Eureka Math

4th Grade
Module 3
Lesson 22

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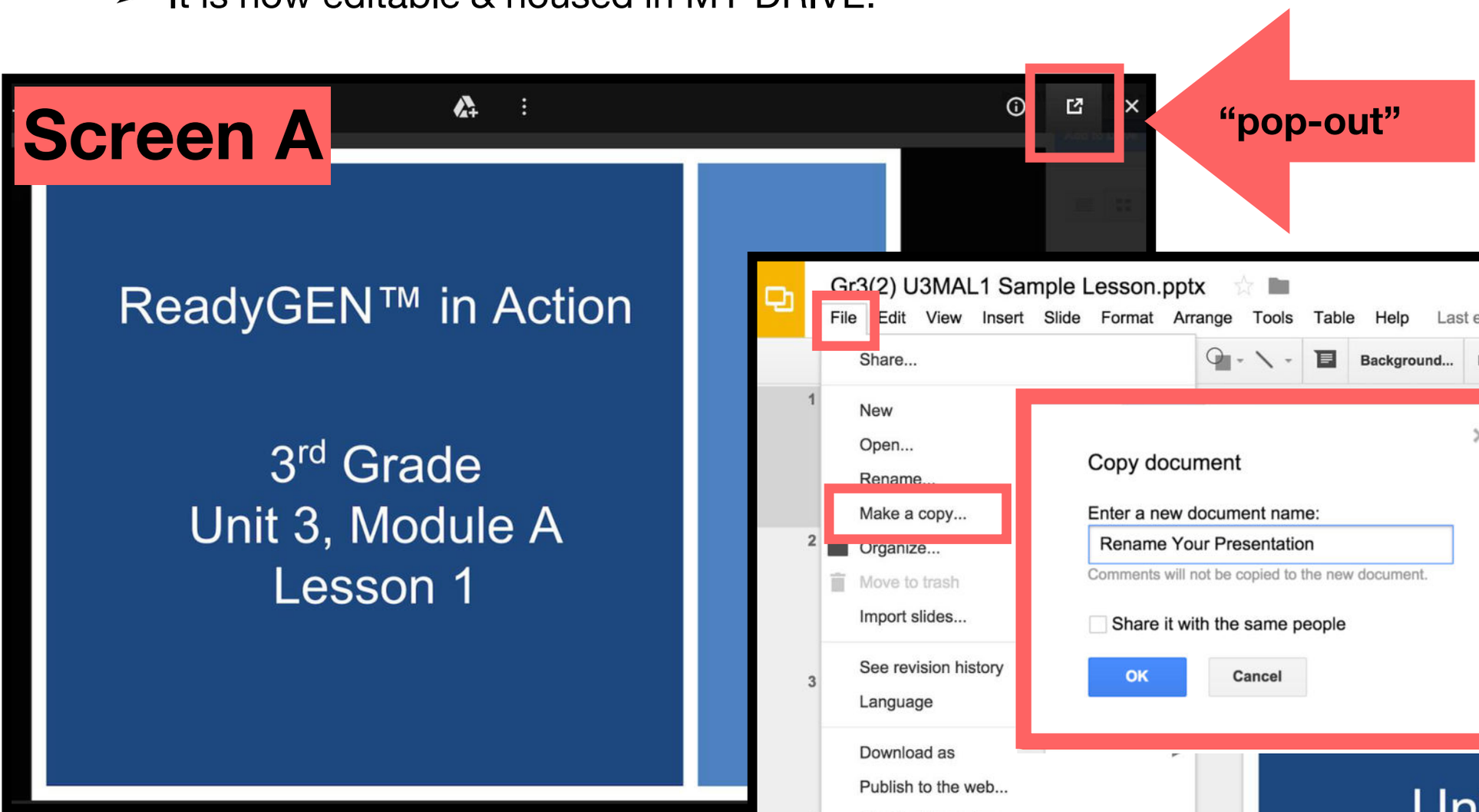
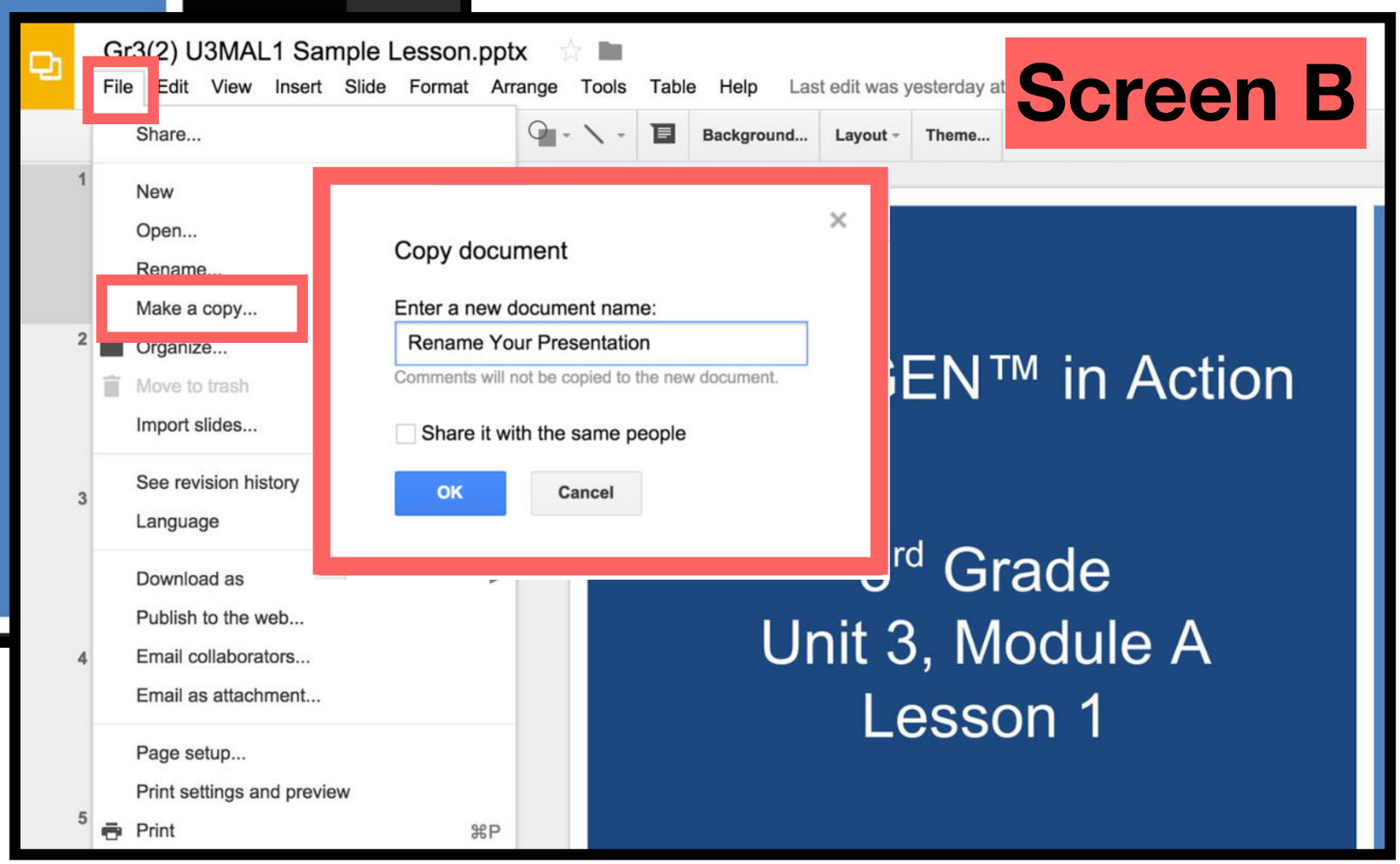


