

# Action Forum: Engaging and Motivating Students

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Notes and Ideas

# 3: Buccaneer Problems

Today, we'll work more on math word problems where the important information is in a story. We read the story carefully to find the important information.

Yesterday we worked on Total problems. Total means the entire amount, or the whole amount. In a Total problem, two or more parts are put together into a total.

Remember, Pirate Math Equation Quest is all about solving word problems. When there's a missing number in the story, it's a word problem. We have to find the X and solve the problem. We figure out what the missing number is.

When we solve word problems, what two things do we have in our answer?

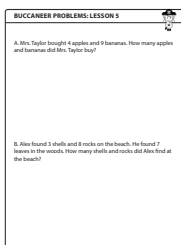
A number and a label.

**Very good.** You must have a number *and* a label. What's a label?

A word that tells us about our number.

**Excellent.** A label is a word that tells us about our missing information.

*Point to A.*



*Display RUN poster.*

Whenever we see a word problem, we first have to check if there is a graph or a table. Is there a graph or a table?

No.

## What should we do anytime we see a table or graph with a word problem?

Number it.

### Solution to Problem A:

*Mrs. Taylor bought 4 apples and 9 bananas. How many apples and bananas did Mrs. Taylor buy?*

*Problem Type:*

*Total*

*Relevant Information:*

$P1 = 4; P2 = 9; T = X$

*Number Sentence:*

$4 + 9 = X$

*Answer:*

$X = 13$  apples and bananas

## Now let's solve this word problem. When we see a word problem, what's the first thing we do?

RUN through it!

## Let's run through the problem: What does R stand for?

Read the problem.

**Good! Listen as I read the problem. "Mrs. Taylor bought 4 apples and 9 bananas. How many apples and bananas did Mrs. Taylor buy?"**

## What does U stand for?

Underline the label and cross out irrelevant information.

## Good. Where do we look to find the label?

In the question sentence.

**Excellent! Now this problem is different from the problems we worked last time. Look here (point to question), the question says, "How many apples and bananas did Mrs. Taylor buy?"**

**The question asks about apples *and* bananas. It's not just asking about apples. It's not just asking about bananas. It's asking about apples *and* bananas. So we need to underline both labels. We underline apples and we underline bananas.**

**If we just underlined apples, would that be correct?**

No.

**If we just underlined bananas, would that be correct?**

No.

**Why not?**

Because the story is about apples and bananas.

**That's right. Two different things are important in this problem: apples and bananas. So we underline apples *and* bananas. Be careful. Sometimes we have 1 word for our label. Sometimes we need 2 words for our label.**

(Write.)

**After we underline the label, we have to check for irrelevant information. Sometimes we have extra numbers in a problem that are not about the label. We do not need these numbers to answer the question, so we call this irrelevant information. If there is irrelevant information, we should cross it out.**

**Is there any irrelevant information?**

No.

**Are all of the numbers about the label we underlined?**

Yes.

**What does N stand for?**

Name the problem type.

**After you read the problem, underline the labels, and check for irrelevant information, you name the problem type. A Total problem puts parts together into a total. Does this problem put parts together into a total?**

Yes.

**Right. This is a Total problem because we have two parts, apples and bananas. The parts are put together into a total number of apples and bananas. (Make hand motions.)**

**This is a Total problem. What should we write next to the problem to remind us it is a Total problem?**

T.

**That's right. Write a T next to the word problem.**

(Writes.)

**The RUN poster helped us organize our paper to solve the problem! We said this is a Total problem. (Point to the T.) We use the Total poster to solve it.**

*Display Total poster.*

**Let's look at the five steps. What's Step 1?**

Write  $P1 + P2 = T$ .

**Go ahead and write the Total equation.**

(Write.)

**Good. In a Total problem, parts are put together into a total. The Total equation,  $P1 + P2 = T$ , helps us organize our work. Equation is a fancy word for number sentence. Equation is what high school students say when they solve math problems.  $P1 + P2 = T$  is the Total equation.**

**Step 2 is "Find T." What does T stand for?**

The total.

