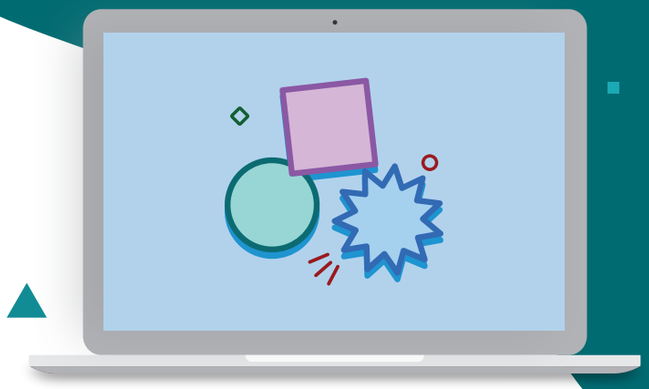
Unit 1
Lesson
14

Student devices recommended

We recommend students use devices for this lesson. Student Edition pages are also available.



A Number Game

Applying Factors, Multiples, and Prime and Composite Numbers

Let's play a game with numbers.

Key Concepts

Today's Goals

1. **Goal:** Apply an understanding of factors, multiples, and prime and composite numbers to identify numbers through questioning and descriptive clues.
2. **Language Goal:** Ask questions about numbers using an understanding of factors, multiples, and prime and composite numbers. **(Speaking, Listening, and Reading)** **ELPS 1.E, 2.E, 2.F, 3.H**

Connections and Coherence

Students play a game in which they eliminate numbers by using clues with the terms *prime*, *composite*, *multiple*, and *factor*. They use their knowledge about the numbers and the relationship the numbers have with their factors and multiples to identify a mystery number. Students ask and answer questions using the terms and then look for and make use of structure while attending to precision as they select numbers. **(TEKS 5.1.D, 5.1.F)**

Prior Learning

In Lesson 13, students used what they know about factors, multiples, and prime and composite numbers to identify numbers in a given set.

Future Learning

In Unit 3, students will apply their understanding of factors and multiples to multiply and divide with multi-digit numbers.

Integrating Rigor in Student Thinking

- Students **apply** their understanding of factors, multiples, and prime and composite numbers to identify and ask questions about numbers.

Vocabulary

Review Vocabulary

composite number

factor

multiple

prime number

TEKS

Addressing

5.4.A

Identify prime and composite numbers.

Math Process Standards: 5.1.D, 5.1.F

ELPS: 1.E, 1.F, 2.B, 2.E, 2.F, 3.F, 3.H

Building On	Building Toward
4.4.I	**5.4.F**

Building Math Identity

I can be all of me in math class.
What is something you are proud of from your work today?

Invite students to reflect on this question as they complete this lesson.

Lesson at a Glance

60 min

TEKS: 5.1.D, 5.1.F, 5.4.A

Why digital?

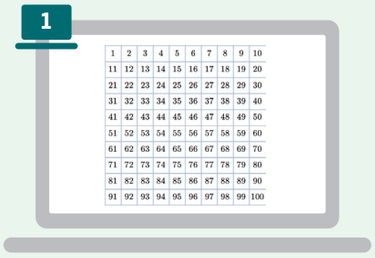
Polygraph supports students in playfully developing language to describe numbers as prime or composite.

Warm-Up

Whole Class | 10 min

Students use the **Notice and Wonder** routine to share what they notice and wonder about the numbers 11, 40, and 75.

1

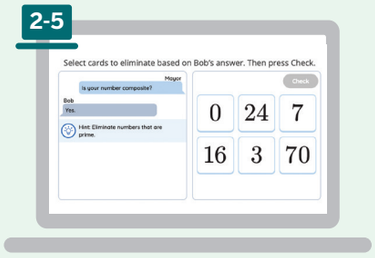


Activity 1

Pairs | 15 min

Students practice identifying numbers by using given clues from Captain Bob and the mayor as they play a game. Students ask questions that could help them identify the mayor's number.

2-5

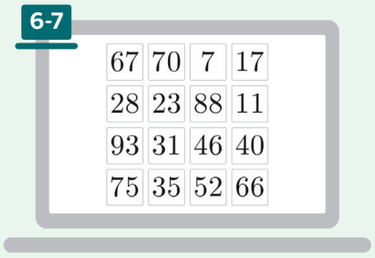


Activity 2

Pairs | 20 min

Students play a game in which they ask and answer questions using the terms *prime*, *composite*, *multiple*, and *factor* to identify their partner's number.