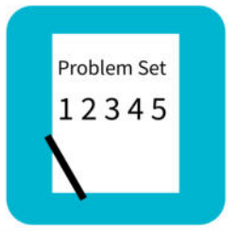


Icons

Read, Draw, Write

Learning Target

Personal White Board

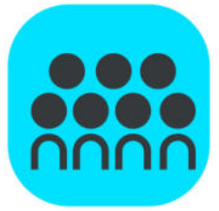


Problem Set

Manipulatives Needed

Fluency

Think Pair Share



Whole Class

Individual

Partner

Small Group

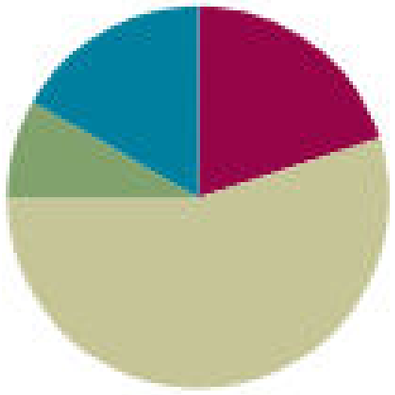
Small Group Time

Lesson 22

Objective: Find factor pairs for numbers to 100, and use understanding of factors to define prime and composite.

Suggested Lesson Structure

Fluency Practice	(12 minutes)
Application Problem	(5 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



I can find factor pairs for numbers to 100, and use understanding of factors to define prime and composite.

Fluency Practice

Divide Using the Area Model

Write a division expression for this area model.

2	60	8

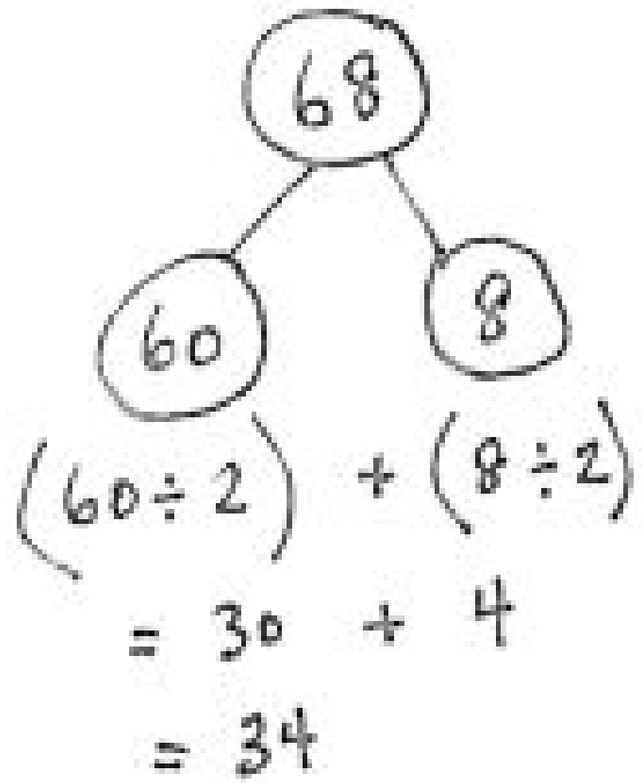
Solve using the standard algorithm or the distributive property with a number bond.

Fluency Practice

Divide Using the Area Model

Write a division expression for this area model.

2	60	8



Fluency Practice

Divide Using the Area Model

Draw an area model and solve using the standard algorithm or the distributive property with a number bond.

93 ÷ 3

72 ÷ 3

72 ÷ 4

Fluency Practice

Find the Unknown Factor

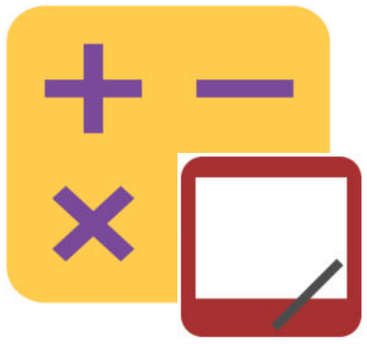
6 x ____ = 18

Fluency Practice

Find the Unknown Factor

$6 \times \_\_3\_\_ = 18$

On your personal white board, write the division problem.



Fluency Practice

Find the Unknown Factor

6 x __3__ = 18

On your personal white board, write the division problem.

18 ÷ 6 = 3

Fluency Practice

Find the Unknown Factor

Continue with the following:

$$4 \times \_\_\_\_ = 16$$

Fluency Practice

Find the Unknown Factor

Continue with the following:

$$4 \times \underline{\quad 4 \quad} = 16$$

$$16 \div 4 = 4$$

Fluency Practice

Find the Unknown Factor

Continue with the following:

6 x _____ = 42

6 x _____ = 54

7 x _____ = 56

9 x _____ = 72

Fluency Practice

Find the Unknown Factor

Continue with the following:

$9 \times \_\_\_\_ = 54$

$3 \times \_\_\_\_ = 9$

$5 \times \_\_\_\_ = 45$

Fluency Practice

Mental Multiplication

4 x 2

Say the complete multiplication sentence in unit form

Fluency Practice

Mental Multiplication

4 x 2

Say the complete multiplication sentence in unit form

4 ones x 2 = 8 ones

Fluency Practice

Mental Multiplication

40 x 2

Say the complete multiplication sentence in unit form

Fluency Practice

Mental Multiplication

40 x 2

Say the complete multiplication sentence in unit form

4 tens x 2 = 8 tens

Fluency Practice

Mental Multiplication

40 x 20

Say the complete multiplication sentence in unit form

Fluency Practice

Mental Multiplication

40 x 20

Say the complete multiplication sentence in unit form

4 tens x 2 tens = 8 hundreds

Fluency Practice

Mental Multiplication

Continue with the following:

3 x 3

30 x 3

30 x 30

Fluency Practice

Mental Multiplication

Continue with the following:

