Math Stories

Strand: Computation and Estimation

Topic: Solve story problems involving joining, separating, and part-part-whole scenarios.

Primary SOL: K.6 The student will model and solve single-step story and picture problems with sums to 10 and differences within 10, using concrete objects.

Related SOL: K.1ab, K.2a, K.4b

Materials
- Circle attribute blocks
- Friends Work Mat (one per student)
- Counters
- Part-Part-Whole Mat (one per student, possibly a laminated one for teacher use, or the ability to draw one on a board)

Vocabulary
combine, fewer, join, more, part, separate, whole

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

Note: It may be overwhelming to teach all four types of addition and subtraction problem types in the same day. Decide which examples to teach depending on the readiness levels of your students and the attention span of your class.

Note: When teaching story/picture problems, be sure to include all common addition and subtraction problem types:

Kindergarten: Common Addition and Subtraction Problem Types	
Join (Result Unknown)	Sue had 4 pennies. Josh gave her 2 more. How many does Sue have altogether?
Separate (Result Unknown)	Sue had 8 pennies. She gave 5 pennies to Josh. How many pennies does Sue have now?
Part-Part-Whole (Whole Unknown)	Josh has 4 red balloons and 3 blue balloons. How many balloons does he have?
Part-Part-Whole (Both parts unknown)	Josh has 5 balloons. Some of them are red and some of them are blue. How many can be blue and how many can be red?

1. Gather students together and ask them to think about their favorite kind of cookie. Ask: *If you had a choice, would you want more cookies or fewer cookies?* Remind students that more means a larger number. Call a student to the front of the class. Give the

student four circle attribute blocks. Say: *Johnny has 4 cookies.* Call another student to the front and give them two circle blocks. *Sally gives him 2 more.* Have Sally give Johnny her cookies. *How many cookies does Johnny have now?* Allow Johnny to count his cookies aloud for the class. Ask: *Does Johnny have more cookies now, or does he have fewer cookies?* Say: *Johnny has more cookies now because Sally gave him her cookies. She joined or combined her cookies with his.* Take the cookies from the students, allow them to sit down.

2. Call two new students to the front of the classroom. Say: *This time, Marsha has 5 cookies. Brad gives her 3 more cookies. How many cookies does Marsha have altogether?* Allow students to count with Marsha to come up with the correct answer of 8. Explain to students that we are going to work on showing this problem on a work mat.

3. Pass out a Friends Work Mat and counters to pairs of students. Display the story problem: **Marsha has 5 cookies. Brad gave her 3 more cookies. How many cookies does Marsha have altogether?** *Let's think through this problem. How many cookies did Marsha have?* (5) Place five counters on the picture of Marsha to show her five cookies. *How many cookies did Brad have?* (3) *How do you know?* (Because he gave Marsha three cookies.) Put three counters on the picture of Brad. *Now, if Brad gave her three cookies, what should we do with the cookies on Brad's picture?* (Move them to Marsha.) *How can we find out how many cookies Marsha has altogether?* (We can count.) Tell me how many cookies Marsha has now. (8) *Does she have more cookies or fewer cookies than what she started with?*

4. Repeat this process with additional join story problems, as needed. If students are ready, allow them to come up with the two amounts to combine.

5. Tell students: *This time, we're going to change things up.* Display the story problem as you read: **Marsha has 5 cookies. She gives Brad 2 cookies. How many cookies does Marsha have now?** Ask students: *Where do I begin?* The students should be able to tell you to put five counters on Marsha. Ask what step comes next, and be prepared for students to say to place two new counters on Brad. If this occurs, ask: *Where did Brad's cookies come from?* Guide them back to the story problem to understand that Marsha gave him the cookies. *Because Marsha gave Brad the cookies, Brad's two cookies must come from Marsha's pile. She separated the cookies from her own pile. Let's move two counters from Marsha to Brad.* Be sure all students have done this correctly. *How many cookies does Marsha have now?* Allow students to count and give the answer. *Does she have more cookies or fewer cookies than what she started with?*

