

Elementary Mathematics Methods

Video Guide Sheet

Numeration: Fractions

Focus

- Whole Number Times Simple Proper Fraction

Concepts To Think About

- When modeling fractions, it is very important to identify the whole first so that fractional parts can be accurately identified.

Vocabulary

- Fraction – An expression that indicates the quotient of two quantities, such as $\frac{1}{3}$
- Whole – Not divided or disjointed; in one unit

Tools

- pink fraction rods and blue rods

Process

- Problem: $6 \times \left(\frac{1}{4}\right) = 1 \left(\frac{1}{2}\right)$
- Identify the whole first so that fractional parts can be accurately identified.
- The learner places the pink fraction rod and identifies it as the whole.
- The blue fraction rods show the whole in four parts; each part is a fourth.
- The learner represents $6 \times \left(\frac{1}{4}\right)$ (six times one-fourth) so that there are 6 sets with $\frac{1}{4}$ in each set.
- By connecting the fourths and comparing them to the whole, $6 \times \left(\frac{1}{4}\right)$ results in one whole and one-half of a whole.
- $6 \times \left(\frac{1}{4}\right) = 1 \left(\frac{1}{2}\right)$ (six times one fourth equals one and one-half).

Try Another Example

- Using fraction rods, follow the process presented in the video to explore $4 \times \left(\frac{1}{3}\right)$.

Elementary Mathematics Methods

Video Guide Sheet

Numeration: Fractions

Focus

- Simple Proper Fraction Times Whole Number

Concepts To Think About

- When modeling fractions, it is very important to identify the whole first so that fractional parts can be accurately identified.
- The first factor tells how many sets.

Vocabulary

- Fraction – An expression that indicates the quotient of two quantities, such as $\frac{1}{3}$
- Whole – Not divided or disjoined; in one unit
- Factors – the multiplier and the quantity being multiplied are both factors. In $m \times q$, the factors are m and q .

Tools

- fraction circles

Process

- Problem: $(\frac{1}{3}) \times 4 = 1(\frac{1}{3})$
- The learner places one white fraction circle and identifies it as the whole.
- Then shows the whole in three parts; each part is a third.
- This demonstrates $(\frac{1}{3}) \times 4$ (one third times four); an example of a simple proper fraction times a whole number.
- The first factor tells how many sets, so $(\frac{1}{3})$ means that we only want $\frac{1}{3}$ of a set of four.
- The learner shows four wholes and four wholes with each whole in thirds.
- Because we only want $\frac{1}{3}$ of four, we can remove $\frac{2}{3}$ from each whole that makes up four and be left with $\frac{1}{3}$ of the wholes that make up four.
- That represents $\frac{1}{3}$ of four, the third fraction pieces can be placed together and compared to the whole.
- The result of $(\frac{1}{3}) \times 4$ is four thirds or $1(\frac{1}{3})$ (one and one-third).

Try Another Example

- Using fraction circles, follow the process presented in the video to explore $(\frac{1}{4}) \times 2$.

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Numeration: Fractions

Focus

- Simple Proper Fraction Times a Simple Proper Fraction

Concepts To Think About

- When modeling fractions, it is very important to identify the whole first so that fractional parts can be accurately identified.

Vocabulary

- Fraction – An expression that indicates the quotient of two quantities, such as $1/3$
- Whole – Not divided or disjoined; in one unit

Tools

- fraction squares

Process

- Problem: $(2/3) \times (3/4) = 1/2$
- The learner places a square from a set of fraction squares and identifying it as the whole.
- The whole is shown in two parts; each part is a half.
- The whole is shown in four parts; each part is a fourth.
- We are interested in not a whole set of $3/4$, but only $2/3$ of a set of $3/4$.
- Show $3/4$.
- Note that $3/4$ is made up of three parts already and the interest is in two of those parts.
- Compare the two parts of three-fourths back to the whole and it shows that the two parts is one-half.
- So $2/3 \times 3/4 = 2/4$ or $1/2$.

Try Another Example

- Using fraction squares, follow the process presented in the video to explore $(1/2) \times (2/4)$.

Elementary Mathematics Methods Video Guide Sheet

Numeration: Fractions

Focus

- Simple Proper Fraction Times a Simple Proper Fraction (repeat)

Concepts To Think About

- When modeling fractions, it is very important to identify the whole first so that fractional parts can be accurately identified.