4 x 3

40 x 3

40 x 30

Application Problem

8 x ____ = 96

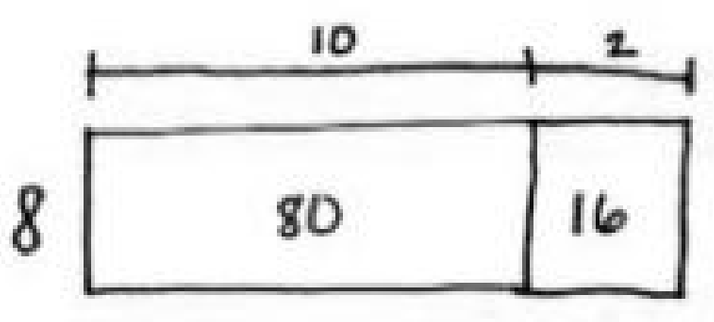
Find the unknow side length, or factor.
Use an area model to solve the problem.

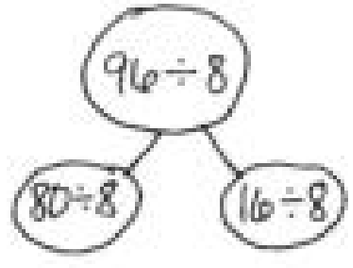
Application Problem

$8 \times \_\_\_\_ = 96$

Find the unknow side length, or factor.

Use an area model to solve the problem.

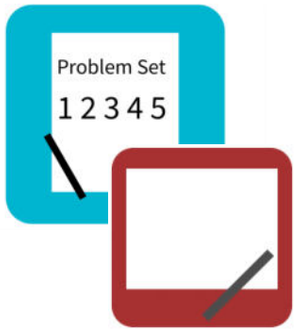




= 10 + 2

= 12

The unknown factor is 12.



Concept Development

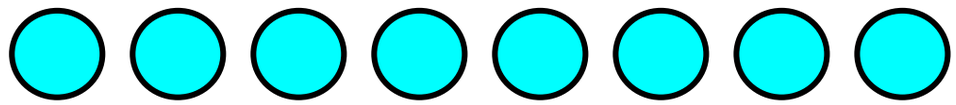
Materials

(S) Personal white board

Concept Development

Identify the factors and product
represented in an array.

Tell your partner the multiplication sentences that are represented by this array.



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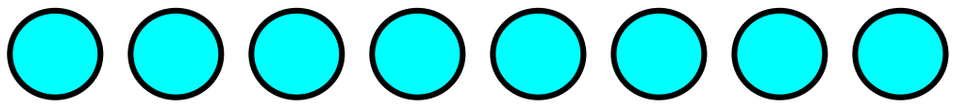

$$1 \times 8 = 8$$

factor x factor = product

Concept Development

Identify the factors and product
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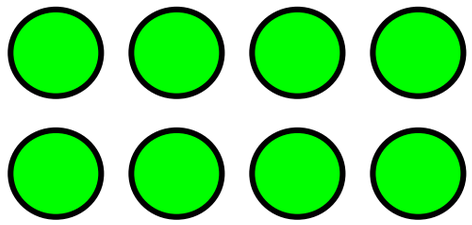
Tell your partner the multiplication sentences that are represented by this array.



Concept Development

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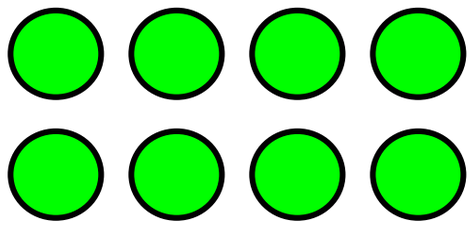
Tell your partner the multiplication sentences that are represented by this array.



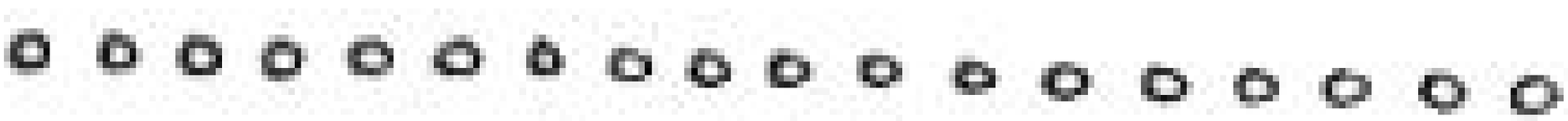
$$2 \times 4 = 8$$

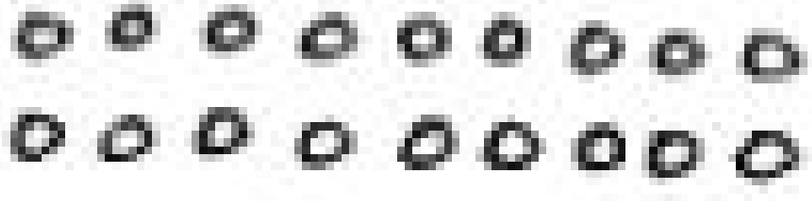
factor x factor = product

Concept Development

Identify the factors and product represented in an array.

