

# PIRATE MATH

## WORD-PROBLEM SOLVING PROGRAM AT SECOND GRADE

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Dear Educator,

Thank you for your interest in Pirate Math Word-Problem Solving program at Second Grade. This Tier 1 intervention program was developed at Vanderbilt University to assist second grade students with single-digit and double-digit word problems that fall under three schema: Total, Difference, and Change. We are pleased to offer you this excerpt to review.

These pages from the Pirate Math manual are provided as a courtesy to allow you to preview a representative sampling of the program. This excerpt includes the following:

1. Table of Contents
2. Introduction
3. Lesson 1
4. Activity Guide
  - a. Teacher-Led Problem
  - b. Partner Work
  - c. Pirate Problems
  - d. Wrap-Up
5. Posters
  - a. Partner Rules
6. Fidelity Checklists
7. Student Materials
  - a. Transparencies
  - b. Worksheets

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If you would like to place an order for Pirate Math Word-Problem Solving Program at Second Grade, call 615-343-4782 for an order form, or visit our secure on-line site for credit card purchases at <http://vkc.mc.vanderbilt.edu/palsorder/catpick?pay=1>.

If you have questions, email Lynn Davies at [lynn.a.davies@vanderbilt.edu](mailto:lynn.a.davies@vanderbilt.edu). Thank you for your interest in Pirate Math.

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# **Pirate Math**

## **Word-Problem Solving Program at Second Grade**

### **TEACHER MANUAL Whole-Class Instruction**

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**This research was supported by Award Number RO1HD059179 from the Eunice Kennedy Shriver National Institute of Child Health & Human Development to Vanderbilt University. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health.**



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# Introduction

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Welcome to Pirate Math! Pirate Math comprises whole-class (primary prevention) and small-group (secondary prevention) levels of word-problem instruction for use with students at second grade instructional level. The focus of Pirate Math is single-digit and double-digit word problems that fall under three schema: Total, Difference, and Change.

This manual contains the teacher lessons and student materials necessary to implement Pirate Math at the whole-class level. A separate manual contains the tutor lessons and student materials for conducting Pirate Math Small-Group Tutoring for students at-risk for poor outcomes with the Pirate Math Whole-Class Instruction program.

Scientific evaluations of Pirate Math indicate that not-at-risk and at-risk second-grade students make greater progress with Pirate Math compared to students who do not participate in Pirate Math on assessments of word problems.



# In This Manual

---

This Teacher Manual contains the following:

## **Introduction**

- Basic information about implementing Pirate Math
- Schedule for implementation
- Information about pairing students for partner work
- List of materials and how to copy materials

## **Lessons 1-34**

- Teacher lessons

## **Activity Guides**

- Guides to core lesson components (teachers are referred to Activity Guides in the lessons)

## **Posters**

- Templates for posters to use during lessons

## **Fidelity Checklists**

- Checklists to ensure proper implementation of Pirate Math

The Supplemental Materials Packet contains the following:

## **Transparencies**

- Templates for materials that teachers use during each lesson

## **Teacher-Led Problem & Partner Work (PW)**

- Copy 1 sheet (front-to-back) for each student

## **Pirate Problems (PP)**

- Copy 1 half-sheet (front-to-back) for each student

## **Pirate Problems Answer Sheet (PPAS)**

- Copy 1 sheet for each student

## **Treasure Map**

- Copy 1 set for each student; place in brads in two-pocket folder

## **Cards**

- Copy 1 card for each student



# Implementation

---

Pirate Math Primary Prevention is conducted **twice** each week for **17 school weeks**. Each session lasts **45 minutes**.

During each session, the teacher teaches a lesson to the students. Then, the students in the class work on a word problem with the teacher. Then, the students are paired, and the pair works together to practice solving word problems. Finally, each student works individually on solving equations and a word problem.

## Daily Activities

### *Teacher Lesson (15-20 minutes)*

- Teacher teaches a lesson to the whole class.
- Teacher uses Transparencies for visual representations.

### *Teacher-Led Problem (5 minutes)*

- Students work with the teacher to solve a word problem. (PW)
- Student work should mimic the teacher's work.

### *Partner Work (10 minutes)*

- Students are paired together, and the pair works together to solve two word problems. (PW)
- Teacher monitors pairs and provides feedback as needed.
- After finishing the two word problems (or at the end of approximately 8 minutes), students check their work against an example provided by the teacher.

### *Pirate Problems (10-15 minutes)*

- Each student works individually on a Pirate Problems sheet. (PP)
- As students finish the Pirate Problems sheet, students raise their hand. The teacher comes and grades the student's work using the Pirate Problems Answer Sheet. (PPAS)
- Each student colors in their score on a Treasure Map in their Pirate Math folder.



# Schedule

---

DAY	TEACHER LESSON
1	Understanding math symbols
2	Introduce finding X
3	Finding X
4	Numbering charts and graphs
5	Introduce Total problems (T as X)
6	Total problems (T as X)
7	Total problems (T as X)
8	Total problems (P1 and P2 as X)
9	Total problems
10	Total problems
11	Total problems with three parts
12	Total problems
13	Introduce Difference problems (D as X)
14	Difference problems (D as X)
15	Difference problems (D as X)
16	Difference problems (B and s as X)
17	Difference problems
18	Difference problems
19	Difference problems
20	Difference problems
21	Difference problems
22	Difference problems
23	Difference problems
24	Introduce Change problems (E as X)
25	Change problems (E as X)
26	Change problems (C as X)
27	Change problems (ST as X)
28	Change problems
29	Change problems with two changes
30	Change problems
31-34	Review



# Teacher Materials

During each teacher lesson, the teacher will use *Transparencies*. Each transparency is labeled with a **T**. These do not have to be copied as transparencies. They can be projected via a document camera or scanned and projected via projector. The display of each transparency should be large enough so all students in the classroom can see the transparency. The teacher writes on some transparencies; others are for examples.

The transparencies are organized by lesson. For example, PM6 T2 is the second transparency shown on Day 6 of Pirate Math. The following are examples of transparencies for different parts of the lessons:

Review

T1

Kay has 10 fewer markers than Rob.

$B - s = D$

PM 21

This sample transparency is labeled in the top left corner (T 1). It is the first transparency for Lesson 21.

The transparency is labeled in the top left corner (T 2), so this is the second transparency teachers use on Lesson 21. Problem A is the first word problem teachers solve each day. Teachers write all word-problem work on the transparency.

Problem A

T2

Pat and Liz weigh 90 pounds together. Pat weighs 50 pounds and is 4 feet tall. How much does Liz weigh?

PM 21

T4

**Teacher-Led Problem**

Prices at School Store	
Folder	
Glue	
Notebook	
Ruler	?

Each stands for 5¢

A ruler costs 10¢ more than glue. How much money does the ruler cost?

