Name: _____   Date: _____

4.OA.1

Write a multiplication equation to match each comparison statement.

comparison statement	multiplication equation
21 days is 3 times longer than 7 days.	
8 pounds is 4 times as heavy as 2 pounds.	
72 inches is 12 times the legnth of 6 inches.	
30 fish is 5 times as many as 6 fish.	

Write a comparison statement to match the multiplication equation.

comparison statement	multiplication equation
	36 = 9 x 4

Name: _____   Date: _____

4.OA.1

Write a multiplication equation to match each comparison statement.

comparison statement	multiplication equation
21 days is 3 times longer than 7 days.	
8 pounds is 4 times as heavy as 2 pounds.	
72 inches is 12 times the legnth of 6 inches.	
30 fish is 5 times as many as 6 fish.	

Write a comparison statement to match the multiplication equation.

comparison statement	multiplication equation
	36 = 9 x 4

Teacher notes:

• The target concept of this task is described in 4.OA.1: *Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.*
• The students are expected to write a multiplication equation to match each statement. As indicated in the wording of the standards, the order of the factors does not matter and an equation should be considered as matching a statement regardless of the order of the factors or the order of the equation itself. For example, for "21 days is 3 times longer than 7 days", students may write *3 x 7 = 21, 7 x 3 = 2*1, *21 = 3 x 7* or *21 = 7 x 3*.
• The student should write multiplication equations, not division equations. However, if the students write a correct division equation, that will indicate <u>some</u> level of understanding of number relationships.
• If students write an expression instead of equation (i.e., 3 x 7 instead of 3 x 7= 21), that should be considered as evidence that the student "got" the relationship between comparative statements and multiplication. In this case, the students will simply need instruction in, or clarification of, the difference between "expressions" and "equations".
• For the second part of the task, students should write a stament that matches the give multiplication equation. The statements does not have to have a specific context or labeled numbers, but can simply read "36 is 9 times as much as 4" or "36 is 4 times as much as 9."

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	1 Marginal: Partial Accomplishment Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	2 Proficient: Substantial Accomplishment Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	3 Excellent: Full Accomplishment Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

Adapted from Van de Walle, J. (2004) Elementary and Middle School Mathematics: Teaching Developmentally. Boston: Pearson Education, 65

Name_____   Date_____

4.OA.1

Last weekend, Cassidy, Jefferson, and Braden played three basketball games against their cousins, Sammy, Kara, and Mitchell. The chart to the right shows how many baskets each were able to make during their three games.

Fill in each blank with a player's name or a number to make each comparison statement true. Below each comparison statement, write a multiplication equation to show that the statement is true.

player	# of baskets
Cassidy	24
Jefferson	18
Braden	8
Sammy	6
Kara	36
Mitchell	3

statement: _____ made three times as many baskets as Sammy.

   multiplication equation: _____

   ....

statement: Cassidy made _____ times as many baskets as Mitchell.

   multiplication equation: _____

   ....

statement: Jefferson made _____ times as many baskets as _____.

   multiplication equation: _____

   ....

statement: Sammy made double the number of baskets _____ made.

   multiplication equation: _____

HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work. You may also choose to give stduents extra paper on which they can do their work.
• The target concept of this task is described in 4.OA.1: *Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.*
• Part of this task requires students to fill in the comparative statements about the number of baskets. Three of the statements have a particular correct answer, while the third has more than one possible answer. Each blank needs to be filled in with a number or a name. The context of the sentences should make it clear which blank requires a number and which requires a name.
• In addition, the students are expected to write a multiplication equation to match each statement. As indicated in the wording of the standards, the order of the factors does not matter and an equation should be considered as matching a statement regardless of the order of the factors or the order of the equation itself. For example, for "Jefferson made three times as many baskets as Sammy", students may write *3 x 6 = 18, 6 x 3 = 18, 18 = 3 x 6,* or *18 = 6 x 3.*
• The student should write multiplication equations, not division equations. However, if students write a correct division equation, that will indicate <u>some</u> level of understanding of number relationships.
• If students write an expression instead of equation (i.e., 3 x 7 instead of 3 x 7= 21), that should be considered as evidence that the student "got" the relationship between comparative statements and multiplication. In this case, the students will simply need instruction in, or clarification of, the difference between "expressions" and "equations".