What product is represented in both arrays?

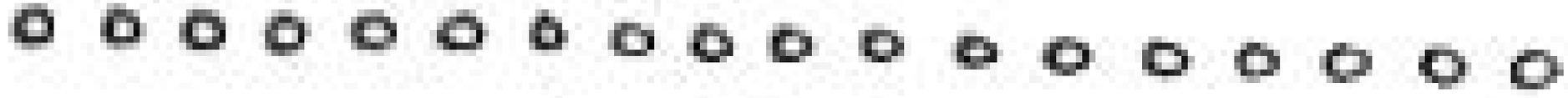


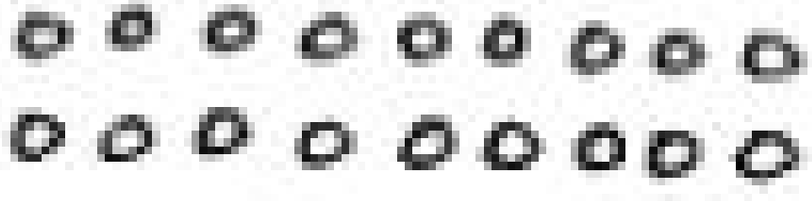


Concept Development

Identify the factors and product represented in an array.

Record the multiplication sentences for each array.

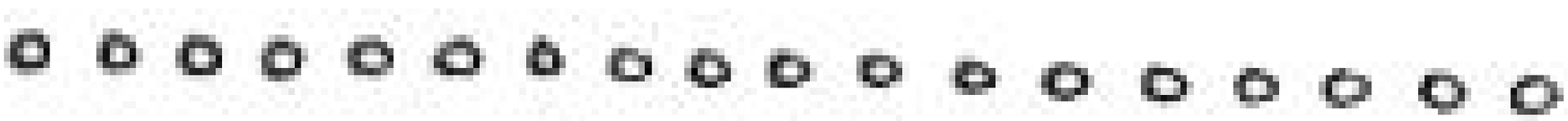




Concept Development

Identify the factors and product represented in an array.

Circle the factors.
Then write the factors in order from least to greatest.



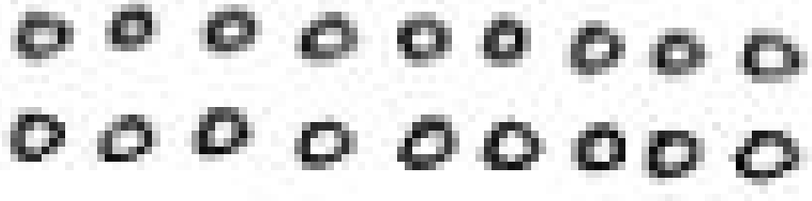
$1 \times 18 = 18$

$2 \times 9 = 18$

Concept Development

Identify the factors and product represented in an array.

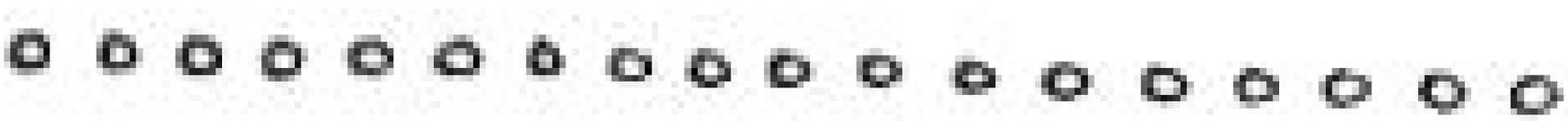
1, 2, 9, 18

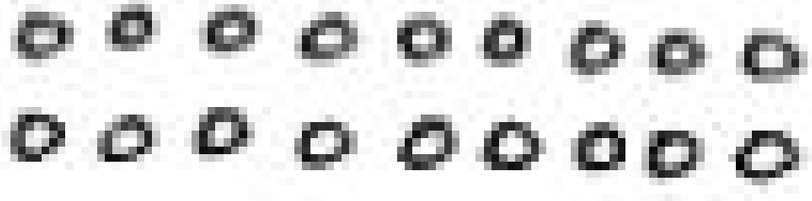


Concept Development

Identify the factors and product
represented in an array.

