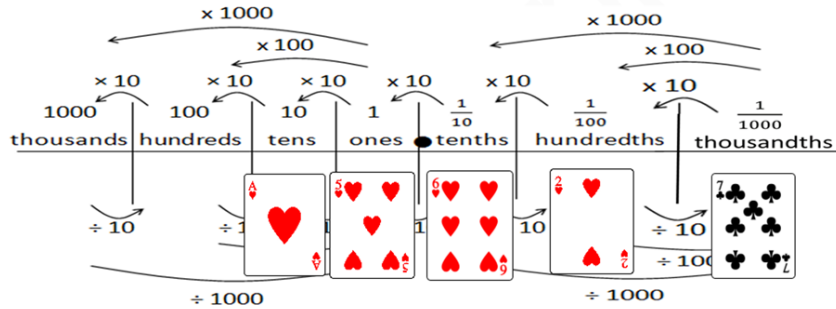
- ▶ Let's look at the place value chart.
- ▶ Can you see the 1 hundredth?
- ▶ Can you see the 4 thousandths?

- ▶ How could we describe 0.014 using non-standard place value?
- ▶ Could we describe 0.014 as 14 thousandths?

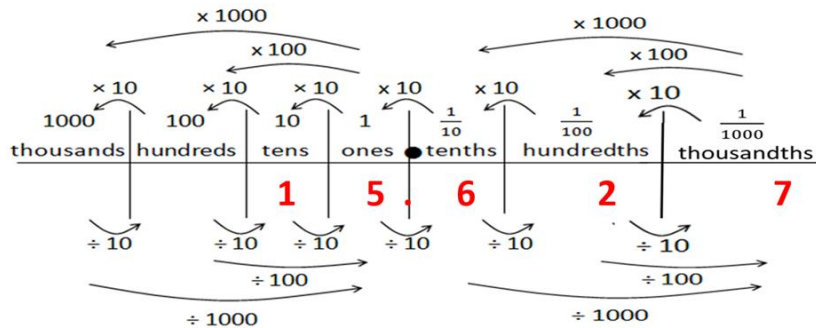
Children record a dotted line going from the 1 to 4 and up to the thousandths label, for example,



Children select cards and place them in the place value chart, for example,



Children record, 1 ten + 5 ones + 6 tenths + 2 hundredths + 3 thousandths, for example,



- ▶ Let's look at the place value chart.
- ▶ Can you see the 14 thousandths?

- ▶ Please select cards and place them in the place value chart with one of them in the thousandths column.

- ▶ What number have we made?
- ▶ Have we 15 point 6 2 7?

- ▶ How many tens do we have?
- ▶ Do we have 1 ten?
- ▶ Let's record that we have 1 ten in the ones column.
- ▶ How many ones do we have?
- ▶ Do we have 5 ones?
- ▶ Let's record that we have 5 ones in the ones column.
- ▶ How many tenths do we have?

Record, for example, 15.627

*The decimal point
can't move! It tells us
where the ones column
is, so it is always after
the ones place.*

Record, for example, $15.627 = 1 \text{ ten} + 5 \text{ ones} + 6 \text{ tenths} + 2 \text{ hundredths} + 7 \text{ thousandths}$

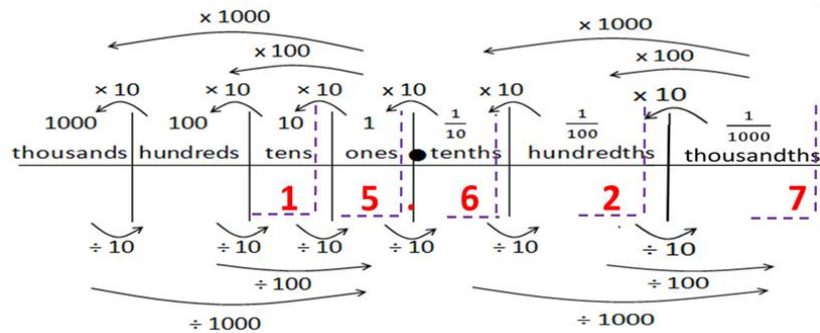
Record, for example, $15.627 = 1 \text{ ten} + 5 \text{ ones} + \frac{6}{10} + \frac{2}{100} + \frac{7}{1000}$

- ▶ Do we have 6 tenths?
- ▶ Let's record that we have 6 tenths in the tenths column.
- ▶ How many hundredths do we have?
- ▶ Do we have 2 hundredths?
- ▶ Let's record that we have 2 hundredths in the hundredths column.
- ▶ How many thousandths do we have?
- ▶ Do we have 7 thousandths?
- ▶ Let's record that we have 7 thousandths in the thousandths column.

- ▶ Could we record our number as 15.627?
- ▶ What does the decimal point tell us?
- ▶ Does it tell us where the ones column is?
- ▶ If we know where the ones column is, can we work out the value of every other column?

- ▶ How could we describe 15.627 using standard place value?
- ▶ Could we describe 15.627 using standard place value as 1 ten and 5 ones and 6 tenths and 2 hundredths and 7 thousandths?
- ▶ Can we record our decimals as fractions?
- ▶ Do we have 2 ways to record fractions?