6-7

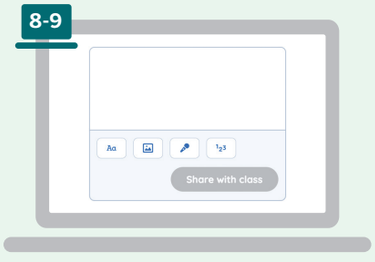


Synthesis

Whole Class | 10 min

Students review and reflect on identifying and representing prime numbers, composite numbers, and factors and multiples of numbers.

8-9



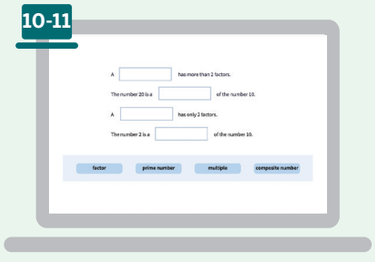
Show What You Know

Independent | 5 min

Students demonstrate their understanding of factors, multiples, and prime and composite numbers by completing fill-in-the-blank statements.

Students using print: *Show What You Know* PDF

10-11



Math Language Development

Emergent Bilinguals

Consider using the *Math Language Development Resources* with the **Activity 1, Monitor** to support math language acquisition.

- ✓ Cognates
- ✓ Frayer model
- ✓ word bank

ELPS 1.E, 2.B, 2.C, 2.D, 2.E, 2.F, 3.C, 3.E, 3.F, 3.G

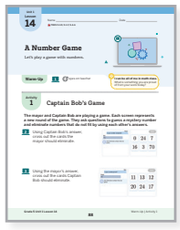
Pre-Production	Beginning	Intermediate	High Intermediate	Advanced
Students **listen** to spoken English and **respond** using their primary languages and gestures.	Students **listen** to and **read** English. They **speak** using their primary languages, gestures, and single words or short phrases	Students **listen** to and **read** English. They **speak** using short phrases or simple sentences.	Students **listen** to and **read** English. They **speak** using a variety of sentence types.	Students **listen** to and **read** English. They **speak** using longer sentences. Exemplar responses are provided.

