

EQUATIONS and MODELS FOR SOLVING Unit 4th Grade

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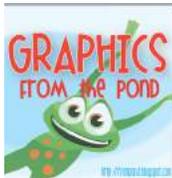


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TO The Teacher

Thank you for purchasing this resource! Within it you will find a complete unit for teaching the fourth grade standards for using equations and models to solve problems for all operations including pre-assessment, content vocabulary, daily warm-ups and exit tickets, daily lessons with student activities, and a post assessment.

While this unit is laid out over a nine day time span do not feel that you must rigidly stick to the timeline. As a teacher you know what is best for your students, and should follow your gut, as some classes may require more time to reach understanding of a concept.

To save on ink and decrease prep time, every page of this unit is created in black and white. To create a more colorful unit print or copy on color paper.

Standards

TEKS

4.5A represent multi-step problems involving the four operations with whole numbers using strip-diagrams and equations with a letter standing for the unknown quantity

CCSS

4.OA.A.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.

ALL ABOUT This Unit

This unit is made up of unique elements that can be used independently or together to provide a complete unit of math instruction.

Content Vocabulary

Vocabulary for this using equations and models to solve problems for all operations unit is included in a few forms.

- Word wall cards make it easy to add your content vocabulary to your word wall
- The word and definition list make a great reference for student math notebooks and teachers alike
 - This list is included completed as well as with blank areas for definitions and examples
- Double-sided word and definition cards are great for review and small group remediation

Pre-Assessment and Student Standard Checklist

To be used as an informal assessment to check students' prior knowledge as well as determine any misconceptions. The data that you gather from this pre-assessment can be recorded on the Student Standards Checklists and used to set student learning goals, form small groups, or partner students based on ability. Checklists fit 11 students per page.

ALL ABOUT This Unit

DAILY WARM-UPS

Eight days of half-page daily warm-ups are provided along with answer keys. Each day has two standards-based questions for students to think through their learning. A student tracking sheet is also included for students to record their own grow and glow areas. To save paper you may choose to project the warm up each day and have students complete their work in math notebooks.

EXIT TICKETS

Eight days worth of exit tickets and answer keys, with one question each, are included two to a page for easy copying. Each of the questions is based on how that standard is tested, providing a test bridge and exposing students to test style language. This serves to build familiarity with standardized testing without overwhelming students.

Exit tickets can be checked as a class, or by the teacher. A checklist of questions is included to track how students are doing on their exit tickets.

ASSESSMENT

An end of unit assessment is included to check for student mastery on the equations and models for solving problems with all operations standards included. This assessment is meant to be used informally. While students should do their best work, it is best to not place too much importance on the test.

Daily Lessons

Eight daily lessons are included in this unit. Each lesson includes:

- Guiding question(s)
- Objectives
- List of necessary materials
- Overview of the lesson
- Student activity sheets when applicable
- Suggestions for small group activity

Day 1 Pre-assessment & Definitions

Day 2 Strip Diagrams for Addition

Day 3 Strip Diagrams for Subtraction

Day 4 Strip Diagrams for Multiplication

Day 5 Strip Diagrams for Division

Day 6 Representing a Problem with an Equation

Day 7 Creating Your Own Models

Day 8 Assessment

Content Vocabulary

Vocabulary for using equations and models to solve problems for all operations unit is included in a few forms.

- Word wall cards make it easy to add your content vocabulary to your word wall
- The word and definition list make a great reference for student math notebooks and teachers alike
 - This list is included completed as well as with blank areas for definitions and examples
 - TIP: print/copy definition list at 80% to fit perfectly in math notebooks
- Double-sided word and definition cards are great for review and small group remediation
 - To complete these cards print, fold along the dotted line with the word and definition on the outside, then tape or glue to secure the card.

equation

a mathematical statement, also known as a number sentence

strip diagram

a model in linear format to show number relationships
sometimes known as a tape diagram

unknown quantity

a part of an equation that is not known, represented by a letter or symbol

model

a visual representation of an equation used to represent a problem situation

MULTIPLICATION & DIVISION VOCABULARY

equation	a mathematical statement also known as a number sentence
strip diagram	a model in linear format to show number relationships sometimes known as a tape diagram
unknown quantity	a part of an equation that is not known, represented by a letter or symbol
model	a visual representation of an equation used to represent a problem situation

equation

a mathematical statement, also known as a number sentence

strip diagram

a model in linear format to show number relationships, sometimes known as a tape diagram

unknown quantity

a part of an equation that is not known, represented by a letter or symbol

Name _____

1 Greg has a box of 24 crayons. Cindy has a box with 12 more crayons than Greg's box. Write an equation that shows c , how many crayons Greg and Cindy have together.