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment	1 Marginal: Partial Accomplishment	2 Proficient: Substantial Accomplishment	3 Excellent: Full Accomplishment
The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

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HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

Name_____   Date_____
4.OA.1

Hannah was doing a report on animals' sleep habits. She made the charts below to show the number of hours certain animals usually sleep each day.

animal	bat	mouse	guinea pig	possum	gray seal
hours of sleep	20 hours	12 hours	9 hours	18 hours	6 hours

animal	tiger	horse	cheetah	cow	goat
hours of sleep	16 hours	3 hours	12 hours	4 hours	l5 hours

Fill in the blanks to make the statements true.

A possum sleeps _____ times as many hours a day as a guinea pig.

A bat sleeps _____ times as many hours per day as a cow.

Write a multiplication equation to show the
relationship between the length of time a gray
seal sleeps and the length of time a possum sleeps.   _____ x _____ = _____

When Hannah was reading about donkeys, she said, "I can't believe that goats sleep 5 times as many hours per day as donkeys." Find the number of hours per day a donkey sleeps. Show your thinking below using words, numbers, and/or pictures.

A donkey sleeps _____ hours per day.

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work. You may also choose to give students extra paper on which they can do their work.
• The target concept of this task is described in 4.OA.1: *Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.*
• For the first part of this task, students need to fill in blanks to compare the number of hours animals sleep.
• For the second part, the students are expected to write a multiplication equation to match each statement. As indicated in the wording of the standards, the order of the factors does not matter and an equation should be considered as matching a statement regardless of the order of the factors or the order of the equation itself. For this part, students may write *3 x 6 = 18 or 6 x 3 = 18.*
• For the final part of the task, students need to figure out that donkeys sleep 3 hours per day. There are a couple of common errors that students may make for this part of the task. Some students may write "10", "20", or "75". If students write "10" or "20" then that will show that they are having trouble distinguishing betweeen additive and mutliplicative comparison and need more practice with those types of situations. If the student writes "75", while still incorrect, this will show <u>some</u> level of understanding that the situation in the task is multiplicative, since 5 x 15 = 75. Even though "75" is a completely unreasonable answer in terms of size, it does show more understanding of the target concept than "10" or "20" would show.

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment	1 Marginal: Partial Accomplishment	2 Proficient: Substantial Accomplishment	3 Excellent: Full Accomplishment
The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

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HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

Name_____   Date_____
4.0A.1

Joe has 8 pieces of gum. Lynn has 6 times as many pieces of gum as Joe. How many pieces of gum does Lynn have? Use pictures or words to explain how you solved the problem.

Lynn has ____ pieces of gum.

Lynn's friend Sarah said, "Wow! You have 4 times as many pieces of gum as I do!" How many pieces of gum does Sarah have?

Sarah has ____ pieces of gum

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work. You may also choose to give students extra paper on which they can do their work.

• The target concept of this task is described in 4.OA.1: *Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.*

• For the first part of this task, students need to identify that Lynn has 48 pieces of gum. A common error for this task would be for students to indicate that Lynn has "14" or "2" pieces of gum. If students write either of those answers, then that will show that they are having trouble distinguishing betweeen additive and mutliplicative comparison and need more practice with those types of situations. If the student writes an incorrect answer as a result of a mislearned fact (i.e., writing that 6 x 8 = 46) while still incorrect, this will show some level of understanding that the situation in the task is multiplicative.

• For the second part of the task, the students should write that Sarah as 12 pieces of gum. As with the first part, if students write "44" or "52", then that will show that they are having trouble distinguishing betweeen additive and mutliplicative comparison and need more practice with those types of situations. If they write "192", while also incorrect, this will show some level of understanding that the situation in the task is multiplicative, since 48 x 4 = 192. Even though "192" is an unreasonable answer in terms of size, it does show more understanding of the target concept than "44" or "52" would show.

• In scoring this task, you may choose to use the level of student work to distinguish between a 3 and a 2 or a 2 and a 1. If so, it is important to make it clear to the students in advance that the task will be scored not only for the correct answer, but also for the work that they show.

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment	1 Marginal: Partial Accomplishment	2 Proficient: Substantial Accomplishment	3 Excellent: Full Accomplishment
The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

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HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

Name_____   Date_____
4.OA.1

Madeline has three times as many fish as Mallory. If Madeline has 18 fish, how many fish does Mallory have? Use pictures and/or words to explain your answer.