**Let's look at the problem to see if it gives us the total or if we need to find the total. The problem says, "Mrs. Taylor bought 4 apples and 9 bananas. How many apples and bananas did Mrs. Taylor buy?"**

**We have two parts: the apple part and the banana part. This problem tells us the number of apples (point). There are 4 apples. That's part 1. The problem also tells us the number of bananas (point). There are 9 bananas. That's part 2.**

**The question asks, "How many apples and bananas did Mrs. Taylor buy?" Is the question asking us to find T or one of the parts?**

T.

**The question asks us to find T because it asks us to find the number of apples *and* bananas. It doesn't ask us to find part 1: the number of apples. It doesn't ask us to find part 2: the number of bananas. It asks us to find the number of apples *and* bananas. So, we have to find the total, or T.**

**T is missing. In number sentences, how do we mark missing information?**

With an X.

**Right. Write X in the number sentence under the T.**

(Write.)

**Step 3 is "Find P1 and P2." What do P1 and P2 stand for?**

Part 1 and part 2.

**Very good. Let's work on part 1, or P1. The problem (point) says, "Mrs. Taylor bought 4 apples." We already underlined the word "apples" to help us remember this problem is talking about apples and bananas. Is 4 talking about apples or bananas?**

Apples.

**4 is talking about apples. So, it's an important number. The apples are P1. What number stands for P1?**

4.

**4 is P1. Let's check off 4 in the problem and write 4 in the number sentence underneath P1.**

(Write.)

**Let's think about part 2, or P2. We have the apples part. What part do we need to do now?**

The bananas part.

**That's right. This problem isn't just about apples, it's also about bananas. How many bananas did Mrs. Taylor buy?**

9.

**9 is talking about bananas, so it's an important number for solving the problem. The bananas are P2. What number stands for P2?**

9.

**9 is P2. We check off 9 in the problem and write 9 in the number sentence underneath P2.**

(Write.)

**Have we found all the important pieces of information?**

Yes.

**Right. We also have one piece of missing information, T, and it's marked with X. We know P1 and P2 from the story. What's Step 4?**

Write the signs.

**Good. Step 4 is write the signs. For Total problems, we always use P1 plus P2 is the same as T. That's why we wrote our Total equation this way (point). We filled in the numbers and X, but we still don't have any math signs. What math signs do we need to complete our number sentence?**

Plus sign and the same as.

**Right. We still need our plus sign and our same as sign. Go ahead and write the plus and same as sign in the number sentence.**

(Write.)

**4 stands for part 1. 9 stands for part 2. X stands for Total. Now it's time to find X!**

**To solve this problem, we need to balance the two sides. Let's use our cubes. Place 4 cubes and 9 cubes.**

(Place.)

**If we have 4 cubes and 9 cubes on this side (point), how many cubes do you need to place on that side to make the sides the same (point)?**

13.

**Yes. 4 plus 9 is the same as 13. Go ahead and write 4 plus 9 is the same as 13.**

(Write.)

**So, X is 13. Let's write X is the same as 13.**

(Write.)

**Our answer to a word problem must have a number. But that's not all. What else do we need to write in our answer?**

A label.

**Yes. Our answer to a word problem must have a number and a label. Think about what the problem is about. Look at the labels we underlined. What's a good label for the number 13?**

Apples and bananas.

**Right! The question is asking about apples and bananas. So that's the best label for our number 13. We underlined apples *and* bananas earlier to help us remember what the problem is about.**

**We can't label with just apples or just bananas because that's not what's missing. X stands for apples *AND* bananas. We have to use both words! Our label is apples and bananas. Let's write our label, apples and bananas, next to**



**our number answer. Do that now.**

(Write.)

**The last thing we need to do is check to see if our answer makes sense. Let's see if the answer makes sense. "Mrs. Taylor bought 4 apples and 9 bananas. How many apples and bananas did Mrs. Taylor buy?" Does 13 apples and bananas make sense?**

Yes.

**Yes. This is a Total problem. The total is always more than the numbers in parts 1 and 2. Is 13 more than 4 and is it more than 9?**

Yes.

**Did we answer the question, "How many apples and bananas did Mrs. Taylor buy?"**

Yes.