PM 21

The transparency is labeled in the top left corner (T 4), so this is the fourth transparency for Lesson 21. Students have a paper copy of this transparency so students can copy the teacher work on their own copy.

The transparency is labeled T5, so this is the fifth transparency for Lesson 21. Students are shown the Partner Work Answer Sheet at the conclusion of Partner Work.

T5

**Partner Work**  
Answer Sheet

D Farmer Hank has <sup>B</sup> more cows than horses. He has <sup>S</sup> horses. He also has 9 chickens. How many cows does he have?

$$\begin{array}{rcl} B - S & = & D \\ X - 4 & = & 6 \\ 10 - 4 & = & 6 \\ X & = & 10 \text{ cows} \end{array}$$

D Tori has <sup>B</sup> pets. Ali has <sup>S</sup> pets. How many more pets does Tori have than Ali?

$$\begin{array}{rcl} B - S & = & D \\ 4 - 2 & = & X \\ 4 - 2 & = & 2 \\ X & = & 2 \text{ pets} \end{array}$$

PM 21

PPAS 21

$$\begin{array}{lcl} X - 1 = 8 & \underline{X = 9} & \\ 14 - X = 9 & \underline{X = 5} & \\ X - 10 = 10 & \underline{X = 20} & \\ 5 + 8 = X & \underline{X = 13} & \\ X - 3 = 2 & \underline{X = 5} & \end{array}$$

2 pts. per problem:  
1 pt. Correct answer  
1 pt. Writing X =  
Score = \_\_\_\_ / 10 pts.

Tino's Birthday Money	
Grandma	
Parents	
Uncle	

T How much money did Tino get from his grandma and uncle?

$$\begin{array}{rcl} P1 + P2 & = & T \\ \$4 + \$3 & = & X \\ \$4 + \$3 & = & \$7 \\ X & = & \$7 \end{array}$$

1 pt. Underlined label (money)

1 pt. Correct problem type equation ( $P1 + P2 = T$ )

1 pt. Checked important numbers (4, 3)

1 pt. Correct # sentence ( $4 + 3 = X$ )

1 pt. Showed work

1 pt. Numbered graph

1 pt. Wrote X =

2 pts. Correct answer (7)

1 pt. Correct label (\$)

Score = \_\_\_\_ / 10 pts.

TOTAL SCORE: \_\_\_\_ / 20

The teacher will also use a **Pirate Problems Answer Sheet (PPAS)** to grade each student's Pirate Problems.

For the Find X problem, the teacher circles each problem the student answers correctly. For the word problem, the teacher circles each component the student answered correctly. Maximum score for the Pirate Problems is 20.



# Student Materials
















Each Pirate Math session includes Teacher-Led Problem, Partner Work, and Pirate Problems.


Here are sample materials used during each lesson:

The **Teacher-Led Problem (PW)** is worked on simultaneously with the teacher and students. As the teacher shows word-problem work, the students write the same work on their paper.

PW 21

**Teacher-Led Problem**

Prices at School Store	
Folder	    
Glue	    
Notebook	    
Ruler	?

Each  stands for 5¢

A ruler costs 10¢ more than glue. How much money does the ruler cost?

PW 21

**Partner Work**

Farmer Hank has 6 more cows than horses. He has 4 horses. He also has 9 chickens. How many cows does he have?

Tori has 4 pets. Ali has 2 pets. How many more pets does Tori have than Ali?

During **Partner Work (PW)**, students are paired together. The pairs work together on solving two word problems, but each student writes on their own paper.

PP 21

$X - 1 = 8$

$14 - X = 9$

$X - 10 = 10$















$5 + 8 = X$

$X - 3 = 2$

Each student works on **Pirate Problems (PP)** at the end of each lesson. Students solve 5 equations and 1 word problem. The teacher grades the Pirate Problems using the Pirate Problems Answer Sheet (PPAS).

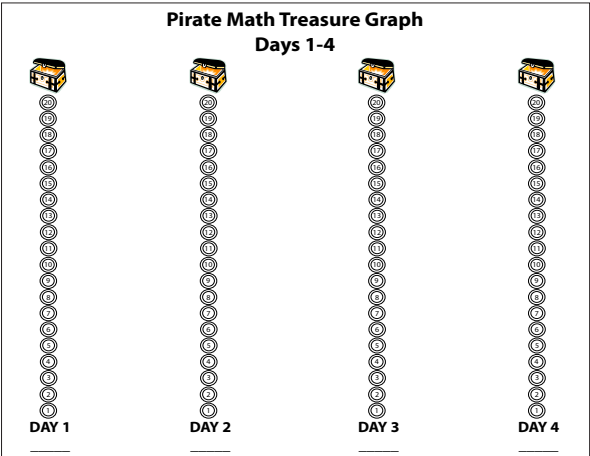
PP 21

Tino's Birthday Money

Grandma	   
Parents	      
Uncle	  

How much money did Tino get from his grandma and uncle?


Students graph their Pirate Problems score on the **Pirate Math Treasure Graph**. This graph is copied and placed in the student's Pirate Math folder.



Students have three cards for use during Pirate Math. Cards are copied onto colored card stock and kept in the Pirate Math folder. (Cards are given to students as each problem type is introduced.)

**TOTAL**

1. Write  $P1 + P2 = T$ .
2. What's T?
3. What's P1 and P2?
4. Write the signs.
5. Find X!




$P1 + P2 = T$

The Total card is copied onto yellow card stock. In a Total problem, two parts (**P1** and **P2**) are put together into a total (**T**).

**DIFFERENCE**

1. Write  $B - s = D$ .
2. What's the compare sentence?  
• Does it give D?
3. What's B and s?
4. Write the signs.
5. Find X!




$B - s = D$

The Difference card is copied onto blue card stock. In a Difference problem, two amounts are compared - a bigger amount (**B**) and a smaller amount (**s**) - for a difference (**D**).

**CHANGE**

1. Write  $ST + C = E$  or  $ST - C = E$ .
2. What's ST?
3. What's C?
4. What's E?
5. Write the signs.
6. Find X!



$ST + C = E$   
 $ST - C = E$

The Change card is copied onto green card stock. In a Change problem, there is a starting amount (**ST**) that increases or decreases - a change (**C**) - into an end amount (**E**).



# Organizing Student Materials

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Pirate Math materials are organized into folders with brads and inside pockets.

Each student has their own folder. The student's name is written on the outside of the folder.

On the inside, label the left-hand pocket "**Cards**." Label the right-hand pocket "**Worksheets**."

The **Pirate Math Treasure Graph** is copied and placed within the brads of the folder.

As cards are introduced in the lessons, students are given their own card. Students store the cards on the "Cards" pocket for use during each lesson.

The worksheets (i.e., **PW**, **PP**, and **PPAS**) are handed out to students during each lesson. At the end of the lesson, students place all worksheets in the "Worksheets" pocket. Students can take home worksheets every few weeks.