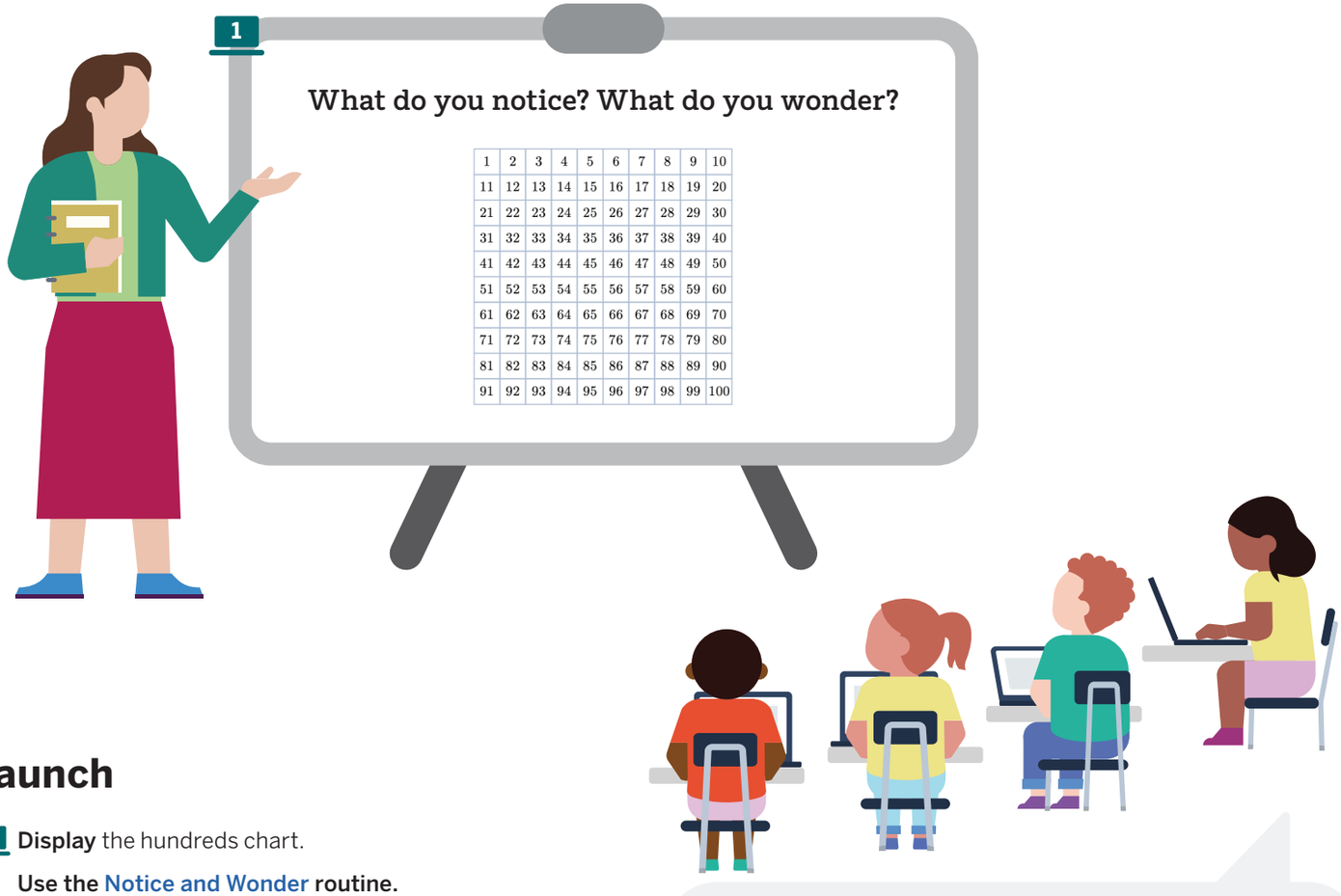
Whole Class | 10 min | Suggested Pacing: Screen 1

Warm-Up Notice and Wonder

Purpose: Students examine the factors and multiples of the numbers 11, 40, and 75 using a hundreds chart to prepare for thinking about the factors and multiples of numbers.

Students using print





1 Launch

1 **Display** the hundreds chart.

Use the Notice and Wonder routine.

Use the Think-Pair-Share routine. Ask, "What do you notice? What do you wonder?"

2 Connect

1 **Invite students to share** their responses. As they share, demonstrate what happens by clicking on each number.

Say, "You will use what you know about factors and multiples of numbers to help you play a game."

Students might say . . . ELPS 2.B

I notice 11 has a lot of multiples shown.

I notice 75 does not have any multiples shown.

I notice the numbers with circles on them are factors of the given number.

I wonder why 40 has the most factors shown.

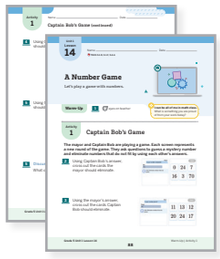
I wonder what multiples there are of 75.

Pairs | 15 min | Suggested Pacing: Screen 2, Screens 3–5

Activity 1 Captain Bob's Game

Purpose: Students practice identifying numbers by using answers to questions to prepare for playing a game with mystery numbers.

Students using print



1 Launch

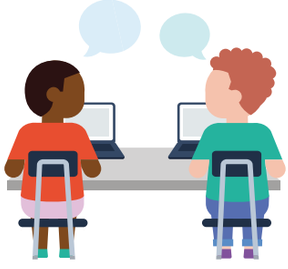
Say, "Captain Bob and the mayor are playing a game. Each screen represents a new round of the game. They ask questions to guess a mystery number and eliminate numbers that do not fit by using each other's answers."

2 **Display** the gameboard, the mayor's question, and Bob's answer.

Ask, "Which numbers would you eliminate? Which numbers could be Bob's number?"

Say, "You will complete Screens 3–5 with your partner."

2 Monitor



After students have completed **Screen 3**, refer to the D **Differentiation | Teacher Moves** table on the following page.

3-5 **If students need help getting started . . .**

- Ask, "What do you know about multiples of 4?"
- Ask, "How could you use the hint to help you?"