Mallory has _____ fish

Karen has 5 times as many fish as Kelly. Fill in the chart to show three different amounts of fish that Karen and Kelly might have.

possibility 1

Karen	Kelly
____ fish	____ fish

possibility 2

Karen	Kelly
____ fish	____ fish

possibility 3

Karen	Kelly
____ fish	____ fish

Name_____   Date_____
4.OA.1

Madeline has three as many fish as Mallory. If Madeline has 18 fish, how many fish does Mallory have? Use pictures and/or words to explain your answer.

Mallory has _____ fish

Karen has 5 times as many fish as Kelly. Fill in the chart to show three different amounts of fish that Karen and Kelly might have.

possibility 1

Karen	Kelly
____ fish	____ fish

possibility 2

Karen	Kelly
____ fish	____ fish

possibility 3

Karen	Kelly
____ fish	____ fish

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work. You may also choose to give students extra paper on which they can do their work.

• The target concept of this task is described in 4.OA.1: *Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.*

• For the first part of this task, students need to identify that Mallory has 6 fish. Common error for this task would be for students to indicate that Mallory has "15", "21", or "54" fish. If students write 15 or 21, then that will show that they are having trouble distinguishing betweeen additive and mutliplicative comparison and need more practice with those types of situations. However, if they write "54", while also incorrect, this will show some level of understanding that the situation in the task is multiplicative, since 18 x 3 = 54. Even though 54 is both incorrect and unreasonable in terms of size, it does show more understanding of the target concept than 15 or 21 would show.

• For the second part of the task, the students should write pairs of numbers so that Karen's number is 5 times the size of Kelly's number. Look to see if the students write pairs of numbers that show an additive realtionship (ex: 5 & 10, 12 & 17, etc.), that will indicate that they are having trouble distinguishing betweeen additive and mutliplicative comparison and need more practice with those types of situations. If they write pairs of numbers that do show a multiplicative relationship but are reversed (giving Kelly the higher number), that would be incorrect but would show an understanding of multiplicative vs. additive number relationships.

• In scoring this task, you may choose to use the level of student work to distinguish between a 3 and a 2 or a 2 and a 1. If so, it is important to make it clear to the students in advance that the task will be scored not only for the correct answer, but also for the work that they show.

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
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HOWARD COUNTY
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Name: _____   Date: _____

4.OA.2

Jayden helped his dad plant a baby pear tree in their yard. Jayden read the tag on the tree and joked, "This tree is just a baby and it's already three feet tall!"

Jayden's dad pointed at a maple tree in the back of the yard and said, "That tree used to be the same size when I first planted it a years ago. Now it's six times the height of this little pear tree."

Jayden was wondering what the height of the maple tree was, so his dad drew him the diagram to the right.
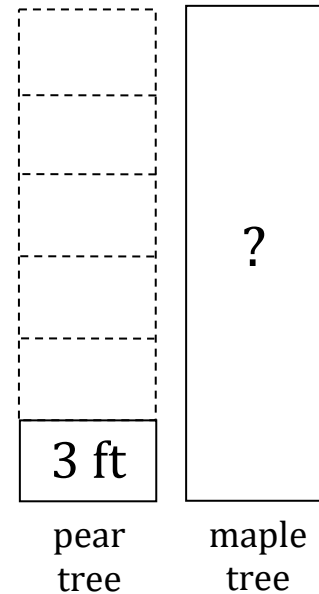
How can the diagram that Jayden's dad drew help Jayden figure out the height of the maple tree?

```
┌ ─ ─ ─ ┐  ┌───────┐
│       │  │       │
├ ─ ─ ─ ┤  │       │
│       │  │       │
├ ─ ─ ─ ┤  │   ?   │
│       │  │       │
├ ─ ─ ─ ┤  │       │
│       │  │       │
├ ─ ─ ─ ┤  │       │
│       │  │       │
│ 3 ft  │  │       │
└───────┘  └───────┘
 pear       maple
 tree        tree
```

_____

_____

_____

_____

Jayden was trying to figure out how to use an operation to figure out the maple tree's height. He wasn't sure which expression he should use: 3 + 6 or 3 x 6.

Identify the expression that Jayden should use to find the maple tree's height and explain why that expression is the correct one for Jayden to use.

_____

_____

_____

_____

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work.   You may also choose to give students extra paper on which they can do their work.

• The target concept of this task is described in 4.OA.2: *Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.*

• This task uses a diagram sometimes referred to as a bar diagram or a tape diagram. The students do **not** need to know the name of the type of diagram. This type of diagram is an easy way to representing multiplicative (and other types of numeric) relationships, and it may be helpful to your students to show them how this type of diagram can be used to help work thorugh various mathematical situations.