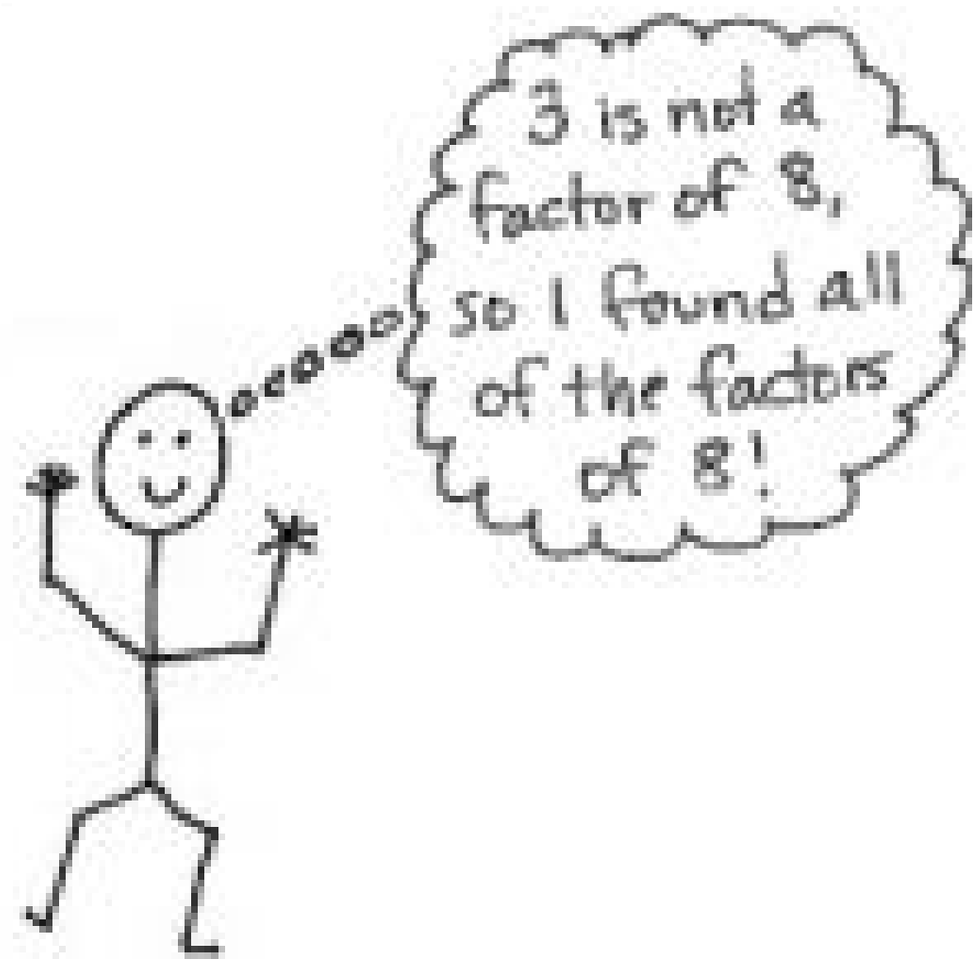
With your partner, draw an array to represent another pair of factors with the product of 18. List ALL the factors of 18.





Concept Development

Identify the factors and product represented in an array.



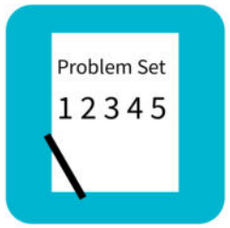
Concept Development

Identify the factors and product represented in an array.

$$2 \times 8 = 16$$

What are the factors?

What other multiplication sentences can you write using different factors that will give us the same product?



Concept Development

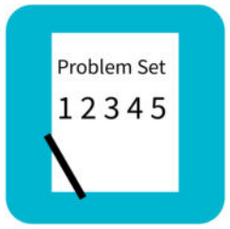
Identify the factors and product represented in an array.