A **Accessibility: Conceptual processing** Clarify that, in the game, when the response to a question is *no*, numbers that fit the description should be eliminated, and when the answer is *yes*, numbers that do not fit the description should be eliminated.

3 Connect

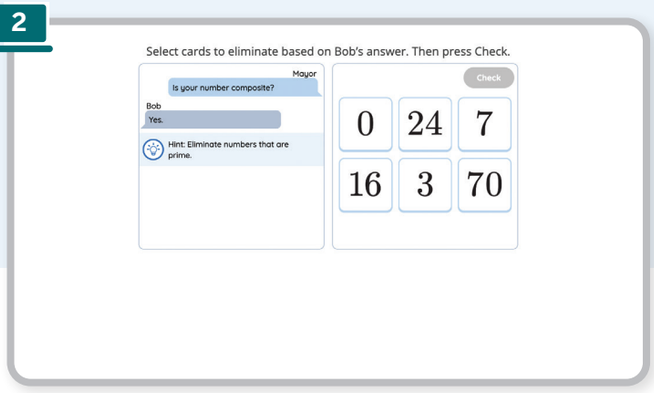
5 **Display** the gameboard, the questions, and the answers.

Invite students to share the questions they came up with for Screen 5.

Key Takeaway: Say, "You will ask questions like the mayor and Bob to help you identify your partner's number in the next activity."

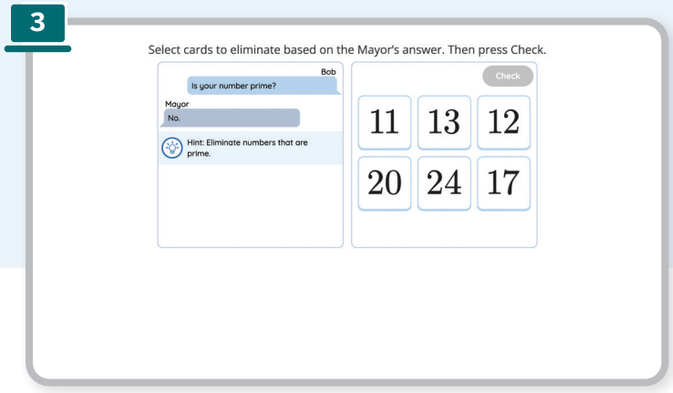
Students using digital

2



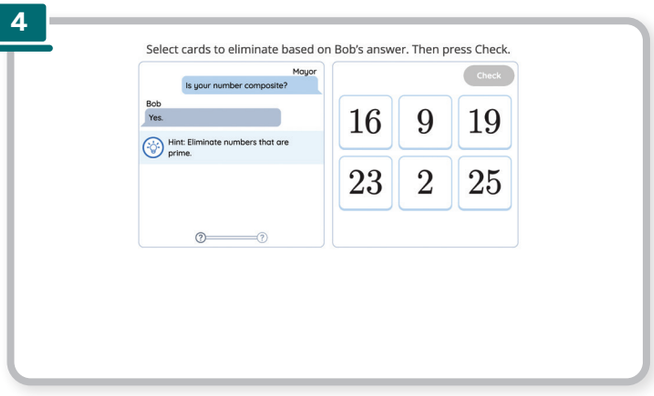
Students eliminate numbers that are prime, such as 7.

3



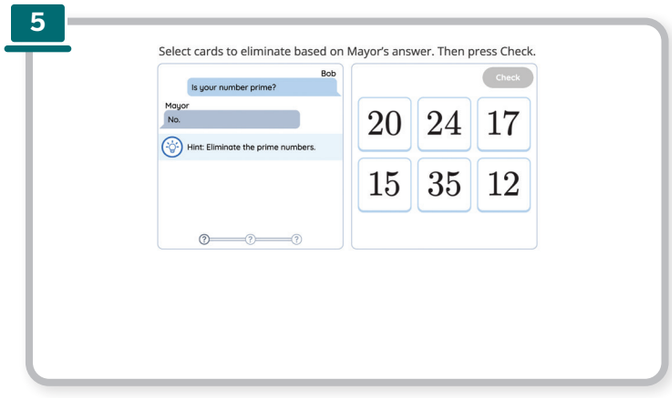
Students eliminate numbers that are prime, such as 17 and 13.

4



Students eliminate numbers to determine Captain Bob's number.