• For the first part of the task, students should describe how the different parts of the diagram relate to the tree situation. For the second part of the task, students should identify "3 x 6" as the correct expression and explain how that expression relates to the tree situation. A student should not simply say that the tree is 18 feet tall (3 x 6) and not 9 feet tall (3 + 6). While that would show that the student "got" the target concept, in order to show "full accomplishment", students should be able to explain why "6 times taller" and "6 feet taller" are not the same. The level of specifics in the answers can help distinguish between "full" and "substantial" accomplishment.

• When reviewing the scored tasks with the class, it may be helpful to clarify (or have a student clarify if a particular student's answer reflects this) that adding 6 feet to 3 feet creates a height that is <u>3 times taller</u> than the original height, while a tree that is 6 times taller is actually 15 feet taller.

| Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment	1 Marginal: Partial Accomplishment	2 Proficient: Substantial Accomplishment	3 Excellent: Full Accomplishment
The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

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HOWARD COUNTY
PUBLIC SCHOOL SYSTEM

Name: _____   Date: _____

4.OA.2

Abby and her friend Chris each ran a lemonade stand on their streets. Abby lives on a busy street, but Chris does not. When Abby and Chris compared what they had earned, Chris said, "Wow! You made $200! That's 4 times as much as I earned!" This made Abby wonder how much Chris earned.

Look at the two models below that Abby drew to figure out how much Chris earned.

MODEL 1   MODEL 2

Abby	$200					Abby	$200	
Chris	?					Chris	?	$4
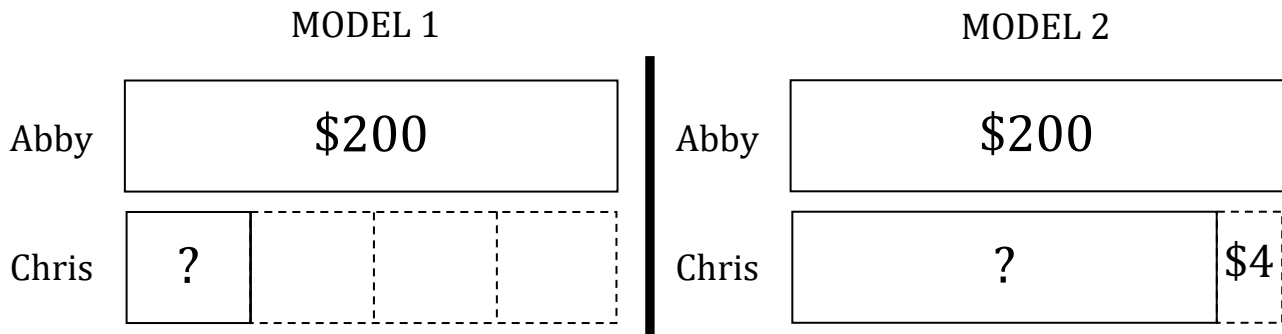
Which model best represents the relationship between Abby and Chris's earnings?

circle one: model 1   model 2

Explain why you think the model you chose best represents the relationshhip between Abby and Chris's earnings. Then, identify the amount of money that Chris earned at his lemonade stand.

_____

_____

_____

_____

Chris earned $_____ at his lemonade stand.

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work. You may also choose to give students extra paper on which they can do their work.

• The target concept of this task is described in 4.OA.2: *Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.*

• This task uses a diagram sometimes referred to as a bar diagram or a tape diagram. The students do **not** need to know the name of the type of diagram. This type of diagram is an easy way to representing multiplicative (and other types of numeric) relationships, and it may be helpful to your students to show them how this type of diagram can be used to help work thorugh various mathematical situations.

• For this task, students should select "model 1" as matching the problem situation and explain how that model relates to the problem situation. Their answer should show their understanding that Abby's amount is 4 times the size of Chris's amount not just $4 more than Chris's. The level of specifics in the answer can help distinguish between "full" and "substantial" accomplishment.

• For the last part, stduents should identify that Chris earned $50. Common incorrect answers could be "$196", "$204", or "$800". If students write $196 or $204, that will show that they are having trouble distinguishing betweeen additive and mutliplicative comparison and need more practice with those types of situations. If they write $800, while also incorrect, this will show some level of understanding that the situation in the task is multiplicative, since $200 x 4 = $800. Even though $800 is incorrect as well as unreasonable answer in terms of size, it does show more understanding of the target concept than $196 or $204 would show.