2 There are 748 students at Beeville Elementary. The middle school has 60 less student. Write an equation that shows s , how many students are at the middle school.

3 Bruce has 15 packs of gum. Each pack of gum has 12 sticks. Write an equation showing g , the number of pieces of gum Bruce has.

4 Eliana has 244 baseball cards. She places them in card holders that hold 9 cards per page. Write an equation to show p , the number of pages she will need.

5 A large bag of dog food has 43 pounds of food. A small bag has half amount of a large bag. Write an equation showing f , the amount of food in a large and small bag.

6 Josue baked 144 cupcakes and placed them in boxes with six cupcakes each. He then sold each box for \$4. Write an equation showing $\$$, the amount Josue made from selling cupcakes.

7 Create a strip diagram to represent $178+212=W$

8 Create a strip diagram to represent $982-64=M$

9 Create a strip diagram to represent $157+6=F$

10 Create a strip diagram to represent $99\div 11=R$

Answer Key

1 Greg has a box of 24 crayons. Cindy has a box with 12 more crayons than Greg's box. Write an equation that shows c , how many crayons Greg and Cindy have together.

$$24+24+12=C$$

2 There are 748 students at Beeville Elementary. The middle school has 60 less student. Write an equation that shows s , how many students are at the middle school.

$$748-60=S$$

3 Bruce has 15 packs of gum. Each pack of gum has 12 sticks. Write an equation showing g , the number of pieces of gum Bruce has.

$$15 \times 12 = g$$

4 Eliana has 244 baseball cards. She places them in card holders that hold 9 cards per page. Write an equation to show p , the number of pages she will need.

$$244 \div 9 = p$$

5 A large bag of dog food has 43 pounds of food. A small bag has half amount of a large bag. Write an equation showing f , the amount of food in a large and small bag.

$$43 \div 2 + 43 = f$$

6 Josue baked 144 cupcakes and placed them in boxes with six cupcakes each. He then sold each box for \$4. Write an equation showing $\$$, the amount Josue made from selling cupcakes.

$$144 \div 6 \times 4 = \$$$

7 Create a strip diagram to represent $178+212=W$

178	212
W	

8 Create a strip diagram to represent $982-64=M$

64	W
982	

9 Create a strip diagram to represent $134 \div 6 = F$

F					
134	134	134	134	134	134

10 Create a strip diagram to represent $99 \div 11 = R$

R	R	R	R	R	R	R	R	R	R
99									

DAILY WARM-UPS

Eight days of half-page daily warm-ups are provided along with answer keys.

Each day has two standards-based questions for students to think through their learning.

A student tracking sheet is also included for students to record their own grow and glow areas.

To save paper you may choose to project the warm up each day and have students complete their work in math notebooks.

Name _____

Strip Diagrams

Create a strip diagram to represent the equation $124+56=180$.

Equations

Xavier counts 148 tires in a parking lot full of cars. If each car has 4 tires, how many cars are in the parking lot? Write an equation that shows C, the number of cars.

Name _____

Strip Diagrams

Create a strip diagram to represent the equation $124+56=180$.

Equations

Xavier counts 148 tires in a parking lot full of cars. If each car has 4 tires, how many cars are in the parking lot? Write an equation that shows C, the number of cars.

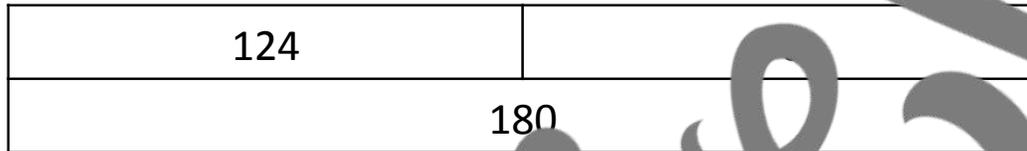
Daily Warm-Up Answer Key

Name _____

Equations and Models for Solving Day 1

Strip Diagrams

Create a strip diagram to represent the equation $124 + 56 = 180$



Equations

Xavier counts 148 tires in a parking lot full of cars. If each car has 4 tires, how many cars are in the parking lot? Write an equation that shows C , the number of cars.

