

ASSESSMENT RESOURCES

# Using Multiplication and Division to Solve Problems



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# Pre-Test/Post-Test Administration

## test administration

For the pre-test, let students know that this test will help you determine what they already know. Explain that the module will help them learn how to solve problems that seem difficult now.

For the post-test, remind students that this test will help you determine what they have learned about using multiplication and division to solve problems.

### Online Testing

Once your testing window has started, you can begin testing.

- Seat students individually in front of a computer.
- Give each student a piece of scratch paper.
- Make sure that students have pencils.
- Have students use their access codes to log in to the pre-test.
- Before each student begins the test, confirm that he or she is taking the correct test.

Tell students that:

- Each question will be displayed on the computer screen. Students should select the answer they think is best by clicking on the option choice and then clicking to confirm the choice.
- After students answer a question, the next question will appear on the computer screen.
- Students may choose to skip a question and flag it to come back to before ending the test.

During the test:

- Observe students as they work to make sure that they are actively engaged in the testing process.
- Support any students who seem to find the material challenging. Encourage them to make a good estimate for any problem they find difficult. You may wish to provide manipulatives.

Once students have answered all the questions, they should follow the online prompts to conclude the test.

 After the pre-test if some students finish early, pair each of them with another student. Give each student a Student Book. Tell the students to read the instructions on page 1 of the Student Book and start working.



### english language learners

Be aware that some English language learners (ELLs) may have difficulty with the language on the test. Make note of any students who appear to be having difficulty with vocabulary. These students may need additional help when new terminology is introduced in the module.



### Paper-and-Pencil Test

- Print copies of the test and answer sheets for each student from ARO.
- Seat students individually.
- Distribute tests, answer sheets, and scratch paper.
- Make sure that students have #2 pencils.
- Instruct students to fill in the answers on their answer sheets.

During the test:

- Observe students as they work to make sure that they are actively engaged in the testing process.
- Support any students who seem to find the material challenging. Encourage them to make a good estimate for any problem they find difficult. You may wish to provide manipulatives.

After students finish, collect their tests, answer sheets, and scratch paper. You will need to upload students' answers to the ARO system so you can analyze the results.



After the pre-test if some students finish early, pair each of them with another student. Give each student a Student Book. Tell the students to read the instructions on page 1 of the Student Book and start working.



### analyzing results

Irrespective of the method (online or paper-and-pencil) that you chose to administer the test, your students must be enrolled in the ARO system in order for you to obtain computer-generated reports.

These reports:

- Offer rich, instructionally-relevant information to teachers and administrators at the individual student, class, grade, school, and district levels.
- Include total test score performance information and item-level analysis for each student and for all students combined.
- Are important references in helping you to assess the misconceptions your students are struggling with and decide what concepts to focus on during the module.

For results:

- **Online Testing:** ARO will automatically generate performance reports.
- **Paper-and-Pencil Test:** Upload students' data to ARO. Once you have uploaded the data, ARO will generate performance reports.

Additional information about the online test reporting can be found on ARO.

Remember to give a copy of the reports to the students' regular mathematics teachers to help them in planning subsequent instruction.

### reflection

 When students have finished working on their pre- or post-tests, ask them to open the Student Book to page 1 for the pre-test and page 69 for the post-test and write a response to the reflection prompt.



#### **english language learners**

It is important to point out to ELLs the progress they have made over the course of the module. Help them look back to where they were when they started so they can see how much they have progressed with both the language and the mathematics.

# Checkpoint 1

# 7

## ➔ preparation

- Make a copy of the Checkpoint 1 lesson and answer sheet for each student.
- Seat students individually and distribute the checkpoint lesson and the answer sheet to each student.
- Ask students to put their names on their answer sheets.

## ➔ setting the direction

This lesson is the first checkpoint lesson of the module. Tell students that today's lesson is a checkpoint lesson; it will help them see how well they understand the concepts they have recently learned.

Tell students to read the checkpoint problems to themselves. They should complete the problems by doing the work and circling the answers in the checkpoint lesson. Then they should fill in the answers on the answer sheet.