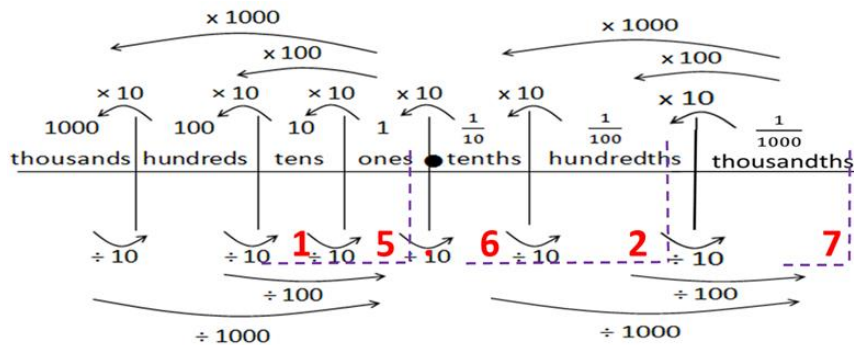
Children record a dotted line going from the 1 to the tens label, 5 to the ones label, the 6 to the tenths label, the 2 to the hundredths label, and from the 7 to the thousandths label, for example,



Record, for example, $15.627 = 15 \text{ ones} + 62 \text{ hundredths} + 7 \text{ thousandths}$

Record, for example, $15.627 = 15 \text{ ones} + \frac{62}{100} + \frac{7}{1000}$

Record a dotted line going from the 7 to 6 and up to the tenths label, and under the 3 and up to the thousandths label, for example,



- ▶ Let's look at the place value chart.
- ▶ Can you see the 1 ten?
- ▶ Can you see the 5 ones?
- ▶ Can you see the 6 tenths?
- ▶ Can you see the 2 hundredths?
- ▶ Can you see the 7 thousandths?
- ▶ $15 \text{ ones} + 62 \text{ hundredths} + 7 \text{ thousandths}$

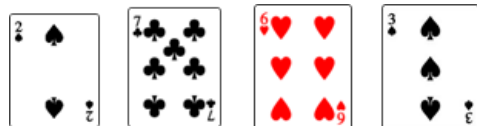
- ▶ How could we describe 15.627 using non-standard place value?
- ▶ Could we describe 15.627 as 15 ones + 62 hundredths + 7 thousandths?
- ▶ Could we record our decimals as fractions?

- ▶ Let's look at the place value chart.
- ▶ Can you see the 15 ones?
- ▶ Can you see the 62 hundredths?
- ▶ Can you see the 7 thousandths?

Record, for example, $15.627 = 14 \text{ ones} + 16 \text{ tenths} + 1 \text{ hundredth} + 17 \text{ thousandths}$

Record, for example, $15.627 = 14 \text{ ones} + \frac{16}{10} + \frac{1}{100} + \frac{17}{1000}$

Children select 4 cards to make a number with ones, tenths, hundredths and thousandths, for example,



Record, for example, 2.763

Record, for example, $2.763 = 2 \text{ ones} + 7 \text{ tenths} + 6 \text{ hundredths} + 3 \text{ thousandths}$

Record, for example, $2.763 = 2 + \frac{7}{10} + \frac{6}{100} + \frac{3}{1000}$

- ▶ How could we describe 15.627 using non-standard place value?
- ▶ Could we describe 15.627 as 14 ones + 16 tenths + 1 hundredth + 17 thousandths?
- ▶ Could we record our decimals as fractions?

- ▶ Let's look at the place value chart.
- ▶ Can we see the 14 ones + 16 tenths + 1 hundredth + 17 thousandths in the place value chart, or do we have to mentally see the place values flexibly to see 14 ones + 16 tenths + 1 hundredth + 17 thousandths?

- ▶ **Let's investigate how we can record numbers to thousandths using standard and non-standard place value without drawing a place value chart.**
- ▶ Please select 4 cards and make a number with ones, tenths, hundredths and thousandths.
- ▶ Let's record our number.
- ▶ What number have we made?
- ▶ Have we made two point seven six three?

- ▶ How could we record two point seven six three using standard place value?
- ▶ Could we record two point seven six three using standard place value as 2 ones and 7 tenths and 6 hundredths and 3 hundredths?
- ▶ Could we record our decimals as fractions?

Record, for example, $2.763 = 27 \text{ tenths} + 4 \text{ hundredths} + 23 \text{ thousandths}$

$$\text{Record, for example, } 2.763 = \frac{27}{10} + \frac{4}{100} + \frac{23}{1000}$$

Record, for example, $2.763 = 1 \text{ one} + 126 \text{ hundredths} + 503 \text{ thousandths}$

$$\text{Record, for example, } 2.763 = 1 \text{ one} + \frac{126}{100} + \frac{503}{1000}$$

- ▶ How could we record two point seven six three using non-standard place value?
- ▶ Could we record two point seven six three using non-standard place value as 27 tenths and 4 hundredths and 23 thousandths?
- ▶ Could we record our decimals as fractions?

- ▶ Could we record two point seven six three using non-standard place value as 226 hundredths and 503 thousandths?
- ▶ Could we record our decimals as fractions?