# Other Materials

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## Teacher Materials

Three posters should be displayed in the classroom. Templates for the posters are included in this manual. Posters do not have to be large (11" x 14" is generally adequate).

- Partner Rules
- Find X!
- RUN!

Crayons and transparency blocks (blue and yellow) are used in some lessons for visual representation of word problems. (Teacher need no more than 10 crayons, 10 blue blocks, and 10 yellow blocks.)

To award students for working well together, the teacher can award "Partner of the Day" pencils. During Math Wise studies, engraved pencils with "Partner of the Day" were purchased from a novelty company. Any pencil or small prize will suffice.

## Student Materials

Two-pocket folders will hold the materials for each lesson.

Students will also need pencils.



# Pairing Students

---

For Coaching, pair each student with a partner. Use whatever assessment information is routinely available to you as the basis for formulating pairs and identifying which skill each pair should work on.

1. Rank order your students in terms of their overall mathematics skills.
2. Split the rank order in half and follow the following pairing scheme.

	First Coach	Second Coach
Pair 1	Student #1	Student #11
Pair 2	Student #2	Student #12
Pair 3	Student #3	Student #13
Pair 4	Student #4	Student #14
Pair 5	Student #5	Student #15
Pair 6	Student #6	Student #16
Pair 7	Student #7	Student #17
Pair 8	Student #8	Student #18
Pair 9	Student #9	Student #19
Pair 10	Student #10	Student #20

3. Reassign partners every 4-6 weeks.

Sometimes students are absent. Sometimes classrooms have uneven numbers of students. Before each lesson, ask students if any partners are missing. If so, try to place odd students into pairs that make sense. If you need to create a triad, have one student act as the “Coach” while the other two students alternate as “Players” on every other problem.



# Teacher Lessons

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The lessons include all information teachers need to implement Pirate Math.

To implement Pirate Math with fidelity (as conducted in the research used to validate Pirate Math), it is essential that teachers teach each and every principle covered in all lessons. Some teachers study the lesson and prepare an outline; then, they use that outline to deliver the instruction in their own words. Other teachers, however, after studying the lesson, still rely heavily on the wording of the script to deliver the lesson. In either case, it is necessary to **study** the lesson before delivery. In all cases, you should deviate from the lesson to elaborate concepts your students do not seem to understand.

The Teacher Lessons begin on page 21. Each lesson has a list of materials teachers and students need for the lessons. Each lesson also uses the following guiding graphics to indicate when a poster, transparency, manipulative, or student material is necessary.



This graphic signals the teacher needs to use a **P**oster.



This graphic signals for the teacher to show a **T**ransparency.



This signals the teacher to use a manipulative (e.g., crayons).



This graphic indicates students will use a worksheet.



This shows the teacher when students should be working together.



This indicates students will use their Pirate Math folder.



This shows the teacher when to award Partner of the Day pencils.

# Lessons

1 - 34





# Lesson 1

*Today's Activities:*

1. Teacher Lesson  
Procedures and signs
2. Teacher-Led Problem
3. Partner Work
4. Pirate Problems

## MATERIALS



*Posters*

Partner Rules



*Transparencies*

PM1 T1	Partners
PM1 T2	Problems A, B
PM1 T3	Problems C, D
PM1 T4	Problems E, F, G
PM1 T5	Teacher-Led Problem
PM1 T6	Partner Work Answer Sheet
PM1 T7	Pirate Problems Answer Sheet
PM1 T8	Pirate Math Treasure Graph



*Manipulatives*

Crayons  
Blue and yellow blocks



*Worksheets*

PW 1	Teacher-Led Problem & Partner Work Day 1
PP 1	Pirate Problems Day 1
PPAS 1	Pirate Problems Answer Sheet Day 1



*Folders*

Pirate Math Folder (1 for each student)

## TEACHER LESSON

**Hi! My name is \_\_\_\_\_, and this year, we'll work together on math word problems. Every day during Pirate Math, you'll work with a partner. Here is the list of pairs.**



*Display PM1 T1.*

**Find your name. Look at the name next to your name. That person will be your partner during Pirate Math. Look around the room to see if your partner is here today. Is anyone's partner absent?**

*If someone's partner is absent, assign the student to another person whose partner is absent, or assign him as a third person in a pair with a strong student.*

**Every day, before we start working in Pirate Math, you'll move to sit with your partner. I'll ask you to move quickly and quietly. Don't move yet. I'll ask the people whose names are in Column A to move. When it's time to move, bring a pencil with you. Right now, make sure you have a pencil.**

*Pause.*

**Now, if your name is in Column A, stand up, push in your chair, and stand behind it.**

*Pause.*

**I want everyone who is standing to move to your partner and stand behind them. Move quickly and quietly.**

*With the help of the teacher, place the students in a seat next to their partner.*

**Now, during Pirate Math, this is where you'll sit. Are there any questions? Remember where you're sitting because you'll sit here every time we do Pirate Math.**

**At the beginning of Pirate Math, I'll teach a lesson. Some days I'll teach you new things. Some days I'll review things you've already learned. When I teach, you sit quietly and pay attention.**

**Sometimes, I'll ask questions. When I ask a question, you think about the answer. When you think you know the answer, raise your hand. I'll call on students who raise their hand. Let's practice.**

**What color is my shirt?**

*Call on Student sitting quietly and raising his hand.*

\_\_\_\_\_.

**Very good. I called on \_\_\_\_\_ because she was sitting quietly and raising her hand.**

**Sometimes I might ask a question and I want the whole class to answer. When I want the whole class to answer, I will say, “Everybody” and then everyone will say the answer together. Let’s practice.**

**How many fingers am I holding up? (Hold up 3 fingers.) “Everybody?”**

*Students call out the answer.*

**3!**

**Good. When I say “Everybody” I want the whole class to say the answer together. Don’t yell. Say the answer in your normal voice.**

*Throughout Pirate Math, alternate students raising hands to answer questions and saying “Everybody?” to get a group response. Elicit responses both ways based on classroom needs.*

**Let’s get started with our lesson today. Soon we will start working on word problems, but today let’s talk about the symbols we use to solve math problems.**

**We’ll talk about the equal sign, the plus sign, and the minus sign. Let’s start with the equal sign.**



*Display PM1 T2.*

*When talking about every number sentence, read and work the number sentence from left to right. When referring to the sides of a number sentence, “this” side is the left side and “that” side is the right side. Always point to each side or make a sweeping motion (from left to right) when referring to the sides.*

$$\begin{array}{ccccccc} 4 & + & 5 & = & 9 \\ \text{("this" side)} & & & & \text{("that" side)} \end{array}$$

*The equal (=) sign should be called the “equal” sign, not the “equals” sign. When you read a number sentence, vary between “the same as” and “equals.”*

(Point equal sign.) **This is the equal sign. The equal sign means *the same as*. When you see the equal sign in a number sentence, people say *equals* or *the same as*. When you see this sign** (point to equal sign), **what should you say?**

Equals or the same as.