Vocabulary

- Fraction – An expression that indicates the quotient of two quantities, such as $1/3$
- Whole – Not divided or disjoined; in one unit

Tools

- fraction circles

Process

- Problem: $(2/3) \times (3/4) = 1/2$
- The learner places a circle from a set of fraction circles and identifies it as the whole.
- The whole is shown in two parts; each part is a half.
- The whole is shown in four parts; each part is a fourth.
- We are interested in only $2/3$ of a set of $3/4$.
- Show $3/4$.
- Note that $3/4$ is made up of three parts already and the interest is in two of those parts.
- The two parts of three-fourths are compared to the whole and it shows that the two parts is one-half.
- So $2/3 \times 3/4 = 2/4$ or $1/2$.
- This is an example of a simple proper fraction times a simple proper fraction.

Try Another Example

- Using fraction squares, follow the process presented in the video to explore $(1/3) \times (3/5)$.

Elementary Mathematics Methods

Video Guide Sheet

Numeration: Fractions

Focus

- Whole Number divided by a Simple Proper Fraction

Concepts To Think About

- Recall that there are two types of division: measurement and partition.
- When modeling fractions, it is very important to identify the whole first so that fractional parts can be accurately identified
- Measurement division always asks “how many sets are there?”.

Vocabulary

- Fraction – An expression that indicates the quotient of two quantities, such as $1/3$
- Whole – Not divided or disjointed; in one unit

Tools

- fraction circles

Process

- Problem: $3 \div (2/3) = 4 (1/2)$
- The learner places a whole from the set of fraction circles.
- The learner shows the whole in three parts.
- By taking $1/3$ away, the learner models $2/3$.
- Consider 3 divided by $2/3$. This can be best be interpreted through measurement division: how many sets of $2/3$ are there in 3 or how many sets of $2/3$ can 3 be divided into.
- The learner shows 3 wholes and filling each whole with thirds.
- Now we can determine how many $2/3$ there are in the set of 3.
- Note that the learner makes as many $2/3$ as possible.
- The result is that there are 4 sets of $2/3$ with one piece left.
- Compare it to the divisor of $2/3$ and that determines that it is one half of $2/3$.
- So $3 \div (2/3) = 4(1/2)$ (three divided by $2/3$) = 4(1/2) (four and one half).

Try Another Example

- Using fraction circles, follow the process presented in the video to explore $4 \times (2/5)$.

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Numeration: Fractions

Focus

- Simple Proper Fraction divided by a Whole Number

Concepts To Think About

- When modeling fractions, it is very important to identify the whole first so that fractional parts can be accurately identified
- Partition division always asks “how many objects are there in each set?”.

Vocabulary

- Fraction – An expression that indicates the quotient of two quantities, such as $1/3$
- Whole – Not divided or disjointed; in one unit

Tools

- fraction rods

Process

- Problem: $(3/5) / 2 = 3/10$
- The learner is showing the whole represented by a fraction rod and also the whole in five parts; each part is a fifth.
- Now the learner displays $3/5$.
- Three-fifths divided by 2 can be demonstrated by asking a partition division question: “If $3/5$ is divided into 2 groups, what is in each group?”
- However, $3/5$ is made up of 3 parts that cannot be evenly partitioned into two groups.
- The whole can also be shown in 10 equal parts; each part is a tenth.
- $3/5$ is equivalent to $6/10$, which is made up of 6 parts that can be evenly partitioned to two groups.
- This shows that $3/5$ divided by 2 is equivalent to $6/10$ divided by 2 can be determined by showing $6/10$ in two equal sets.
- $(6/10) / 2 = 3/10$ so $(3/5) / 2 = 3/10$.
- This is an example of a simple proper fraction divided by a whole number.

Try Another Example

- Using fraction circles, follow the process presented in the video to explore $(2/5) / 4$.

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Numeration: Fractions

Focus

- Simple Proper Fraction divided by a Simple Proper Fraction

Concepts To Think About

- When modeling fractions, it is very important to identify the whole first so that fractional parts can be accurately identified

Vocabulary

- Fraction – An expression that indicates the quotient of two quantities, such as $1/3$
- Whole – Not divided or disjointed; in one unit

Tools

- fraction rods

Process

- Problem: $(3/4) / (2/12) = 4(1/2)$
- The learner shows the whole.
- Then the learner shows the whole in four parts.
- $3/4$ can be modeled by removing one fourth.
- What is $3/4$ divided by $2/12$?
- The question can be asked this way “how many $2/12$ are there in $3/4$?”
- The learner first shows the whole in 12 parts, then the learner shows that $3/4$ is equivalent to $9/12$.
- Now it can be seen that there are four sets of $2/12$ and a $1/12$ in $3/4$.
- The $1/12$ is $1/2$ of a set of $2/12$.
- So there are $4(1/2)$ (four and one half) sets of $2/12$ in $3/4$.

Try Another Example

- Using fraction circles, follow the process presented in the video to explore $(4/5) / (2/10)$.