5



Students eliminate numbers to determine possibilities for the mayor's number and then discuss what question Captain Bob could ask next.

Students using print **will arrive at similar answers.**

D Differentiation | Teacher Moves

Look for students who . . .	For example . . .	Provide support . . .
Almost there Eliminate 1 number that does not fit with the question and answer.	eliminated 3	**Support** Ask, "Are there other numbers that do not fit with the question and answer? Which numbers could be eliminated?"
Almost there Eliminate some, but not all, of the numbers that do not fit with the question and answer.	eliminated 3 and 7	
Eliminate all the numbers that do not fit with the question and answer.	eliminated 0, 3, and 7	**Stretch** Ask, "What is another question that could lead you to eliminate the same numbers?"

Pairs | 20 min | Suggested Pacing: Screen 6, Screen 7

Activity 2 What's the Number?

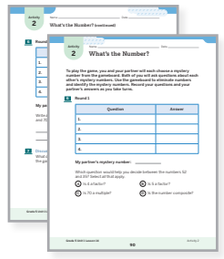
Purpose: Students ask questions involving the terms *prime*, *composite*, *multiple*, and *factor* to identify a mystery number.

Students using print

Additional Print Materials

Lesson Resources:

- Distribute the Activity 2 PDF to each student.



1 Launch

6 **Say**, "In this activity, you and your partner will each choose a number from the gameboard. Then you and your partner will take turns asking questions about each other's mystery numbers. Using the answers to the questions, you will eliminate numbers that do not belong and identify each other's mystery numbers."

EB **Emergent Bilinguals** Provide question frames to help students formulate questions, such as the following: ELPS 3.F

- "Is __ a factor?"
- "Is it a multiple of __?"
- "Is it a factor of __?"
- "Is it prime?"
- "Is it composite?"

2 Monitor

While students complete **Screen 6**, refer to the D Differentiation | Teacher Moves table on the following page.

6 **If students need help getting started . . .**

- Ask, "What is a question you could ask that could help you eliminate some numbers?"
- Ask, "What do you notice about the numbers that are remaining on the gameboard? What question could you ask next?"

3 Connect

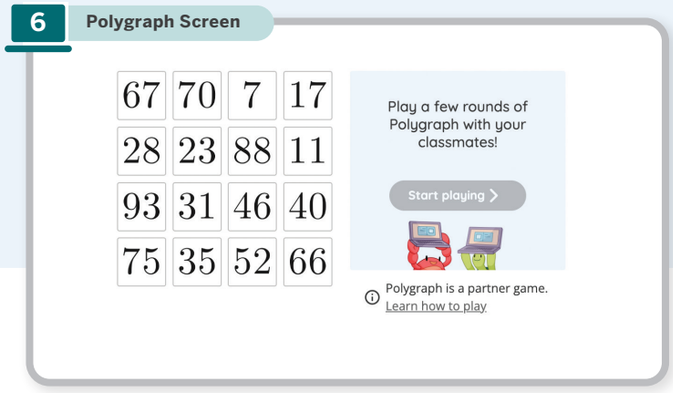
7 **Use the Think-Pair-Share routine.** Ask, "What did you notice about the questions that were asked during the game?"

Display examples of students' questions using the dashboard's Teacher View.

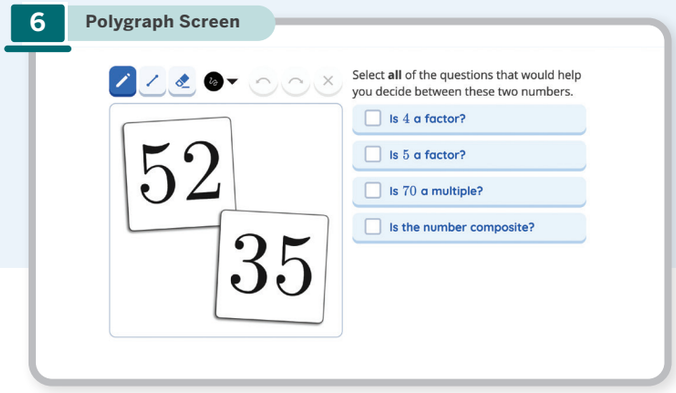
Ask (if not yet mentioned during discussion), "Why do you think some questions were more helpful than others?"