**Most of the time when you see the equal sign, you probably say *equals*. That's okay. The equal sign means *equals*, but the equal sign also means *the same as*. *The same as* means the same thing as *equals*. I'd like you to say *the same as* when you see the equal sign, but if you say *equals*, that's okay too.**

**You can think about it like this. A person who is your buddy can also be called your pal or your friend. Buddy, pal, and friend all mean the same thing just like *equals* and *the same as* mean the same thing.**

**When you talk to your Mom, you might call her Mommy, Mom, or Mama. Those words all mean the same thing just like *the same as* and *equals* mean the same thing. Now, your Mom may like you to call her Mommy. If you call her Mom, that's okay, but Mommy is better.**

**That's just like with the equal sign. When you see the equal sign, try to remember to say *the same as*. Saying *the same as* helps you remember what the equal sign means.**

**Now, every number sentence has two *sides*. One side is here on this side of the equal sign** (point). **The other side is here, on that side of the equal sign** (point).

**Your job is to check if this side** (point to left side) **is *the same as*** (point to equal sign) **that side** (point to right side.)

**Let's look at some problems that use these crayons.**



*Place 3 crayons on left side of equal sign.  
Place 3 crayons on right side of equal sign.*

**Let's check that this side** (point) **is the same as that side** (point).

**On this side of the equal sign** (point to left side), **there are 1, 2, 3 crayons** (touch each crayon). **On that side of the equal sign** (point to right side), **there are 1, 2, 3 crayons** (touch each crayon). **Is this side** (point to left) **the same as that side** (point to right)?

Yes.

**That's great. The two sides are the same.**

**Let's clear the crayons and try another one.**



*Place 5 crayons on left side and 5 crayons on right side.*

**Let's check if one side *is the same as* the other side. Count the crayons on this side** (point to left side). **How many crayons are on this side?**

5.

**Very good. There are 1, 2, 3, 4, 5 crayons. Now, count the crayons on that side** (point to right side).

5.

**Yes, there are 1, 2, 3, 4, 5 crayons. Is this side** (point to left) **the same as that side** (point to right)?

Yes.

**Are the sides the same?**

Yes.

**The two sides are the same, so we can use the equal sign.**

**Let's try another one.**



*Place 6 crayons on left side and 4 crayons on right side.*

**Let's check if the sides are the same. Count the crayons on this side** (point to left side).

6.

**There are 1, 2, 3, 4, 5, 6 crayons. Now, count the crayons on that side** (point to right side).

4.

**There are 1, 2, 3, 4 crayons. Is this side** (point to left) **the same as that side** (point to right)?

No.

**The sides are NOT the same. 6 is NOT the same as 4, so this example is wrong. We can't use the equal sign because the sides are not the same.**

*Take crayons off transparency immediately.*

**Let's try another one.**



*Place 2 crayons on left side and 2 crayons on right side.*

**Is this side** (point) **the same as that side** (point)? **Why?**

Yes. Because each side has two crayons.

**Excellent! This side has 2 crayons** (point), **and that side has 2 crayons** (point). **The sides are the same. We can use the equal sign. This example is correct.**

**Try this one.**



*Place 3 crayons on left side and 5 crayons on right side.*

**Is this side** (point) **the same as that side** (point)? **Why not?**

No. The sides are not the same.

**This side has 3 crayons** (point), **and that side has 5 crayons** (point). **These sides are NOT the same. This example is wrong. We can't use the equal sign because the sides are not the same.**

**Look here.** (Point to A.)



*Place 2 yellow blocks and 3 blue blocks on the left side.  
Place 5 blue blocks on the right side.*

**There are 1, 2, 3, 4, 5 blocks on the left side (point). There are 1, 2, 3, 4, 5 blocks on the right side (point). Is this side (point) *the same as* that side (point)?**

Yes.

**Yes, the two sides are the same.**

**Now, look at this number sentence. (Point to B.)**

**Every number sentence has two sides. One side is on the left of the equal sign (point). This other side is on the right of the equal sign (point).**

**This number sentence says 2 plus 3 *is the same as* 5. It's just like the problem with the blocks. The 2 stands for the number of yellow blocks. The 3 stands for the number of blue blocks.**

**When we see a plus sign (point), we add the numbers together. When we add, we combine numbers together to make a bigger number. In this problem, 2 plus 3 is 5. When we combine the numbers on this side (point), the answer *is the same as* the number on that side (point).**

**When you read a number sentence, say 2 plus 3 *is the same as* 5. Let's say that together: 2 plus 3 *is the same as* 5. Let's say it again: 2 plus 3 *is the same as* 5. Say it on your own three times.**

2 plus 3 is the same as 5.

2 plus 3 is the same as 5.

2 plus 3 is the same as 5.

**Remember, when we see a plus sign, we combine the numbers by adding. When we add numbers together on one side of the equal sign, the total should be *the same as* the number on the other side of the equal sign.**



*Display PM1 T3.*

**Let's do another problem. (Point to C.)**

**This number sentence says 1 plus 3 *is the same as* blank. What do we need to do when we see a plus sign?**

Add.

**Yes, add or combine the numbers to make a bigger number. Let's add to find out what number goes in the blank box so the sides will be the same.**

**Watch. I'll use blocks to help us figure out what number is the same as 1 plus 3.**

(Place 1 yellow block under the number 1 and 3 blue blocks under the number 3.)

**Let's count together.** (Point as you count.) **There are 1, 2, 3, 4 blocks on this side of the equal sign** (point). **How many blocks should I put on that side** (point)?

4.

**OK, I'll put 4 blocks on that side. Are the sides the same?**

Yes.

**They're the same. To complete the number sentence, I'll write 4 in the empty box. Let's read it together. 1 plus 3 is the same as 4.**

**Sometimes one of the numbers we need to add is missing from a number sentence. Look at this example.** (Point to D.)

**This number sentence says 4 plus blank** (point) **is the same as 6. Let's say that together: 4 plus blank is the same as 6. What do we need to do when we see a plus sign?**

Add.

**Yes, we combine the numbers on this side of the equal sign** (point). **First, we figure out what number goes in the blank. That way, when we add the numbers on this side of the equal sign** (point), **the answer is the same as the number on that side** (point).

**Let's use the blocks to figure out what should go in the blank.**



*Place 4 yellow blocks under the number 4.*

*Place 6 blue blocks under the number 6.*

**Let's add blocks to this side** (point) **until we get to 6. I'll put them in the empty box in the number sentence so we know what to write when we're finished. We already have 4** (point), **so we need 5, 6.** (Put 1 blue block down for each number you count.)

**How many blocks did we put under the blank box?**

2.

**Yes, we added 2 blocks. I'll write a 2 in the blank box.**

*Write 2 in blank box.*

(Point to the number sentence.) **Do we have the same number of blocks on each side?**

Yes.