At the end of the lesson, collect the completed answer sheets. Enter the data from each checkpoint into ARO. The report generated by ARO will help you assess whether students are on track and making sufficient progress.

## checkpoint



Give students 6–10 minutes to complete the problems.

Ask students to be sure they have circled their answers in their checkpoint lesson before you collect the answer sheets.

## Checkpoint 1 7

**checkpoint**

Solve each problem below. Write your answer on the answer sheet. Circle each answer in your checkpoint lesson, too.

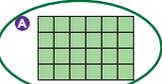
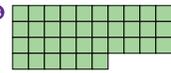
- Mr. Samson is planning to have a class party. He has 9 students in his class. How many hot dogs will he need to buy so that each student can have 3 hot dogs?
 

A 27 hot dogs   
  B 21 hot dogs   
  C 18 hot dogs   
  D 3 hot dogs
  
- Some teams got on the bus to go to the basketball tournament. Each team had 5 players. Altogether, 45 players got on the bus. How many teams got on the bus?
 

A 225 teams   
  B 45 teams   
  C 9 teams   
  D 50 teams
  
- Which array best represents this problem?
 

Amir has 4 bags of marbles and in each bag he has 6 marbles. How many marbles does he have altogether?



A    
  B 

C    
  D 
  
- Which equation best represents this problem?
 

Tran arranged his toy cars on the shelf this way. How many toy cars does he have?



A  $3 + 4 = \underline{\quad}$    
  B  $5 \times 3 = \underline{\quad}$    
  C  $6 \times 2 = \underline{\quad}$    
  D  $3 \times 4 = \underline{\quad}$

## learning from the checkpoint

 Explain to the group that when students choose the wrong answer, it is usually because they have a misconception or have made a common mistake. Ask students to write a sentence or two explaining the misconception or mistake that makes the answer a common wrong answer.

This discussion of common mistakes engages students in the mathematical practice of constructing viable arguments and critiquing the reasoning of others (MP3) as they explain their own reasoning and making sense of other's reasoning. Note students' ability to justify the errors in and correctness of solutions and to explain their own thinking to others.



### english language learners

You may want to write the word *misconception* on the board and have students define it in their own words. Leave this displayed for the remainder of the lesson.

Be sure that students understand the meaning of the word *common* and why it is significant in this discussion. It would be helpful to students if you write these "Ask Myself" questions on chart paper so that students can refer to them as needed.

### Learning from Problem 1

The correct answer is **A**.

This problem is a multiplication problem because we know the number of groups and how many are in each group. We need to know the total number or product.

#### learning from the checkpoint

##### Problem 1

The correct answer to problem 1 is **A**.

What mistake would cause a student to choose answer **D**?

*A student might think this is a division situation, because there is a larger number and a smaller number that can be divided.*

Assessment Resources, page 15



Answer choice **D**:

Possible misconception: Students might think the problem is a division situation, because there is a greater number and a lesser number that can be divided. This is not a division problem because we do not know the total number of hot dogs. It is a situation in which we have 9 students each needing 3 hot dogs.

Suggestion: Ask students what conditions are needed for multiplication. Help them to see that we need to find the total number of hot dogs. Model with connecting cubes to show that 3 hot dogs for each of 9 students will be  $3 + 3 + 3 + 3 + \dots$ , or  $9 \times 3$ .

## Learning from Problem 2

The correct answer is **C**.

This problem is a division problem since we know the total number that we started with (45) and we are separating that number into equal groups or teams of 5.

### Problem 2

The correct answer to problem 2 is **C**.  
What mistake would cause a student to choose answer **A**?

*A student might decide to multiply the two numbers in the problem, without carefully reading what the problem is asking.*

Assessment Resources, page 15



Answer choice **A**:

Possible misconception: Students may have assumed the problem was multiplication, without carefully reading what the problem was asking.

Alert students to the conditions required for multiplication. Help them to recognize that if you know the total amount and either the number of groups or size of each group, then the calculation required is division.