Key Takeaway: Say, "Some questions helped you get closer to your partner's number while others still left many possible numbers. You can use what you know about factors and multiples to identify whether a number is prime or composite to determine possible answers."

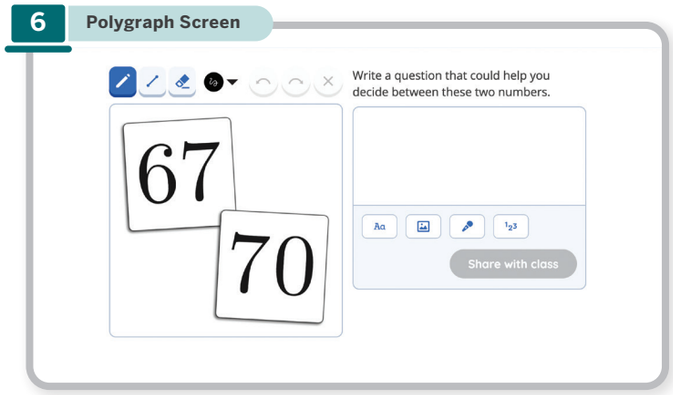
Students using digital



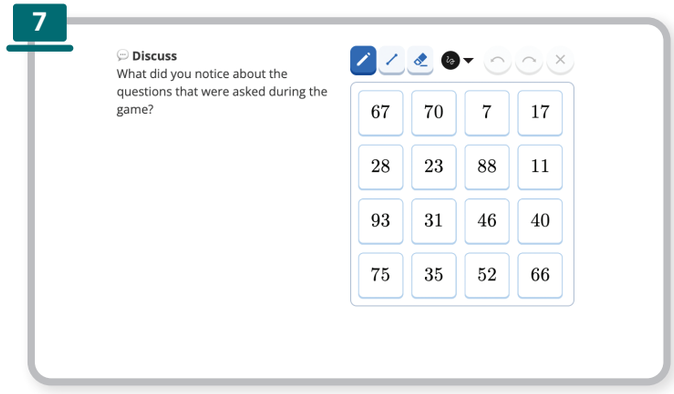
Students alternate roles when asking and answering questions to determine their partner's number.



Students select questions that help distinguish between 2 numbers.



Students write a question that helps distinguish between 2 numbers.



Students discuss what they noticed about the questions that were asked during the game.

Students using print will arrive at similar answers.

D Differentiation | Teacher Moves

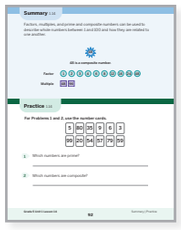
Look for students who . . .	For example . . .	Provide support . . .
Almost there Ask questions that are specific to the digits in a number.	Does the number have a 2?	**Support** Ask, "What question could you ask that involves the terms *prime*, *composite*, *multiple*, or *factor*?"
Ask questions that eliminate some numbers but use terms that apply to many numbers.	Is your number an even number?	**Strengthen** Ask, "What do you know about even numbers? What question could you ask about the factors or multiples of the number?"
Ask questions that use the terms *prime*, *composite*, *multiple*, or *factor*.	Is 2 a factor of your number?	**Stretch** Ask, "If 2 is a factor of the number, what does that mean about that number as a multiple?"

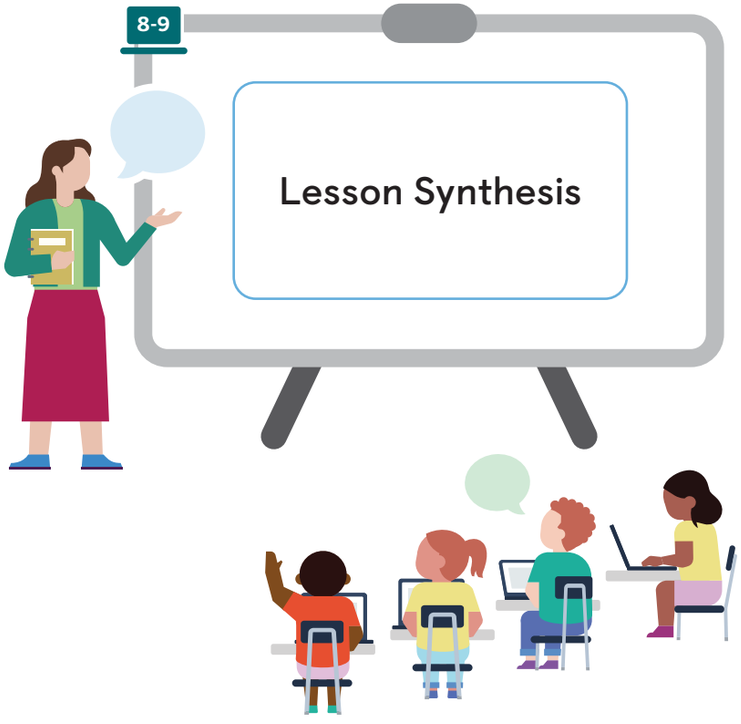
Whole Class | 10 min | Suggested Pacing: Screen 8, Screen 9

