# I Am a Problem Solver!

**Strand:**          Computation and Estimation

**Topic:**           Single step and two-step practical problems involving addition and subtraction

**Primary SOL:**     2.6  The student will

> c)  create and solve single step and two-step practical problems involving addition and subtraction.

**Related SOL:**     2.5 a, b; 2.6 a, b

## Materials

- Counting cubes
- Chart paper
- Markers
- Rubric for Poster Problem (attached)
- Joining or Separating activity sheet (attached)

## Vocabulary

*addition, single-step problem, subtraction, two-step problem*

| COMMON ADDITION AND SUBTRACTION PROBLEM TYPES | | |
|---|---|---|
| **Join**<br>**(Result Unknown)** | **Join**<br>**(Change Unknown)** | **Join**<br>**(Start Unknown)** |
| Sue had 28 pencils. Alex gave her 14 more pencils. How many pencils does Sue have altogether? | Sue had 28 pencils. Alex gave her some more. Now Sue has 42 pencils. How many did Alex give her? | Sue had some pencils. Alex gave her 14 more. Now Sue has 42 pencils. How many pencils did Sue have to start with? |
| **Separate**<br>**(Result Unknown)** | **Separate**<br>**(Change Unknown)** | **Separate**<br>**(Start Unknown)** |
| Brooke had 35 marbles. She gave 19 marbles to Joe. How many marbles does Brooke have now? | Brooke had 35 marbles. She gave some to Joe. She has 16 marbles left. How many marbles did she give to Joe? | Brooke had some marbles. She gave Joe 19 marbles. Now she has 16 marbles left. How many marbles did Brooke start with? |

**Student/Teacher Actions: What should students be doing? What should teachers be doing?**

1. Use counting cubes to model the six different problem types for addition and subtraction (see Common Addition and Subtraction Problem Types).

2. After each problem type has been taught, have students get in pairs and then divide the class in half. Half of the students will work on joining problems, and the other half will work on separating problems.

3. Students will be given chart paper and markers and will need to create and solve single-step or two-step practical problems involving addition and subtraction.

4. On the chart paper, students should have the following: (See the Rubric for Poster Problem)
   - State the problem.
   - Create a picture of what the problem is doing (the action).
   - Write a number sentence that corresponds to the problem.

5. After each pair has completed their problem with the listed criteria, have students discuss what type of action was happening in their problem and find others in the room who used the same problem type.

6. Finally, create a chart with the problems from the students' papers to talk about the action in each and to discuss the missing part.

7. Relate these problems to reading in making the connection that word problems are like a story. There is a beginning, a middle, and an end. Ask students what part is missing in each problem type. (Students do not have to name the type but rather explain what the action is in the problem.)

**Assessment**
- **Questions**
  - Teachers can relate these problems to reading in making the connection that word problems are like a story. There is a beginning, a middle, and an end. Ask the students what part is missing in each problem type. (Students do not have to name the type but rather explain what the action is in the problem.)
  - What is the difference between the two problems?
  - Why did Student A think about his problem as joining and Student B think about his problem as separating when they have the same numbers?

- **Journal writing prompts (include a minimum of two)**
  - Given the two problems below:
    - What is the difference in the two problems?
    - How would you solve each?
    - How would you turn the problem into a subtraction problem?

| | |
|---|---|
| Sue had 28 pencils. Alex gave her 14 more pencils. How many pencils does Sue have altogether? | Sue had 28 pencils. Alex gave her some more. Now Sue has 42 pencils. How many did Alex give her? |

- **Other Assessments (include informal assessment ideas)**
  - Give students six problems based on the problem types and ask them to explain how to solve for each in their own words.
  - Create problems based on the six problem types and have students solve the problems.

**Extensions and Connections (for all students)**

- Use the attached matching game for rotations to match by how the problems were solved, either joining or separating.

**Strategies for Differentiation**

- Use only two matching game pieces and have students draw out their thinking with pictures and number sentences.
- Use game pieces and ask students to create a different problem that matches each type.
- Provide counters, if needed.
- Redirection and corrective feedback should be given throughout lesson.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

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## **Rubric for Poster Problem**

| Name | Yes | No |
|---|---|---|
| Neat and Organized | Yes | No |

| Poster Criteria | Possible Points | Points Earned |
|---|---|---|
| State the problem | 10 points | |
| Create a picture of what the problem is doing (the action) | 10 points | |
| Write a number sentence that corresponds to the problem | 10 points | |

Student Reflection:

Teacher Feedback:

# Joining or Separating

| Joining Problems | Separating Problems |
|---|---|
|  |  |

| Joining Problems | | Separating Problems | |
|---|---|---|---|
| | | | |
| Mark had 15 toy cars. Alex gave him 14 more toy cars. How many toy cars does Mark have altogether? | Vince had some candy. Shawn gave him 15 more pieces. Now Vince has 31 pieces of candy. How many pieces of candy did Vince have to start with? | Sue had some pencils. Alex gave her 14 more. Now Sue has 42 pencils. How many pencils did Sue have to start with? | Shelly had 28 pencils. Alex gave her some more. Now Shelly has 42 pencils. How many did Alex give her? |
| John had 35 marbles. He gave 19 marbles to Luis. How many marbles does John have now? | Lisa had 22 beads. She gave some to Tim. She has 16 beads left. How many beads did she give to Tim? | Brooke had some marbles. She gave Joe 19 marbles. Now she has 16 marbles left. How many marbles did Brooke start with? | Lisa purchased 22 toy rings. She gave some to Ann. She has 16 toy rings left. How many toy rings did she give to Ann? |

| | | | |
|---|---|---|---|
| Mark had 15 toy cars. Alex gave him14 more toy cars. How many toy cars does Mark have altogether? | Vince had some candy. Shawn gave him 15 more pieces. Now Vince has 31 pieces of candy. How many pieces of candy did Vince have to start with? | Sue had some pencils. Alex gave her 14 more. Now Sue has 42 pencils. How many pencils did Sue have to start with? | Shelly had 28 pencils. Alex gave her some more. Now Shelly has 42 pencils. How many did Alex give her? |
| John had 35 marbles. He gave 19 marbles to Luis. How many marbles does John have now? | Lisa had 22 beads. She gave some to Tim. She has 16 beads left. How many beads did she give to Tim? | Brooke had some marbles. She gave Joe 19 marbles. Now she has 16 marbles left. How many marbles did Brooke start with? | Lisa purchased 22 toy rings. She gave some to Ann. She has 16 toy rings left. How many toy rings did she give to Ann? |