## scaffolding for success

Model the problem using skip-counting backward on a number line. How many jumps of 5 do we take to get back to zero from 45?

## Learning from Problem 3

The correct answer is **A**.

This problem is a multiplication problem because we know how many groups and how many are in each group. The product of  $4 \times 6$  gives the total number of marbles. The array for **A** is the only one that shows  $4 \times 6$ .

### Problem 3

The correct answer to problem 3 is **A**.  
What mistake would cause a student to choose answer **D**?

*This array has the same product as the correct array.*

Assessment Resources, page 15



Answer choice **D**:

Possible misconception: Students may select this array because it has the same product as the correct array.

Suggestion: Help students to see the number of groups in the array (4 bags) and the number in each bag (6). It is then easy to find the total either by repeated addition:  $6 + 6 + 6 + 6$  or  $4 \times 6$ .

## Learning from Problem 4

The correct answer is **D**.

This problem is a multiplication problem because we know the number of groups and how many are in each group. We need to know the total number or product.

### Problem 4

The correct answer to problem 4 is **D**.  
What mistake would cause a student to choose answer **A**?

Someone might see the number of rows (3) and the number in each row (4), and ignore the addition sign.

Assessment Resources, page 15



Answer choice **A**:

Possible misconception: Students might have misread the question and thought it was the correct equation.

Suggestion: Have students read the problem aloud. Have students ask the question, "What do I need to find out?" Model the equation a student suggests with connecting cubes.



## reflection



When you have about 2 minutes left, stop the discussion, even if they are not finished. Have students respond to the reflection prompt in the Student Book.

## ➤ preparation

- Make a copy of the Checkpoint 2 lesson and answer sheet for each student.
- Seat students individually and distribute the checkpoint lesson and the answer sheet to each student.
- Ask students to put their names on their answer sheets.

## ➤ setting the direction

This lesson is a checkpoint lesson. Tell students to read the checkpoint problems to themselves. They should complete the problems by doing the work and circling the answers in the checkpoint lesson. Then they should fill in the answers on the answer sheet.



### scaffolding for success

Remind students to circle key information in a problem to help them understand how to solve it.



### english language learners

Some ELLs may be intimidated by the testing situation. Be sure to check for comprehension and provide assistance with the language in the problems as needed.

At the end of the lesson, collect the completed answer sheets. Enter the data from each checkpoint into ARO. The report generated by ARO will help you assess whether students are on track and making sufficient progress.

## checkpoint



Give students 6–10 minutes to complete the problems.

Tell students to complete problems 1–3. Ask students to be sure they have circled their answers in their checkpoint lesson before you collect the answer sheets.

## Checkpoint 2 13

**checkpoint**

Solve each problem below. Write your answer on the answer sheet. Circle each answer in your checkpoint lesson, too.

- The students on a playground are forming teams for a game. There are 4 students on each team. When every student is placed on a team, exactly 20 teams have been formed. How many students are on the playground?

A 5 students    
  B 24 students    
  C 16 students    
  D 80 students
- Mrs. Chi plans to give 3 pencils to each student who helps at the school festival. She has 27 pencils. How many students can get pencils before she has to buy more?

A 24 students    
  B 9 students    
  C 81 students    
  D not enough information
- Mr. Hakim has 35 students in his class. He gives his students stickers when they complete their homework. Today, he gave stickers to all but 5 students. How many students got stickers?

A 30 students    
  B 40 students    
  C 7 students    
  D 5 students





Assessment Resources, page 18

 **learning from the checkpoint**



Explain to the group that when students choose the wrong answer, it is usually because they have a misconception or have made a common mistake. Ask students to write a sentence or two explaining the misconception or mistake that makes the answer a common wrong answer.

Explain that when students choose a wrong answer, it is usually because they have a misconception or have made a common mistake.



**english language learners**

You may want to write *misconception* on the board and have students define it in their own words. Leave the word and its definition posted throughout the lesson.



**scaffolding for success**

Be sure that students understand the meaning of the word *common* and why it is significant in this discussion.