**We do. Can we use the equal sign?**

Yes.

**Great work! Let's read the number sentence together: 4 plus 2 is the same as 6. Nice work!**



*Display PM1 T4.*

**Let's try another one.** (Point to E.) **Let's read this number sentence together: 8 minus 3 is the same as 5. This number has a minus sign. The minus sign tells us to subtract the numbers on this side of the equal sign** (point).

**The minus sign may also be called the take away sign or the subtraction sign, but we'll call it the minus sign during Pirate Math.**

**When we subtract the numbers, we find out the difference between the starting number** (point to 8) **and the number that comes after the minus sign** (point to 3). **We find this out by taking the number after the minus sign** (point to 3) **away from the starting number** (point to 8).

**Let's use blocks to check whether 8 minus 3 is the same as 5. I start by putting 8 yellow blocks under 8 on this side of the equal sign** (point). **The minus sign tells me to take 3 blocks away. I'll do that in a minute. Then, I put 5 blue blocks under the 5 on that side** (point) **of the equal sign.**



*Place 8 yellow blocks under 8.  
Place 5 blue blocks under 5.*

Okay, I've got 8 blocks on this side of the equal sign, but I need to take 3 away because the number sentence says *minus 3*. The minus sign means to take away.



*Remove 3 yellow blocks.*

The number I have left is the difference between the 8 and 3. Now, how many blocks do we have on this side of the equal sign (point)?

5.

Is 5 the same as the number of blocks we have on that side of the equal sign (point)?

Yes!

You're right. There are 5 blocks on this side and 5 blocks on that side of the equal sign, so the sides are the same. Can we use the equal sign?

Sure.

The numbers are the same, so we can use the equal sign.

Here's another problem. (Point to F.) Let's read it together. 6 minus 5 *is the same as* blank. What does the minus sign tell us to do?

Subtract.

Yes, we need to subtract to find the difference between the starting number and the number after the minus sign. The answer should be the same as the number on that side (point) of the equal sign.

We find out what number goes in the blank to make the sides the same. Let's use blocks to help us figure it out.



*Place 6 yellow blocks under the number 6.*

What does this minus sign mean?

Subtract.

**Yes, the minus sign means to take away or subtract. So, how many blocks should I take away?**

5.

**Good, I'll take away 5 blocks. How many are left?**

**That's right, 1. So how many blocks should I put on that side to make the sides the same?**

1.

**Very good. I'll put 1 block on that side.**



*Place 1 blue block under the blank box.*

**I'll also write a 1 in the blank box to complete the number sentence.**

*Write 1 in blank box.*

**Let's read it together. 6 minus 5 is the same as 1.**

**Let's do one more problem.** (Point to G.) **5 minus blank is the same as 2.** Here's another math problem where the missing information is on this side of the equal sign (point) **instead of that side** (point).

**The missing information is the number we take away to make the sides the same. Let's use blocks to figure out how many we need to take away.**



*Put 5 blue blocks under the number 5.  
Place 2 yellow blocks under the number 2.*

**How many blocks do I take away from this side** (point) **to make it the same as that side** (point)?

3.

**Let's check. If I take 3 away** (remove 3 blue blocks), **is the number of blocks the same on each side?**

Yes.

The amounts are the same, so we can use the equal sign. I'll write a 3 in the blank.

*Write 3.*

Let's read the completed number sentence together. 5 minus 3 *is the same as* 2.

Remember, always look at both sides of the equal sign to check: Is this side *the same as* that side? If the sides are not the same, you cannot use the equal sign. Every time you write a number sentence with the equal sign, ask yourself, "Is this side *the same as* that side?" By checking if the sides are the same, you'll get better in math!

### TEACHER-LED PROBLEM

In Pirate Math, after I teach a lesson to the whole class, we'll work a problem together. It will be a lot like the lesson I teach in the beginning, except you'll have the problem to work along with me.

When we work this problem, you won't work ahead. We'll work it together. You'll help me solve the problem and I'll help you solve the problem.

Let's look at this problem.



*Handout PW 1 with Teacher-Led Problem facing up.*



*Display PM1 T5.*

The problem on your worksheet is the same as the problem on my overhead. We'll work this problem together. You won't work ahead, and I won't work ahead. We'll talk about the problem and solve it together. Then, we'll write the answer. You'll write on your paper and I'll write up here.

Let's look at this problem together. Follow along as I read. "Draw a picture to make the sides the same. Then, write the sentence that matches the picture."

So, what do we need to do first?

Draw a picture.

**Yes. The first sentence says to draw a picture to make the sides the same. How many cats are on this side of the equal sign (point)?**

4.

**So, how many cats should we draw on that side of the equal sign (point)?**

4.

**I'll draw four cats. You draw four cats.**

*Quickly draw four cats on that side of the equal sign.*

**We haven't finished the problem. The second sentence says, "Write the sentence that matches the picture."**

**So, think back to what we just talked about with the equal sign. What would be a good sentence to write for the cats? Be sure to use *the same as* in your sentence.**

Four cats is the same as four cats.

**That's a great idea. "4 cats is the same as 4 cats." (Point.) Let's write that sentence here.**

*Write "4 cats is the same as 4 cats."*

## **PARTNER WORK**

**After I teach a lesson to the whole class and we work a problem together, you work with your partner. At the beginning of Pirate Math, you move to sit by your partner. That person will be your partner during Partner Work. Let's talk about rules for Partner Work.**

**During Partner Work, there are 4 rules to follow. These are our Partner Rules.**



*Display Partner Rules poster.*

Let's look at the first rule. "Talk only to your partner, and talk only about math." During Partner Work, you and your partner should only talk to each other. You should also only talk about math. Talking about lunch or what you did last night is not talking about math.

Rule #2. "Be on task." Being on task means working with your partner on the problems I ask you to work on. You're not on task if you're reading from a book or doing science homework.

Rule #3. "Be nice and helpful." Being nice means that you only say kind and supportive things to your partner. Being helpful means that you help your partner whenever they have a question. Being mean to your partner, doing their work for them, or ignoring them is not being nice and helpful.

Look at rule #4. "Use a soft voice." During Partner Work, all the partners in the room talk to each other. You should use a soft voice so that everyone can hear their partner. A soft voice is almost a whisper. Shouting across the room is not using a soft voice.

When you do Partner Work, I look and listen for good partner work. Partners who talk only to their partner and talk only about math, are on task, are nice and helpful, and use of soft voice will be the *Partners of the Day*. I have a special pencil for both partners.

Now, I have a Partner Worksheet for you to do with your partner. If you don't understand something, ask your partner for help. Also, if it looks like your partner is having trouble or doesn't understand something, ask him if he needs help. What's a good way to ask your partner for help?

You could say, "Could you please help me?"

Good. You could say, "Could you please help me?" Make sure you help your partner whenever she needs help.