2 x 8 = 16

1 x 16 = 16

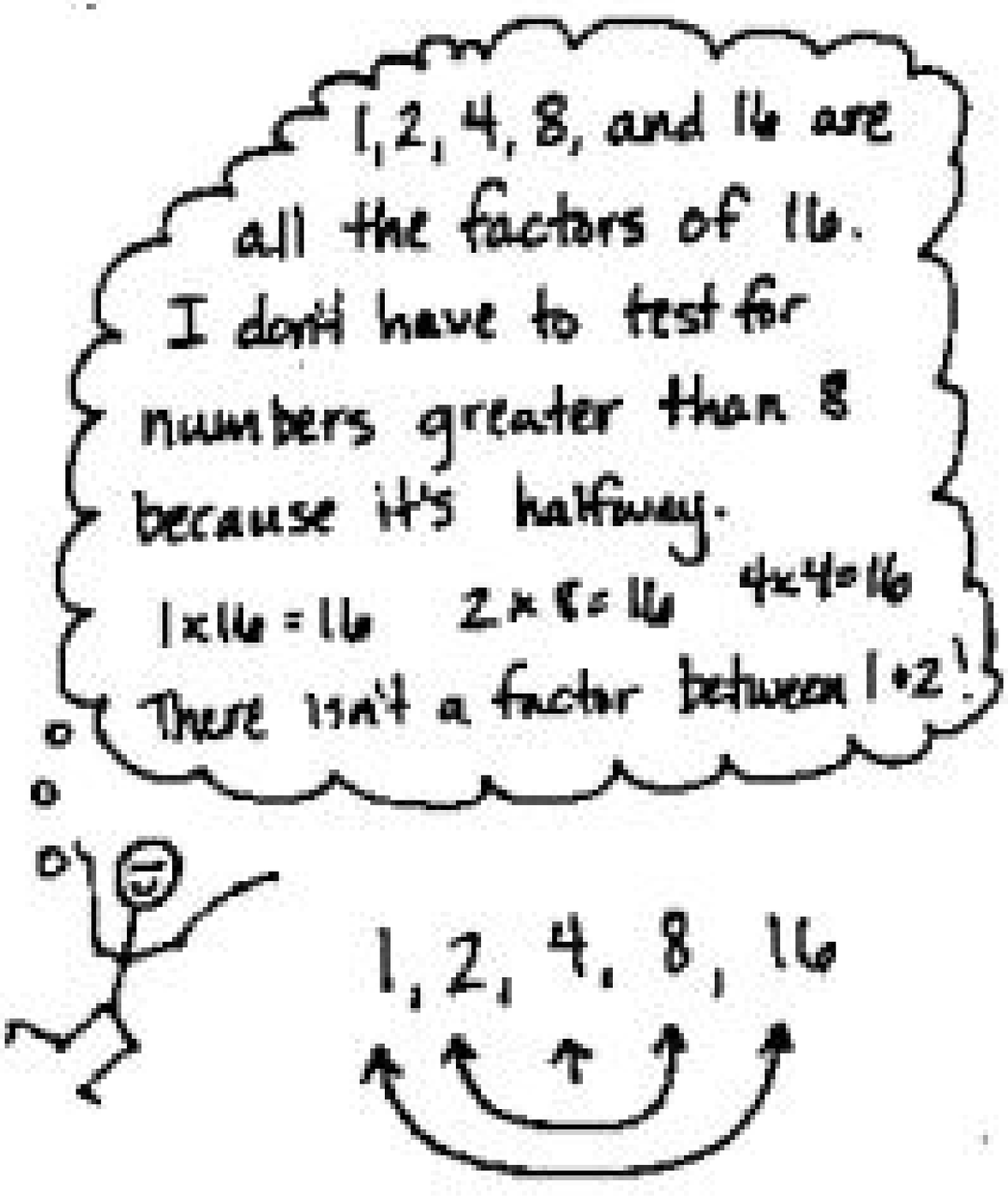
4 x 4 = 16

What are all the factors of 16?



Concept Development

Identify the factors and product represented in an array.



Concept Development

Identify the factors and product represented in an array.

1 x 7 = 7

What are the factors of this equation?

Concept Development

Identify the factors and product represented in an array.

1 x 7 = 7

Find another factor pair for the product 7.

Concept Development

Identify the factors and product represented in an array.

1 x 7 = 7

7 x 1 = 7

These are the same factors.

Concept Development

Identify the factors and product represented in an array.

1 x 7 = 7

7 x 1 = 7

2, 3, 4, 5, and 6 don't work.

Concept Development

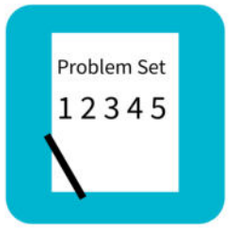
Identify the factors and product represented in an array.

1 and 7 are the ONLY factors for 7.

Concept Development

Identify the factors and product represented in an array.

How is that different from the factors of 8, 10, 16, or 18?



Concept Development

Identify the factors and product represented in an array.