**We did because she bought 13 apples and bananas. Our answer is 13 apples and bananas. The answer has a number and a word label.**

**Good job working this Total problem. Let's look at the next one.**

*Point to B.*

**Whenever we see a word problem, we first have to check if there is a graph or a table. Is there a graph or a table?**

No.

Solution to Problem B:

*Alex found 3 shells and 8 rocks on the beach. He found 7 leaves in the woods. How many shells and rocks did Alex find on the beach?*

*Problem Type:*

*Total*

*Relevant Information:*

*$P1 = 3; P2 = 8; T = X$*

*Irrelevant Information:*

*He found 7 leaves in the woods*

*Number Sentence:*

*$3 + 8 = X$*

*Answer:*

*$X = 11$  shells and rocks*

## BUCCANEER PROBLEMS: LESSON 5



A. Mrs. Taylor bought 4 apples and 9 bananas. How many apples and bananas did Mrs. Taylor buy?

B. Alex found 3 shells and 8 rocks on the beach. He found 7 leaves in the woods. How many shells and rocks did Alex find on the beach?

## *Peruse the Buccaneers Problems Lesson*

**Identify:**

Clear expectations

Opportunities to respond

Opportunities to practice

Behavior-specific praise

**Brainstorm:**

Ways to make this more engaging

## Culminating Activity: Pre-Service Teachers and Tutors

Problem

Step-by-Step Explanation

## Culminating Activity: Pre-Service Teachers and Tutors

**Problem**

**Describe ways to make the tutoring more engaging (Questions, Frequent Responses)**

**Describe ways to provide feedback (Affirmative, Supportive)**

**Describe ways you could incorporate motivation supports/practices (relevance, choice, etc.)**

**Describe the progress monitoring data and strategy for monitoring**

## Culminating Activity: University Partners

Describe your tutoring project to a colleague from another institute

What challenges are you facing?

What successes are you experiencing?

What is one change you want to make next year?

How will you incorporate something discussed today related to motivation and engagement into your tutoring project?

# Integrating Motivation Practices During Explicit Instruction

## EFFECTIVE INSTRUCTION

## MOTIVATION PRACTICES

LESSON OPENING
<p>Gain students' attention</p> <p>Preview new learning</p> <ul style="list-style-type: none"> <li>• State goal of the lesson <b>and discuss relevance</b></li> <li>• Review prerequisite skills</li> </ul>
LESSON BODY
<p style="text-align: center;"><b><i>Modeling</i></b></p> <p><b>Show</b> student show to perform the skill or strategy.</p> <ul style="list-style-type: none"> <li>• Step-by-step</li> <li>• Exaggerate the steps</li> </ul> <p><b>Tell</b> students how to perform the skill or strategy.</p> <ul style="list-style-type: none"> <li>• "Think aloud"</li> <li>• Describe what is being done (actions and decisions)</li> </ul> <p><b>Involve</b> students in modeling (elicit frequent responses)</p> <p style="text-align: center;"><b><i>Guided Practice</i></b></p> <p>Provide opportunities for guided practice (practicing with the teacher's guidance)</p> <ul style="list-style-type: none"> <li>• Students practice the skill or strategy</li> <li>• Teacher provides prompts (directions, clues, cues, reminders) <ul style="list-style-type: none"> <li>○ Physical prompts</li> <li>○ Verbal prompts</li> <li>○ Visual prompts</li> </ul> </li> <li>• <b>Students practice collaboratively</b></li> <li>• Fade prompts as students improve / understanding increases</li> <li>• <b>Provide feedback to support self-efficacy</b></li> </ul> <p style="text-align: center;"><b><i>Independent Practice</i></b></p> <p>Independent practice</p> <ul style="list-style-type: none"> <li>• <b>Incorporate student choice in practice activities</b></li> <li>• Students work independently</li> <li>• Teacher checks work periodically and provides feedback</li> </ul>
LESSON CLOSING
<p>Review the critical content</p> <p>Preview content of the next lesson</p>

- Relevance
- Student choice
- Collaboration
- Feedback to Support Self-Efficacy
- Game-Like Activities
- Growth Mindset
- Attribution Retraining
- Self-Regulation

\*Adapted from Archer & Hughes (2011)