On this worksheet, you and your partner will practice word problems like the one we did in class today.

Remember, I'm looking and listening for good Partner Work.

*After 5 minutes, or when all but 2 pairs are finished.*

**This is today's Partner Work Answer Sheet. Every time we do partner work, we'll check our work against an answer sheet. This helps you see if you got the problems right. I'll show you how to check your work.**



*Display PM1 T6.*

**See if your paper looks like mine. When you answered problem A, did you write "3 plus 2 is the same as 5" for your answer?** (Use "Everybody?" periodically when asking questions and remind class about having their hand up sitting quietly vs. answering together.)

*Walk around the room and help students check their partner work.*

**Check to see if you got the same answer as me for problem B and C. If you didn't figure out what you did wrong. You can talk to your partner or raise your hand.**

*Allow 2 minutes for checking of Answer Sheet.*

## **PIRATE PROBLEMS**

**Now I'm going to pass out a Pirate Problems worksheet for you to do on your own. This time you can't help your partner or ask for help. You work by yourself.**



*Pass out PP1.*

**On Pirate Problems, do your best work. You can earn treasure coins for finding the right answers to math word problems, just like a pirate finds treasure coins!**

**When you're finished, raise your hand and your teacher or I will come score your paper. Your score will be the number of treasure coins you earn for that day.**

**During Pirate Problems, do you talk to your partner?** (Use "Everybody?" when necessary.)

No.

**Do you work by yourself?**

Yes.

**Good. During Pirate Problems you work by yourself and you don't talk to your partner.**

**Begin work when you get your paper. Start on the front.**

*Point to math problems on front of page.*

**Then work the problem on the back.**

*Point to the word problem on the back of the page.*

*If students are taking too long on the first 5 problems, prompt them to try the word problem on the back.*

*Use the PPAS 1 to score their work as they finish.*

*Return the papers face down so that students can not see the points awarded.*

**Put your pencils down. I'm going to tell you how I scored your work, so no one should be writing right now. Don't do anything until I give you directions.**

*Watch to make sure no one changes their answers as you go over them.*



*Display Transparency PM1 T6.*

**Look at the problems at the top of the page. The correct answers are written in. On your paper, I circled the answers you got correct. Look at the box right below these problems. This is the total number of problems you got correct. The most you could get in this section is 10. Raise your hand if you got all 10 correct. Great!!**

*Write 10 in the box below the first set of problems.*

**Now let's look at problems at the bottom. You can see my answers. Look at the box right below the problem. Do you see where it says "2 pts.?" The "pts." means points. This first line in the box means that you get 2 points if you drew 6 stars. If you drew 6 stars, you got these 2 points.**

*Circle the 2 pts. on the transparency.*

**The second line in the box means that you get 2 points for writing 2 in the first box (point). The third line means that you get 2 points for writing 4 in the second box (point). The fourth line means that you get 4 points for writing 6 in the third box (point).**

**The problem at the bottom is always worth 10 points.**

*Write 10 in the blank at the bottom of the box.*

**You can earn 20 points on each worksheet. We added the points you got for the math problems at the top. Then we added the points you got for the word problem at the bottom. Then we wrote your total score on the front of your worksheet.**



*Display PM1 T8.*



*Pass out Pirate Math folders.*

**Now look at your PIRATE folder. Write your name on the front of the folder.**

**Open your folder. Look at the first sheet with treasure boxes and coins on it. We'll use these coins to keep track of your points.**

*Point to page.*

**Go to your first Treasure Graph. Now look at the number of points you earned on your worksheet. First, write your points on the line below Day 1. Then, color in one coin for each point you earned. For example, if you earned 10 points, shade in 10 coins like this.**

*Write 10 below Day 1. Show how to count up 10 coins and color in the correct number.*

*Walk around the room and help students as needed.*

**Go ahead and shade in your score now. If you have a question, raise your hand. We'll use these sheets so you can keep track of your scores.**

**We keep track of our scores every day we do Pirate Math. That way, we'll know when we're getting close to the treasure.**

(Collect folders as students finish charting.) **Everyone did a nice job with Pirate Problems and coloring coins on your chart. Tomorrow, we'll do Pirate Problems again. You can try to improve your score and color more coins.**

**Today we used easy word problems to practice our Pirate Math rules. This year, we'll learn harder math problems. So get ready and make sure to pay attention every day.**



**Now it's time to award the *Partner of the Day* pencils.**

**Today, (Student) and (Student) each earn a pencil because they followed the Partner Rules and worked well together. I especially like how they (praise a behavior). Remember, every time we do Partner Work I'm looking and listening for partners following the Partner Rules.**

**Nice job working hard during Pirate Math today! I'll see you on (say week day of next lesson session).**

# Activity Guides





# Activity Guide: Teacher-Led Problem

(5 minutes)

*If problem has a graph:*

**This problem has a graph. The graph is about \_\_\_\_\_. Use the key and number the graph.**

*Allow students 30 seconds to number the graph.  
Review the graph numbering before moving to the next task.*

**Make sure your paper looks like mine. What do you do now?**

**Or**

**What do you do first?**

RUN! through the problem.

**Listen as I read the problem.**

*Read the problem.*

**Now underline the label and name the problem type. Do this now.**

*Allow 30 seconds for students to complete U and N.  
Do the work on Transparency (either covered or turned off).*

*Reveal Transparency when most students are finished.*

**Make sure your paper looks like mine. I underlined the label here (point) and labeled my problem with a \_\_\_\_\_. I labeled it \_\_\_\_\_, because it's a Total/Difference/Change problem.**

*Explain why the problem is a Total, Difference, or Change problem.*

*Total: Puts parts together into a total.*

*Difference: Compares two amounts for a difference.*

*Change: Starts with an amount that increases or decreases to a new amount.*

**Now use your \_\_\_\_\_ card to solve the problem. When you've written the number sentence underneath the \_\_\_\_\_ equation, stop.**

*Allow 1 minute for students to use the card and write the number sentence.*

**Let's review. Make sure your paper looks like mine.**

*Review the problem type equation and why each number, including  $X$  is in each position. Review the signs in the problem.*

*If problem has irrelevant information, review that now.*

**Now we're ready to Find  $X$ ! Everyone Find  $X$  and label your answer. Do that now!**

*Allow 30 seconds for students to Find  $X$  and label their answer.*

**Let's review.**

*Review finding  $X$  and the correct label for the answer. Put the answer back into the number sentence to show it makes sense.*

**We finished the problem together because we have a number answer and a word answer. Nice job!**



# Activity Guide: Partner Work

**(8 minutes for work; 2 minutes to check)**

**It's time for Partner Work! What are the four partner rules?**

Talk only to your partner, and talk only about math.

Be on task.

Be nice and helpful.

Use a soft voice.