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	1 Marginal: Partial Accomplishment Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	2 Proficient: Substantial Accomplishment Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	3 Excellent: Full Accomplishment Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

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Name: _____   Date: _____

4.OA.2

Lauren and her family just adopted a dog, and
her mom asked her to run to the pet store and
pick up some dog food. Lauren found a food she
thought her dog would like, Doggy Delight. Next
to the food was a chart (shown to the right) that
listed the bag sizes and the weight of each bag size.

Compare the weight of each bag. Then, read
the statements below about the bags. Circle the
letter T or F next to each statement to show if
it is true or false.

Doggy Delight dog food

bag size	weight
extra-small	3 lbs
small	5 lbs
medium	9 lbs
large	15 lbs
extra-large	20 lbs
jumbo	30 lbs

1.   T   F   The large bag weighs 6 more pounds than the medium bag.

2.   T   F   The jumbo bag is 2 times as heavy as the large bag.

3.   T   F   The medium bag's weight is 6 times the weight of the extra-small
bag.

4.   T   F   The jumbo bag weighs 10 times as much as the extra-large
bag.

5.   T   F   The extra-large bag weighs 4 more pounds than the small bag.

6.   T   F   The jumbo bag is 6 times as heavy as the small bag.

7.   T   F   The small bag weighs 2 times as much as the extra-small bag.

8.   T   F   The medium bag weighs 4 pounds more than the small bag.

9.   T   F   The large bag's weight is triple the weight of the small bag.

10. T   F   The extra large bag's weight is 15 pounds more than the small
bag's

                    weight.

11. T   F   The extra large bag weighs 11 times as much as the medium bag.

12. T   F   The large bag's weight is 5 times the weight of the extra-small bag.

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work. You may also choose to give students extra paper on which they can do their work.
• The target concept of this task is described in 4.OA.2: *Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.*
• The true statements are 1, 2, 6, 9, 10, and 12.
• The numbers for the weights, as well as the numbers in each comparison statement, were chosen to require students to think carefully about the different between multiplicative and additive comparisons. For instance, statement 3 reads: "The medium bag's weigh is 6 times the weight of the extra-small bag." Since the medium bag weighs 9 lbs and the extra-small bag weighs 3 lbs, this statement is incorrect. 9 and 3 have a difference of 6, however, so students need to be able to distinguish that "6 times heavier" is not the same as "6 pounds more".
• When reviewing the scored tasks with your class, it may be helpful to use a bar diagram or number line to model the relationships between different bag weights. This may allow students to see the difference between the multiplicative and additive statements, as well as give them a strategy to use when solving similar problems in the future. You can extend this task by modeling a diagram for some of the statements and the having your students create models for the remaining statements. Another extension option is to have the student create equations with unknown numbers to represent the problem (e.g., $l = 6 + m$ for "The large bag weighs 6 more pounds than the medium bag.") as described in the standard. Yet another extension option is to have your students rewrite each of the false statements to make them true.

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	1 Marginal: Partial Accomplishment Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	2 Proficient: Substantial Accomplishment Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	3 Excellent: Full Accomplishment Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

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Name_____   Date_____
4.0A.2

In Jacob's yard, there is an apple tree and a pear tree. The apple tree is 4 times as tall as the pear tree. Which pairs of height below could describe the apple and pear trees? Put a 🗑 in the box next to each pair of heights that could describe the trees' sizes.

☐ apple tree: 24 feet
    pear tree: 20 feet
	☐ apple tree: 16 feet
	    pear tree: 4 feet
		☐ apple tree: 36 feet
		    pear tree: 32 feet

☐ apple tree: 8 feet
    pear tree: 32 feet
	☐ apple tree: 20 feet
	    pear tree: 5 feet
		☐ apple tree: 12 feet
		    pear tree: 3 feet

☐ apple tree: 24 feet
    pear tree: 6 feet
	☐ apple tree: 40 feet
	    pear tree: 10 feet
		☐ apple tree: 8 feet
		    pear tree: 4 feet

The apple tree gives more fruit than the pear tree because it is larger. This year, Jacob collected 6 times as many apples as pears. If he collected over 10 pears, how many apples could he have collected? Fill in the blank to tell how many apples Jacob might have collected, and then use the space below to show Jacob how you came up you're your answer. You may show your thinking using words, numbers, and/or pictures.

Jacob could have collected _____ apples.

Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work.   You may also choose to give students extra paper on which they can do their work.