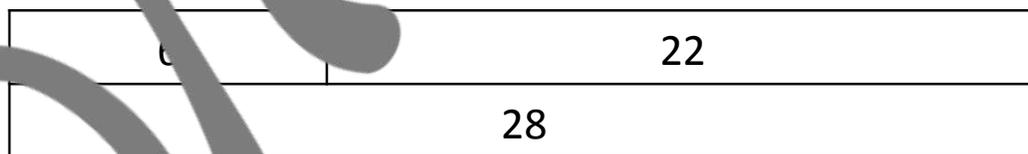
$$148 \div 4 = C$$

Name _____

Equations and Models for Solving Day 2

Strip Diagram

A bag of cat food has 28 servings in it. If a cat has already eaten 6 servings, how many are left? Create a strip diagram to model this problem.



Equations

What equation is represented by the strip diagram below?



$$44 + 16 + 29 = R$$

Name _____

PERSONAL DAILY WARM-UP TRACKING SHEET

	Strip Diagrams	Equations
Day 1		
Day 2		
Day 3		
Day 4		
Day 5		
Day 6		
Day 7		
Day 8		

Exit Tickets

Eight days worth of exit tickets and answer keys, with one question each, are included two to a page for easy copying.

Each of the questions is based on how that standard is tested, providing a test bridge and exposing students to test style language. This serves to build familiarity with standardized testing without overwhelming students.

Exit tickets can be checked as a class, or by the teacher. A checklist of questions is included to track how students are doing on their exit tickets.

Exit Ticket Day 1

Name _____

Rachel has a goal of collecting the fifty quarters that represent each of the fifty states. So far she has collected twenty-two quarters. For her birthday her mom gives her four more quarters.

Which equation can be used to find q , the number of quarters Rachel still needs for her collection to be complete?

- a. $q=50+22+4$
- b. $q=50-22-4$
- c. $q=22+4$
- d. $q=22-4$

EQUATIONS AND MODELS FOR SOLVING

Exit Ticket Day 1

Name _____

Rachel has a goal of collecting the fifty quarters that represent each of the fifty states. So far she has collected twenty-two quarters. For her birthday her mom gives her four more quarters.

Which equation can be used to find q , the number of quarters Rachel still needs for her collection to be complete?

- a. $q=50+22+4$
- b. $q=50-22-4$
- c. $q=22+4$
- d. $q=22-4$

EQUATIONS AND MODELS FOR SOLVING

Exit Ticket Answer Key

Day 1	B
Day 2	A
Day 3	C
Day 4	D
Day 5	A
Day 6	B
Day 7	C
Day 8	D

DAILY LESSONS

Eight daily lessons are included in this unit. Each lesson includes:

- Guiding question(s)
- Objectives
- List of necessary materials
- Overview of the lesson
- Student activity sheets when applicable
- Suggestions for small group activity

DAY 1	Pre-assessment & Definitions
DAY 2	Strip Diagrams for Addition
DAY 3	Strip Diagrams for Subtraction
DAY 4	Strip Diagrams for Multiplication
DAY 5	Strip Diagrams for Division
DAY 6	Representing a Problem with an Equation
DAY 7	Creating Your Own Models
DAY 8	Assessment

Pre-Assessment & Definitions

Guiding Question

How can I show my prior knowledge of how to use models and equations to represent problems?

Materials

- Pre-assessment
- Anchor chart paper

Learning Objective

We will use our prior knowledge of how models and equations represent a problem.

We will define equations and strip diagrams.

L Begin by giving students the pre-assessment as a check
e for prior understanding.
S As a class talk about what they already know about equations and strip diagrams. Some students may know strip diagrams by the name tape diagram.
S Together build a definition of each on chart paper and list several examples. This chart can then be used throughout the unit as reference.

Small Group Ideas

Using student white boards or math journals, review part-part-whole with students and how this relates to addition and subtraction. This pre-teach will help students be successful with strip diagrams.