**Very good. The partners that follow those rules the best will earn the Partner of the Day pencils.**

**So, turn your paper over and work with your partner.**

*Circulate, allowing partners to work for up to 8 minutes.*

*Display Answer Sheet after 8 minutes.*

**This is today's Partner Work Answer Sheet. See if your answers look like mine. If they don't, you and your partner should figure out what you did wrong. If you have a question, raise your hand.**

*Allow 1-2 minutes for partners to check work.*



# Activity Guide: Pirate Problems

**(12 minutes)**

*Pass out Pirate Problems.*

**It's time for Pirate Problems. You do *not* work with your partner on the Pirate Problems. You work on your own.**

**Remember, try to meet or beat your Pirate Problems score from last time. Let's see who can color the coins all the way up to the treasure chest!**

**You will have two minutes to work on the finding X problems. Pick up your pencil and start!**

*Time for two minutes.*

**Stop. Put your pencil down and listen to this problem.**

*Read word problem aloud. Read problem one time.*

**Go ahead and work on the word problem now. When you finish, please raise your hand in the air. (Teacher) or I will come around and check your Pirate Problems.**

*Score each student's work when they finish.*

**After you receive your score sheet, color in the number of points you earned. Color in the coins for day \_\_\_\_.**

*Allow students to color in coins.*

**When you finish coloring the coins, please put your Pirate Problems and the score sheet in the back of your folder. Please put your cards in the front of your folder. Then, close up your folder. That will show me that you're ready to hear about the Partners of the Day.**



# Activity Guide: Wrap Up

(1 minute)

Now it's time to award the *Partner of the Day* pencils.

Today, (Student) and (Student) each earn a pencil because they followed the Partner Rules and worked well together. I especially like how they (praise a behavior). Remember, every time we do Partner Work I'm looking and listening for partners following the Partner Rules.

Nice job working hard during Pirate Math today! I'll see you on (say week day of next lesson session).

*Do not feel obligated to award Partner of the Day pencils.  
If behavior in the class is poor, tell the class that you would like to award pencils but explain why no one earned pencils for the day.*

# Posters



# **PARTNER RULES**

- 1. Talk only to your partner, and talk only about math.**
- 2. Be on task.**
- 3. Be nice and helpful.**
- 4. Use a soft voice.**

# Fidelity Checklists



# Fidelity Checklist

## Lesson 1

Teacher: \_\_\_\_\_

School: \_\_\_\_\_

Reliability completed by: \_\_\_\_\_

Percentage: \_\_\_\_\_



Behavior Demonstrated

(Blank) Behavior Not Demonstrated

NA Not Applicable

- \_\_\_\_ 1. Teacher assigns partners for Pirate Math
- LESSON
- \_\_\_\_ 2. Teacher explains how students respond to questions (raising hand, everybody)
- \_\_\_\_ 3. Teacher asks what color is my shirt?
- \_\_\_\_ 4. Teacher asks how many fingers am I holding up? Everybody?
- \_\_\_\_ 5. Teacher displays T1
- \_\_\_\_ 6. Teacher explains the equal sign means the same as (like pal, buddy, friend)
- \_\_\_\_ 7. Teacher explains two sides of a number sentence (F)
- \_\_\_\_ 8. Teacher explains a number sentence is anything with an equal sign
- \_\_\_\_ 9. Teacher shows  $3 = 3$  with crayons
- \_\_\_\_ 10. Teacher shows  $5 = 5$  with crayons
- \_\_\_\_ 11. Teacher explains you cannot use an  $=$  sign with  $6 = 4$
- \_\_\_\_ 12. Teacher shows  $2 = 2$  with crayons
- \_\_\_\_ 13. Teacher explains you cannot use  $=$  sign with  $3 = 5$
- \_\_\_\_ 14. Teacher demonstrates  $2 + 3$  **is the same as** 5 with blocks (B)
- \_\_\_\_ 15. Teacher demonstrates  $1 + 3$  **is the same as** 4 with blocks (C)
- \_\_\_\_ 16. Teacher solves  $4 + 2$  **is the same as** 6 with blocks (D)
- \_\_\_\_ 17. Teacher demonstrates  $8 - 3$  **is the same as** 5 with blocks (E)
- \_\_\_\_ 18. Teacher solves  $6 - 5$  **is the same as** 1 with blocks (F)
- \_\_\_\_ 19. Teacher solves  $5 - 3$  **is the same as** 2 with blocks (G)

### TEACHER-LED PROBLEM

- \_\_\_\_ 20. Teacher explains during teacher-led problem, they work together
- \_\_\_\_ 21. Teacher hands out PW 1
- \_\_\_\_ 22. Teacher displays PM1 T4
- \_\_\_\_ 23. Teacher solves Teacher-led problem with student help
- \_\_\_\_ 24. Teacher reminds students not to work ahead during Teacher-led problem

## PARTNER WORK

- \_\_\_\_ 25. Teacher displays Partner Rules poster
- \_\_\_\_ 26. Teacher explains the 4 partner work rules
- \_\_\_\_ 27. Teacher reviews how to ask for help
- \_\_\_\_ 28. Teacher allows partners to work together
- \_\_\_\_ 29. Teacher displays PM1 T5 – answer sheet
- \_\_\_\_ 30. Teacher explains students check their work with answer sheet

## PIRATE PROBLEMS

- \_\_\_\_ 31. Teacher explains pirate problems are done individually – not with partner
- \_\_\_\_ 32. Teacher hands out PP1
- \_\_\_\_ 33. Teacher explains to work problems on the front, then word problem on back
- \_\_\_\_ 34. Teacher scores student work as they finish
- \_\_\_\_ 35. Teacher displays PM1 T6
- \_\_\_\_ 36. Teacher explains how points were earned
- \_\_\_\_ 37. Teacher displays PM1 T7
- \_\_\_\_ 38. Teacher passes out Pirate Math folders
- \_\_\_\_ 39. Teacher shows how to color coins for points
- \_\_\_\_ 40. Teacher collects materials and explains partner pencils

# **Pirate Math**

## **Word-Problem Solving Program at Second Grade**



**Lynn S. Fuchs, Sarah R. Powell,  
Robin F. Schumacher, Pamela M. Seethaler,  
& Doug Fuchs**

## **Supplemental Materials for Whole-Class Instruction**

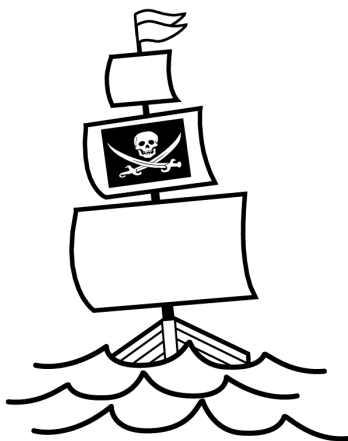
**Transparencies  
Teacher-Led Problem & Partner Work  
Pirate Problems  
Pirate Problems Answer Sheets  
Treasure Maps  
Cards**

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# Transparencies





## Partners

Column A	Column B

**A) =**

**B) 2 + 3 = 5**

**C)    1 + 3 =**

**D)    4 +**  **= 6**

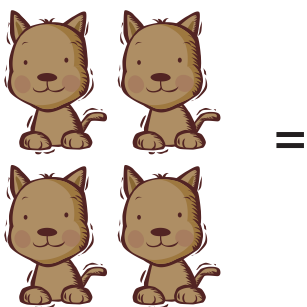
**E)     $8 - 3 = 5$**

**F)     $6 - 5 =$**

**G)     $5 -$    $= 2$**

## Teacher-Led Problem

Draw a picture to make the sides the same. Then, write the sentence that matches the picture.