**english language learners**

Some ELLs will not be fluent enough in English to use the mathematical terminology necessary to describe the misconceptions. If they want to answer a question, allow them plenty of time to formulate the language and assist them by modeling what they are saying with appropriate mathematical terminology. It is also helpful if you write relevant math terms on the board as you discuss them.

**Learning from Problem 1**

The correct answer is **D**.

This problem is not a division situation because we do not know the total number of children that were placed on teams. We have a situation in which we have 20 equal groups of 4 students so this is a multiplication situation.

 **learning from the checkpoint**

**Problem 1**

The correct answer to problem 1 is **D**.

What mistake would cause a student to choose answer **A**?

*This is not a division situation because we do not know the total number of children that were placed on teams. We have a situation in which we have 20 equal groups of 4 students, so this is a multiplication situation.*

Assessment Resources, page 19



Incorrect answer choice **A**:

Possible misconception: The student might think this is a division situation because the problem talks about forming teams and often when the problem is about forming teams, you divide.

Suggestion: Ask the student to compare the story to the conditions that are needed for a division (or multiplication) situation. Help the student to see that the total number of children is unknown so it cannot be a division situation.

## Learning from Problem 2

The correct answer is **B**.

This problem is a division situation because we know the total number that we started with (27 pencils) and we are separating them into equal-sized groups (3 pencils in each group).

### Problem 2

The correct answer to problem 2 is **B**.  
What mistake would cause a student to choose answer **D**?

*This is a division situation because we know the total number that we started with (27 pencils) and we are separating them into equal-sized groups (3 pencils in each group).*

Assessment Resources, page 19



Incorrect answer choice **D**:

Possible misconception: The student might think division is used only when you know the number of groups.

Suggestion: Ask the student to compare the story to the conditions that are needed for a division (or multiplication) situation. Help the student remember that if you know the total amount and either the number of groups *or* the size of each group, the problem is a division situation.

## Learning from Problem 3

The correct answer is **A**.

This problem is not a multiplication *or* a division situation because we are not forming equal-sized groups. This problem is a part-whole subtraction situation.

### Problem 3

The correct answer to problem 3 is **A**.  
What mistake would cause a student to choose answer **D**?

*This is not a multiplication or a division situation because we are not forming equal-sized groups. This is a part-whole subtraction situation.*

Assessment Resources, page 19



Incorrect answer choice **D**:

Possible misconception: The student might have incorrectly read the problem and thought that it said only 5 students got stickers.

Suggestions:

- Read the story aloud.
- Underline the important information.
- Ask yourself, "What quantities do we know?"
- Identify each quantity with a unit or a label.



## reflection



When you have about 2 minutes left, stop the discussion, even if they are not finished. Have students respond to the reflection prompt in the Student Book.

# Checkpoint 1

# 7

## checkpoint

Solve each problem below. Write your answer on the answer sheet.  
Circle each answer in your checkpoint lesson, too.

1. Mr. Samson is planning to have a class party.  
He has 9 students in his class. How many hot dogs  
will he need to buy so that each student can have 3 hot dogs?



- A** 27 hot dogs      **B** 21 hot dogs      **C** 18 hot dogs      **D** 3 hot dogs

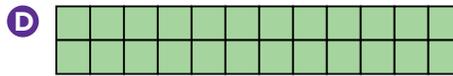
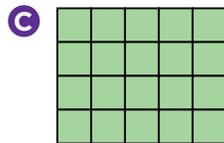
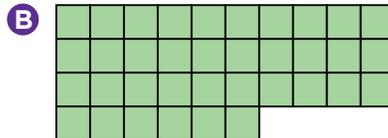
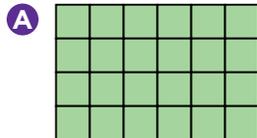
2. Some teams got on the bus to go to the basketball tournament.  
Each team had 5 players. Altogether, 45 players got on the bus.  
How many teams got on the bus?