Now, name the factors for 5.

Concept Development

Identify the factors and product represented in an array.

NUMBERS THAT HAVE EXACTLY TWO FACTORS (1 and itself) ARE CALLED PRIME!

Concept Development

Identify the factors and product
represented in an array.

With your partner, find at least two more prime numbers.

Concept Development

Identify the factors and product represented in an array.

With your partner, list some numbers that are NOT prime.

Concept Development

Identify the factors and product represented in an array.

Numbers that have MORE than two factors are called COMPOSITE!

Concept Development

Identify the factors and product represented in an array.

5	7	8	10	16	18
1 x 5	1 x 7	1 x 8 2 x 4	1 x 10 2 x 5	1 x 16 2 x 8 4 x 4	1 x 18 2 x 9 3 x 6
prime	prime	composite	composite	composite	composite

Concept Development

Identify the factors and product represented in an array.

Find ALL the factors of 6.

Is 6 prime or composite?

Concept Development

Identify the factors and product represented in an array.

Factor pairs for six

1 x 6

2 x 3

Factors of six: 1, 2, 3, 6

Concept Development

Identify the factors and product represented in an array.

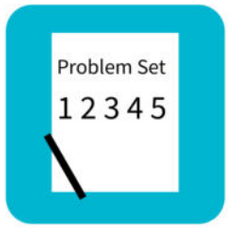
Factor pairs for six

1 x 6

2 x 3

Factors of six: 1, 2, 3, 6

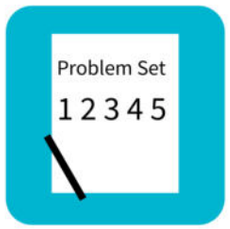
SIX is COMPOSITE



Concept Development

Identify the factors and product represented in an array.

Let's use a table to record the factor pairs for 35



Concept Development

Identify the factors and product represented in an array.

Let's use a table to record the factor pairs for 35

1	35
5	7

35 is COMPOSITE

Concept Development

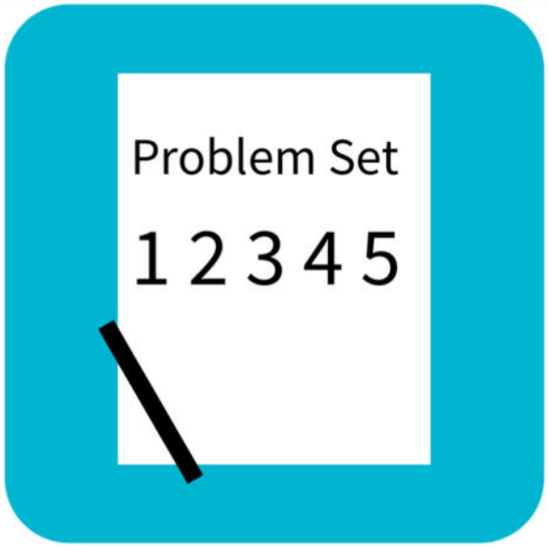
Identify the factors and product represented in an array.

Factor pairs for 23

Prime or Composite

Factor pairs for 48

Prime or Composite



Problem Set

Name _____ Date _____

1. Record the factors of the given numbers as multiplication sentences and as a list in order from least to greatest. Classify each as prime (P) or composite (C). The first problem is done for you.

	Multiplication Sentences	Factors	P or C
a.	4 $1 \times 4 = 4$ $2 \times 2 = 4$	The factors of 4 are: 1, 2, 4	C
b.	6	The factors of 6 are:	
c.	7	The factors of 7 are:	
d.	9	The factors of 9 are:	

Debrief

Compare the factors in Problem 1(e) and 1(l). Twenty-four is double 12. What do you notice about their factors? Compare the factors in Problem 1(d) and 1(i). Eighteen is double 9. What do you notice about their factors?

In Problem 1, what numbers have an odd number of factors? Why is that so?

Are all prime numbers odd? Explain what you would tell Bryan in Problem 3.

Debrief

Explain your answer to Problem 3(b). Are all even numbers composite? How many even numbers are not composite?

We talked a lot about the number 1 today as being a factor of other numbers, but we have not classified it as prime or composite. Can 1 be composite? (No.) It turns out that it's not considered prime either!

Exit Ticket

Name _____ Date _____

Record the factors of the given numbers as multiplication sentences and as a list in order from least to greatest. Classify each as prime (P) or composite (C).

	Multiplication Sentences	Factors	Prime (P) or Composite (C)
a.	9	The factors of 9 are:	
b.	12	The factors of 12 are:	