Synthesis

Lesson Takeaway: Factors, multiples, and prime and composite numbers can be used to represent and describe how whole numbers can be composed and decomposed multiplicatively.

Students using print





8 **Display** the word bank.

Ask, "Using words from the word bank, what do you know about the number 48?"

9 **Play** the animation. ELPS 1.F

Say, "You can use what you have learned in this unit about factors, multiples, and prime and composite numbers to describe whole numbers and how they are related to each other."

Invite students to refer to the **Summary** during Practice or anytime during the year.

Show What You Know

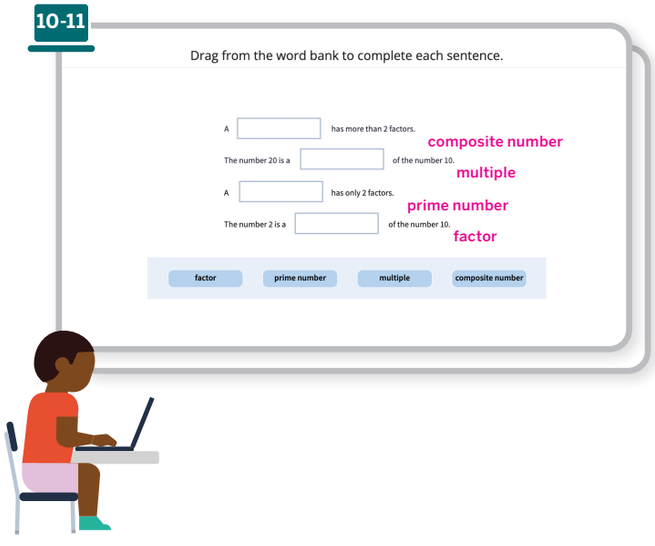
Independent | 5 min |

Suggested Pacing: Screens 10–11

Students using print

(Show What You Know PDF)

Students using digital



Today's Goals

1. **Goal:** Apply an understanding of factors, multiples, and prime and composite numbers to identify numbers through questioning and descriptive clues.
   - In Problems 1-4 in the *Show What You Know*, students applied their understanding of factors, multiples, and prime and composite numbers to match the terms to descriptions.
2. **Language Goal:** Ask questions about numbers using an understanding of factors, multiples, and prime and composite numbers. **(Speaking, Listening, and Reading)** ELPS 1.E, 2.E, 2.F, 3.H
   - Students worked toward this goal in Activities 1 and 2.

D **Differentiation** See the last page of the lesson for differentiation and Math Language Development support.

Practice

Independent

Provide students with sufficient practice to build and reinforce their conceptual understanding, fluency, and application of mathematical topics, assessment practice, and ongoing spiral review.

Lesson 14
Practice

Students using digital

Students using print

Summary 1.14

Factors, multiples, and prime and composite numbers can be used to describe whole numbers between 1 and 100 and how they are related to one another.

48

48 is a composite number.

Factor: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48

Multiple: 48, 96

Practice 1.14

For Problems 1 and 2, use the number cards.

5	80	35	9	6	3
99	20	54	57	79	59

1 Which numbers are prime?

5, 3, 79, 59

2 Which numbers are composite?

80, 35, 9, 6, 99, 20, 54, 57

Practice 1.14

Name _____ Date _____

3 Determine whether each number is *prime*, *composite*, or *neither*. Place a check mark in the correct column.

Number	Prime	Composite	Neither
1			✓
4		✓	
5	✓		
6		✓	
9		✓	
13	✓		
17	✓		
24		✓	
71	✓		

4 Complete the statement so that it identifies the number below.

39

Select **ONE** correct answer in each box to complete the sentence.