- A** 225 teams      **B** 45 teams      **C** 9 teams      **D** 50 teams



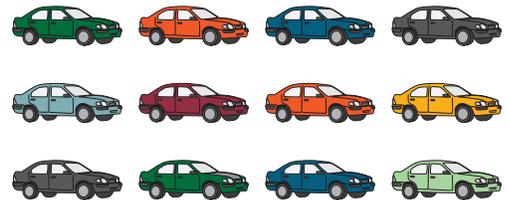
3. Which array best represents this problem?

Amir has 4 bags of marbles and in each bag he has 6 marbles. How many marbles does he have altogether?



4. Which equation best represents this problem?

Tran arranged his toy cars on the shelf this way. How many toy cars does he have?



**A**  $3 + 4 = \underline{\quad}$

**B**  $5 \times 3 = \underline{\quad}$

**C**  $6 \times 2 = \underline{\quad}$

**D**  $3 \times 4 = \underline{\quad}$

## learning from the checkpoint

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### Problem 1

The correct answer to problem 1 is **A**.

What mistake would cause a student to choose answer **D**?

### Problem 2

The correct answer to problem 2 is **C**.

What mistake would cause a student to choose answer **A**?

### Problem 3

The correct answer to problem 3 is **A**.

What mistake would cause a student to choose answer **D**?

### Problem 4

The correct answer to problem 4 is **D**.

What mistake would cause a student to choose answer **A**?

## Class Information

School \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Teacher (mathematics class) \_\_\_\_\_

## Student Information

Grade \_\_\_\_\_

First name \_\_\_\_\_

Last name \_\_\_\_\_

Date of birth \_\_\_\_\_ (month) \_\_\_\_\_ (day) \_\_\_\_\_ (year)

Male  Female

How many years have you been at this school? \_\_\_\_\_ years

Do you usually speak English at home? Yes  No

Does anyone in your home usually speak a language other than English?

Yes  No

Name \_\_\_\_\_

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>1.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>2.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>4.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Checkpoint 2

# 13

### checkpoint

Solve each problem below. Write your answer on the answer sheet.  
Circle each answer in your checkpoint lesson, too.

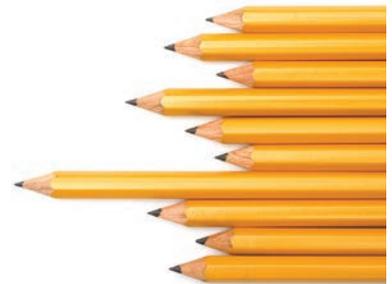


1. The students on a playground are forming teams for a game. There are 4 students on each team. When every student is placed on a team, exactly 20 teams have been formed. How many students are on the playground?

**A** 5 students      **B** 24 students      **C** 16 students      **D** 80 students

2. Mrs. Chi plans to give 3 pencils to each student who helps at the school festival. She has 27 pencils. How many students can get pencils before she has to buy more?

**A** 24 students      **B** 9 students  
**C** 81 students      **D** not enough information



3. Mr. Hakim has 35 students in his class. He gives his students stickers when they complete their homework. Today, he gave stickers to all but 5 students. How many students got stickers?

**A** 30 students      **B** 40 students  
**C** 7 students      **D** 5 students



## learning from the checkpoint

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### Problem 1

The correct answer to problem 1 is **D**.

What mistake would cause a student to choose answer **A**?

### Problem 2

The correct answer to problem 2 is **B**.

What mistake would cause a student to choose answer **D**?

### Problem 3

The correct answer to problem 3 is **A**.

What mistake would cause a student to choose answer **D**?

## Class Information

School \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Teacher (mathematics class) \_\_\_\_\_

## Student Information

Grade \_\_\_\_\_

First name \_\_\_\_\_

Last name \_\_\_\_\_

Date of birth \_\_\_\_\_ (month) \_\_\_\_\_ (day) \_\_\_\_\_ (year)

Male  Female

How many years have you been at this school? \_\_\_\_\_ years

Do you usually speak English at home? Yes  No

Does anyone in your home usually speak a language other than English?

Yes  No

Name \_\_\_\_\_

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>1.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>2.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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