Anchor Chart Example

Equations

mathematical statement
expression
number sentence

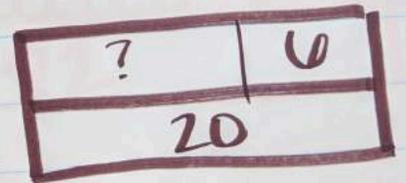
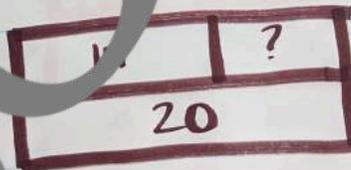
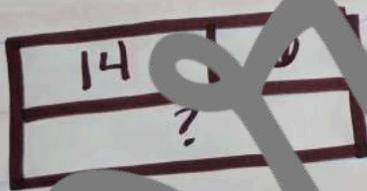
$$14 + 6 = ?$$

$$14 + ? = 20$$

$$? + 6 = 20$$

Strip Diagrams

tape diagram
model
visualization



Strip Diagrams for Addition

Guiding Question

How can I use a model to represent an addition problem?

Materials

- Anchor chart paper
- Addition Model Partner Coach Practice

Learning Objective

We will use strip diagrams to model addition problems.

- L** Begin by referring students back to the anchor chart that you created yesterday.
- E** Ask students to think about how they would use a strip diagram to show an addition problem. Have students turn and talk then ask for students to make suggestions. As
- S** students describe their models either create the model or have them create the model on the chart. Make the connection that an addition strip diagram looks a lot like a part-part-whole model.
- S** Continue to create models for complete equations as well as equations with a letter representing a missing addend or sum.
- O** For practice students will complete the Addition Model Partner Coach Practice.

Small Group Ideas

Using student white boards or math journals, give students addition problems for them to model. Inversely, have students identify the problem that is represented by the model.

Partner Coach

- **To complete Partner Coach**
 - Each pair of students needs one paper and one writing utensil
 - Partner A sits with the writing utensil ready to write
 - Partner B stands behind their partner
 - Partner B uses their mathematical thinking to explain to partner A how to answer each question
 - Partner A records partner B's thinking
 - If partner B needs help, partner A can give them tips
 - After the question is answered correctly, partner A praises partner B, they trade places, and begin with the next question
- **Tips for the teacher:**
 - Explicitly model the process of Partner Coach with your students
 - Show students what a praise and tip/teaching looks and sounds like
 - Explain the proper voice level for working with a partner
 - Circulate and assist or praise students as they work

Addition Models Partner Coach Practice

Partner A:	Partner B:
$162 + 24 = 186$	$321 + 480 = 801$
$16 + 12 = 28$	$25 + 4 = 29$
$976 + 14 = 990$	$201 + 38 = 239$
$34 + 4 = 40$	$R + 45 = 52$
$97 + 36 = P$	$9 + 18 = A$

Addition Models Partner Coach Practice

Answer Key

$162+24=186$

162	24
186	

$321+480=801$

321	480
801	

$16+12=28$

16	12
28	

$25+4=29$

25	4
29	

$976+14=990$

976	14
990	

$201+38=239$

201	38
239	

$31+H=40$

31	H
40	

$R+45=52$

R	45
52	

$27+56=P$

27	56
P	

$9+18=A$

9	18
A	

Answer Key

1 There are 119 student in the first grade and 128 students in the second grade. Write an equation showing t , the total number of students in first and second grade.

$$119 + 128 = t$$

2 A washing machine costs \$546 while a dryer costs \$150 less. Write an equation to show L , how much less a dryer costs.

$$546 - 150 = L$$

3 A baseball team has 9 players on the field at a time. A team has 14 innings. Write an equation to show b , the number of baseball players on the team.

$$9 \times 14 = b$$

4 A bag of candy has 189 pieces in it. A group of 3 friends are sharing the candy equally. Write an equation to show C , the number of pieces of candy each get.

$$189 \div 3 = C$$

5 Rachel has 189 pages left to read in one book. She also has twice as many pages left to read in another book. Write an equation to show P , the number of pages Rachel has to read.

$$189 \times 2 + 189 = P$$

6 Sam has saved \$64 when his grandpa gives him another \$10. He then spends half his money on a game. Write an equation to show $\$$, how much money Sam has left.

$$64 + 10 \div 2 = ?$$

7 Create a strip diagram to represent $714 + 313 = W$

714	313
W	

8 Create a strip diagram to represent $327 - 78 = M$

78	W
327	

9 Create a strip diagram to represent $56 \div 4 = F$

F			
56	56	56	56

10 Create a strip diagram to represent $108 \div 9 = R$

R	R	R	R	R	R	R	R	R
108								