The number is a [A prime / B composite] number because it has [A more than one / B one] factor pair.

Practice 1.14

Name _____ Date _____

Spiral Review

For Problems 5–8, determine the value of the expression.

5 73 × 42 3,066

6 19 × 62 1,178

7 18 × 12 216

8 35 × 15 525

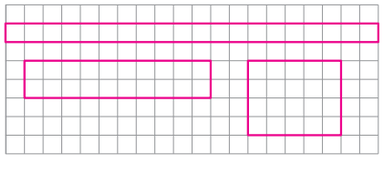
For Problems 9 and 10, write the number in expanded notation.

9 140,890 (1 × 100,000) + (4 × 10,000) + (8 × 100) + (9 × 10)

10 8,425 (8 × 1,000) + (4 × 100) + (2 × 10) + (5 × 1)

11 Use the grid to draw *all* the possible rectangles with an area of 20 square units.

Each grid square has an area of 1 square unit.



Practice Problem Item Analysis

	Problem(s)	DOK	TEKS
On-Lesson			
	1, 2	2	5.4.A
	3	3	5.4.A
Test Practice	4	1	5.4.A
Spiral Review			
Fluency	5–8	1	4.4.D
	9, 10	2	4.2.B
	11	3	4.5.D

Need more Practice?

Additional practice can be found in the **Practice Resources, Intervention and Extension Resources,** and online resources (item banks, Boost Personalized Learning, and Fluency Practice).

Differentiation Use after Lesson 14

Lesson Goal: Apply an understanding of factors, multiples, and prime and composite numbers to identify numbers through questioning and descriptive clues.

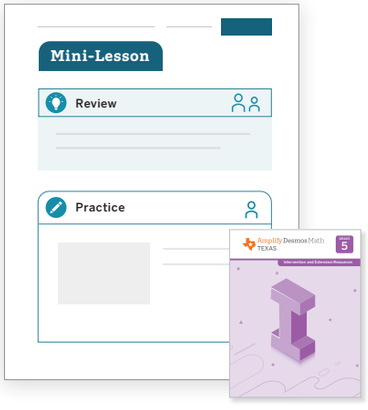
Support

Provide targeted intervention for students by using these resources.

If students confuse prime and composite when identifying a number:

Respond:

- Assign the *Describing Numbers Using Factors, Multiples, and Prime and Composite Numbers* **Mini-Lesson. |** 15 min
- Students will also have more opportunities to develop this concept in future lessons, so intervention is not necessary at this time.



Strengthen

Reinforce students' understanding of the concepts assessed by using these resources.

If students use what they know about the prime and composite numbers when identifying a number:

Respond:

- **Centers |** 15 min
  Cover Up:
  - *Factors 1–5 and 10*
  - *Factors 1–9*
- Have students complete **Lesson 14 Practice. |** 15 min
- **Item Bank**

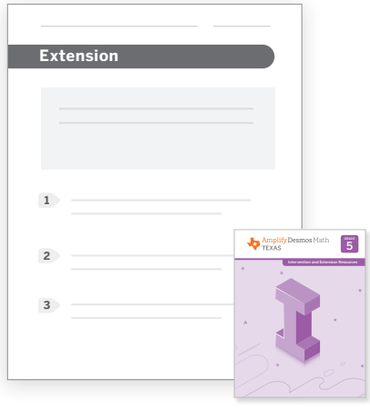
Stretch

Challenge students and extend their learning with these resources.

If students use what they know about the relationship between factors and multiples when identifying a number:

Respond:

- **Sub-Unit 3 Extension Activities |** 15 min



Support, *Strengthen*, and *Stretch* learning by assigning these digital resources that adjust to each student's current level of skill and understanding.
• **Boost Personalized Learning** • **Fluency Practice** • **Math Adventures**

Math Language Development

EB Use the ***Math Language Development Resources*** for further language support with all your students, including those building English proficiency.

- English/Spanish cognates, e.g., *composite number/ número compuesto*
- Frayer Model templates
- Vocabulary routines

Professional Learning

Which parts of the lesson did students find most approachable? Why did that part of the lesson stand out to them?