## Partner Work

### Answer Sheet

**Draw a picture to make the sides the same. Then, write the sentence that matches the picture.**



3 plus 2 is the same as 5.

$$3 + 5 = 8$$

3 plus 5 is the same as 8.

$$4 - 3 = 1$$

4 minus 3 is the same as 1.

$$8 + 8 = \underline{16}$$

$$10 - 3 = \underline{7}$$

$$18 - 9 = \underline{9}$$

$$6 + 7 = \underline{13}$$

$$4 - 2 = \underline{2}$$

2 pts. for each correct answer

Score = \_\_\_\_ / 10 pts.

Draw stars in the box to make the sides of the equal sign the same.



Write the number sentence that goes with the picture.

$$\boxed{2} + \boxed{4} = \boxed{6}$$

2 pts. Correct drawing (6 stars)

2 pts. Correct addend (2)

2 pts. Correct addend (4)

4 pts. Correct answer (6)

Score = \_\_\_\_ / 10 pts.

**TOTAL SCORE = \_\_\_\_ / 20**

# Pirate Math Treasure Graph

## Days 1-4



**DAY 1**



**DAY 2**



**DAY 3**



**DAY 4**

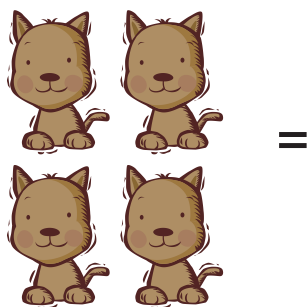
# **PW 1-34**

## **Teacher-Led Problem Partner Work**



## Teacher-Led Problem

Draw a picture to make the sides the same. Then, write the sentence that matches the picture.



## Partner Work

**Draw a picture to make the sides the same. Then, write the sentence that matches the picture.**



-----

$$3 + 5 =$$

-----

$$4 - 3 =$$

-----

# PP 1-34

## Pirate Problems



**Draw stars in the box to make the sides of the equal sign the same.**

$$\star\star + \star\star\star\star =$$

**Write the number sentence that goes with the picture.**

$$\square + \square = \square$$

**Draw stars in the box to make the sides of the equal sign the same.**

$$\star\star + \star\star\star\star =$$

**Write the number sentence that goes with the picture.**

$$\square + \square = \square$$

# **PPAS 1-34**

## **Pirate Problems**

### **Answer Sheets**



$$8 + 8 = \underline{16}$$

$$10 - 3 = \underline{7}$$

$$18 - 9 = \underline{9}$$

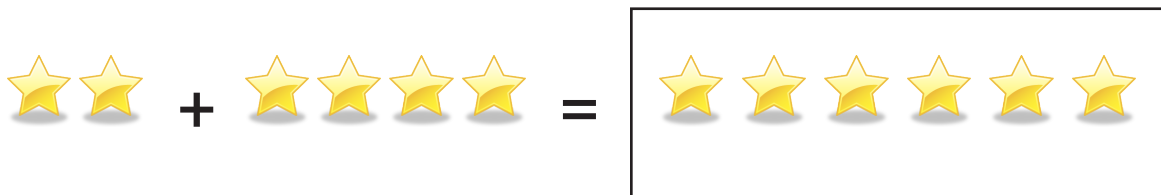
$$6 + 7 = \underline{13}$$

$$4 - 2 = \underline{2}$$

2 pts. for each correct answer

Score = \_\_\_\_\_ / 10 pts.

Draw stars in the box to make the sides of the equal sign the same.



Write the number sentence that goes with the picture.

$$\boxed{2} + \boxed{4} = \boxed{6}$$

2 pts. Correct drawing (6 stars)

2 pts. Correct addend (2)

2 pts. Correct addend (4)

4 pts. Correct answer (6)

Score = \_\_\_\_\_ / 10 pts.

**TOTAL SCORE:** \_\_\_\_\_ / 20

# Treasure Maps



# Pirate Math Treasure Graph

## Days 1-4



**DAY 1**

---



**DAY 2**

---



**DAY 3**

---



**DAY 4**

---

# Cards

**Find X!**  
**Total**  
**Difference**  
**Change**



Is **X** at the end?

Solve it!

$$2 + 3 = \mathbf{X}$$

$$5 - 2 = \mathbf{X}$$

Is it **X** - ?

Add

$$\mathbf{X} - 2 = 3$$

Otherwise:

Subtract

$$\mathbf{X} + 2 = 5$$

$$3 + \mathbf{X} = 5$$

$$5 - \mathbf{X} = 3$$

Is **X** at the end?

Solve it!

$$2 + 3 = \mathbf{X}$$

$$5 - 2 = \mathbf{X}$$

Is it **X** - ?

Add

$$\mathbf{X} - 2 = 3$$

Otherwise:

Subtract

$$\mathbf{X} + 2 = 5$$

$$3 + \mathbf{X} = 5$$

$$5 - \mathbf{X} = 3$$

# TOTAL

1. Write  $P1 + P2 = T$ .
2. What's T?
3. What's P1 and P2?
4. Write the signs.
5. Find X!



$$P1 + P2 = T$$

# TOTAL

1. Write  $P1 + P2 = T$ .
2. What's T?
3. What's P1 and P2?
4. Write the signs.
5. Find X!



$$P1 + P2 = T$$

# DIFFERENCE

1. Write B – s = D.
2. What's the compare sentence?
  - Does it give D?
3. What's B and s?
4. Write the signs.
5. Find X!



**B – s = D**

# DIFFERENCE

1. Write B – s = D.
2. What's the compare sentence?
  - Does it give D?
3. What's B and s?
4. Write the signs.
5. Find X!



**B – s = D**

# CHANGE

1. Write  $ST + C = E$  or  $ST - C = E$ .

2. What's ST?

3. What's C?

4. What's E?

5. Write the signs.

6. Find X!



**ST**    **+**    **C**    **=**    **E**

**ST**    **-**    **C**    **=**    **E**

# CHANGE

1. Write  $ST + C = E$  or  $ST - C = E$ .

2. What's ST?

3. What's C?

4. What's E?

5. Write the signs.

6. Find X!



**ST**    **+**    **C**    **=**    **E**

**ST**    **-**    **C**    **=**    **E**