• The target concept of this task is described in 4.OA.2: *Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.*

• For the first part of this task, students should select the pairs of heights that correctly match the problem situation: apple 16ft & pear 4 ft, apple 20 ft & pear 5 ft, apple 12 ft & pear 3 ft, apple 24 ft & pear 6 ft, apple 40 ft & pear 10 ft.

• Examining any incorrect choices can help give insight into the students' understanding of multiplicative vs. additive relationships. If a students selects "apple 24 ft & pear 20 ft", "apple 36 ft & pear 32 ft", and/or "apple 8 ft & pear 4ft", this will will show that they are having trouble distinguishing betweeen additive and mutliplicative comparison and need more practice with those types of situations. If the student selects the answer "apple 8 ft & pear 32 ft", while still incorrect, this pair of numbers does show a "times 4" relationship", but the numbers are in the wrong order. Choosing this answer would indicate that the student has some understanding of multiplicative vs. additive relationships.

• For the last part of the task, there are a variety of possible answers that the students can choose. In order to match the criteria of the question, the lowest possible number that the students can name is "66." Students can correctly choose any multiple of 6 that is higher than 60.   If a student gives an incorrect answer, it is important to consider whether the answer shows an understanding of multiplicative vs. additive relationshups. This will allow you to better determine next steps for your instruction.

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment	1 Marginal: Partial Accomplishment	2 Proficient: Substantial Accomplishment	3 Excellent: Full Accomplishment
The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

Adapted from Van de Walle, J. (2004) Elementary and Middle School Mathematics: Teaching Developmentally. Boston: Pearson Education, 65

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4.0A.2

Josh, Olivia, Brandon, Steve, and Maddy are all friends. Since each of them has a dog, the five of them have decided to enroll in a dog training class with their pets.

On the first day of class, the kids had to write their names, their pets' names and their pets' weights on the sign-up sheet.

Below are clues to the dogs' weights. Use the clues to figure out what each dog weighs. Show your thinking as you work through the clues. Then, fill in the chart to tell how many pounds each dog weighs.

Pet Training Sign-Up Sheet

owner	dog	weight
Josh	Bruiser	_____ lbs
Olivia	Max	_____ lbs
Brandon	Princess	_____ lbs
Steve	Duke	_____ lbs
Maddy	Snapple	_____ lbs

clue 1: Bruiser weighs 4 times as much as Princess.

clue 2: Snapple weighs 3 more pounds than Brandon's dog.

clue 3: Duke's weight is 5 pounds more than Max's weight.

clue 4: Steve's dog weighs 4 times as much as Snapple.

clue 5: Max is 5 times heavier than Princess.

clue 6: Olivia's dog weighs 7 pounds more than Bruiser.

clue 7: Snapple weighs 10 pounds.

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Teacher notes:

• Students may do calculations on the paper, either to solve or to check their work. You may also choose to give students extra paper on which they can do their work.

• The target concept of this task is described in 4.OA.2: *Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.*

• You may note for the students that all the weights are whole numbers, no decimals or fractions.

• Students should identify the following weights: Bruiser – 28 lbs, Max – 35 lbs, Princess – 7 lbs, Duke – 40 lbs, Snapple – 10 lbs

• The clues require students to be able to distinguish between additive and multiplicative comparisons. There are actually more clues than are necessary to find all the weights, so there are a variety of ways students might find all the weights. In scoring this task, you may choose to use the level of student work to distinguish between a 3 and a 2 or a 2 and a 1. If so, it is important to make it clear to the students in advance that the task will be scored not only for the correct answer, but also for the work that they show.

• When reviewing the scored tasks with your class, it may be helpful to use a bar diagram or number line to model the relationships between different dog weights. This may allow students to see the difference between the multiplicative and additive statements, as well as give them a strategy to use when solving similar problems. You can extend this task by modeling a diagram or number line for some of the pairs of dog weights, and have them create the models for other pairs. Another extension option is to have the student create equations with unknown numbers to represent the problem (e.g., $m = 5 \times p$ for Max is 5 times heavier than Princess) as described in the standard.

Not yet: Student shows evidence of misunderstanding, incorrect concept or procedure.		Got It: Student essentially understands the target concept.	
0 Unsatisfactory: Little Accomplishment The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.	1 Marginal: Partial Accomplishment Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.	2 Proficient: Substantial Accomplishment Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.	3 Excellent: Full Accomplishment Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors that do not impact the mathematics.

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