Simplifying Multiplication and Division using Factors.

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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. Select the Differentiate button on this screen.

Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding. Select the Integrate button on this screen.

Intervene

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

SIMPLIFYING MULTIPLICATION AND DIVISION USING FACTORS.

EXPLICIT TEACHING PLAN OVERVIEW PAGE

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

RESOURCES: PLAYING CARDS,PENCIL, PAPER

WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
Children: • divide numbers by a common factor to simplify a division calculation, for example, 144 ÷ 8 = 72 ÷ 4 = 36 ÷ 2 = 18 • • identify the equivalent division number sentences, for example, 144 ÷ 8 = 72 ÷ 4 = 36 ÷ 2 = • create equivalent multiplication number sentences, for example, 16 x 4 = 32 x 2	Children • ask one another questions about simplifying division and multiplication, for example: ▸ How could we divide 144 by 8? ▸ Do 144 and 8 have any common factors? ▸ Is 2 a common factor of 144 and 8? ▸ Could we divide both numbers by 2 to simplify the calculation? ▸ Could we divide 72 and 4 by 2 to continue to simplify the calculation? ▸ What is 36 divided by 2? ▸ How could we describe 144 divided by 8, 72 divided by 4 and 36 divided by 2? ▸ Are 144 divided by 8, 72 divided by 4 and 36 divided by 2 all equivalent number sentences? ▸ Did we create equivalent number sentences by dividing each number by a common factor? • How could we create equivalent multiplication number sentences?

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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?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.	▸ Today brings an investigation about using common factors to divide. ▸ What do you know about using common factors to divide? ▸ Talk about using common factors to divide with a friend. ▸ Is anyone ready to share what they are thinking about using common factors to divide?
	▸ We've investigated highest common factors. ▸ And we found that the highest common factor is the highest number that is a factor of more than 1 number.
	▸ **Today we're going to investigate how we can make division simpler if we divide both numbers by a common factor.**
Display a division number sentence, for example, 144 ÷ 12 =	▸ Let's record a division number sentence, 144 divided by 12. ▸ Let's look at our division number sentence. ▸ Could we make our division simpler by dividing both numbers by a common factor? ▸ Let's find the common factors of 144 and 12.
Record, for example, factors of 12: 1, 12, 2, 6, 4, 3	▸ What are the factors of 12? ▸ Are the factors of 12, 1, 12, 2, 6, 4 and 3

	▶ We're investigating divisibility tests. ▶ Let's use what we've found to work out if any of our our factors of 12 are factors of 144.
Record, for example, factors of 144: 1, 144, 2	▶ Is 2 a factor of 144? Is 144 even?
Record, for example, factors of 144: 1, 144, 2, 3	▶ Is 3 a factor of 144 – is 144, 99 plus 45? Are both 99 and 45 multiples of 3?
Record, for example, factors of 144: 1, 144, 2, 3, 4	▶ Is 4 a factor of 144 – is 144, 100 plus 44? Are both 100 and 44 multiples of 4? ▶ Is 6 a factor of 144 – is 144, 120 plus 24? Are both 120 and 24 multiples of 6?
Record, for example, factors of 144: 1, 144, 2, 3, 4, 6	▶ So all of the factors of 12 are also factors of 144.
	▶ Which factor shall we divide both numbers by to simplify our division? ▶ Let's divide both numbers by 4. ▶ Is 144 divided by 4, 100 divided by 4, plus 44 divided by 4, which equals 25 plus 11 which equals 36? ▶ Is 12 divided by 4, 3? ▶ Have we created an equivalent number sentence? ▶ Will 36 divided by 3 be equal to 144 divided by 12?
Divide both numbers by 4, for example, 144 ÷ 12 = 36 ÷ 3 =	▶ Are 144 divided by 12 and 36 divided by 3 equivalent number sentences?
	▶ Let's look at our equivalent number sentence. ▶ Do we know what 36 divided by 3 is?
Divide by 3, for example, 144 ÷ 12 = 36 ÷ 3 = 12	▶ Is 36 divided by 3, 30 divided by 3 plus 6 divided by 3, which equals 10 plus 2 which equals 12? ▶ If we divide by 4, then we divide by 3, have we divided by 12? ▶ Did we make our division simpler by dividing both numbers by a common factor?

Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.	► **Today brings an investigation about using common factors to create equivalent number sentences.** ► What do you know about using common factors to create equivalent number sentences? ► Talk about using common factors to create equivalent number sentences with a friend. ► Is anyone ready to share what they are thinking about using common factors to create equivalent number sentences?
	► Let's investigate how we can use common factors to create equivalent multiplication number sentences. ► Let's select a multiplication number sentence, for example 16 times 4.
Record, for example, 16 x 4 =	► How could we make this multiplication number sentence simpler? ► Is multiplying by 2 simpler than multiplying by 4? ► If we have four 16s, how many 32s will we have?
Record, for example, 16 x 4 = 32 x 2	► Will we have two 32s? ► Is 2 times 32 simpler than 4 times 16? ► Do we need half as many 32s as 16s because 32 is twice as large as 16? ► Do we need two times as many 16s as 32s because 16 is half as large as 32? ► Have we created equivalent multiplication number sentences? ► What did we do to 16 times 4 to make an equivalent number sentence? ► Did we divide one number by 2 and multiply the other number by 2?