6. Repeat this process with additional separate story problems, as needed.

7. Display a laminated Part-Part-Whole Mat, or draw one on the board that you can easily wipe off. Say: *Sometimes when we're solving problems, we don't have to give something to someone else, we just count the two amounts together.* Display the story problem as you read: *There are 3 boys and 3 girls in the pool. How many children are in the pool?* Call students to the front of the room to act out the problem. Remind students that they don't have to share anything; we're just combining the number of children. Once students identify how many boys were in the first group, draw three dots in the first part section on the mat. Repeat for the number of girls, allowing a student to draw the

three dots in the second part section of the mat. Encourage students to count to find the answer of 6. Draw six dots in the whole section of the mat.

8. Give each student a Part-Part-Whole Mat and repeat the story problem, allowing students to use and move counters to show the number of children in the pool.
9. Repeat this process with additional part-part-whole (whole unknown) story problems, as needed.
10. Continue using the Part-Part-Whole Mat as a whole-group exercise. Tell students: *Sometimes we know the total amount of objects and we need to find the parts that make up the whole.* Share the story problem: *There are 9 children in the pool. Some are boys and some are girls. How many of the children are boys?* Ask students what we know. (We know that there are nine children in the pool.) *We should put nine in the Whole section of our mat, because that's the whole amount of children we have. Do we know what parts make our whole?* (No) Explain to students that the only way to figure this type of problem out is to start separating the whole pile into two parts. Direct students to fill their Whole portion with nine counters. Say: *Move two counters into one part on your mat. Move the remaining counters to the other part. Remember, in this story problem, one part is the number of boys in the pool, and the other part is the number of girls in the pool. What did we just come up with?* (two boys and seven girls) Direct students to move all nine counters back into their whole section and repeat the process again by moving three counters this time. Discuss what that means for the number of girls. *What do you notice about the answers to this story problem? Is there only one correct answer, or are there many different ways to respond? Are you wrong if your partner has a different response than you?* Explain that as long as they created both parts using the counters they had in their whole, the answer they give is possible.
11. Repeat this process with additional part-part-whole (both parts unknown) story problems, as needed.
12. Give students the activity sheet, or a similar sheet of your creation, to complete using their Friends Work Mat or their Part-Part-Whole Mat. Direct students to model their story problem on their mat, then draw a picture to show what they did. Alter your activity sheet to match the problem types you have covered with your class.

Assessment
- **Questions**
  - There are 3 frogs in the pond. 2 more frogs jump in. How many frogs are in the pond now?
  - Tell me a story problem with the numbers 3 and 5.
  - What does it mean to join?
  - What does it mean to separate?

- **Journal/writing prompts**
  - Draw pictures to "write" your own number story. Use your pictures to show both the words and the numbers in your story.
  - There were six birds in a nest. Some flew away. Draw what the nest might look like now.

- o There were six balls on the playground. Some were red and some were blue. Draw what the balls might have looked like. Can you show more than one way to do this?

- **Other Assessments**
  - o Provide a story problem and counters. Observe students as they solve the problem.
  - o Use the activity sheet as an individual assessment activity. Read each problem to the student and ask him or her to use counters to solve the problem.

Extensions and Connections (for all students)

- Provide story mats. Allow children to tell their own stories to a partner and solve the problem together.
- When doing part-part-whole activities to develop fluency, use story problems to provide a context for the activity.

Strategies for Differentiation

- Vary the size of the numbers with which students work.
- When working with part-part-whole problems, provide struggling students with one of the parts.
- Use a variety of counters to model problems. Students with fine-motor difficulties may benefit from working with larger counters.
- Provide an anchor chart that shows a join problem, a separate problem, and a part-part-whole problem with visual representations for each problem.
- Replace some of the words with pictures in problems to aid in independence for lower level readers.

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

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Friends Work Mat

Part-Part-Whole Mat

Part	Part

Whole
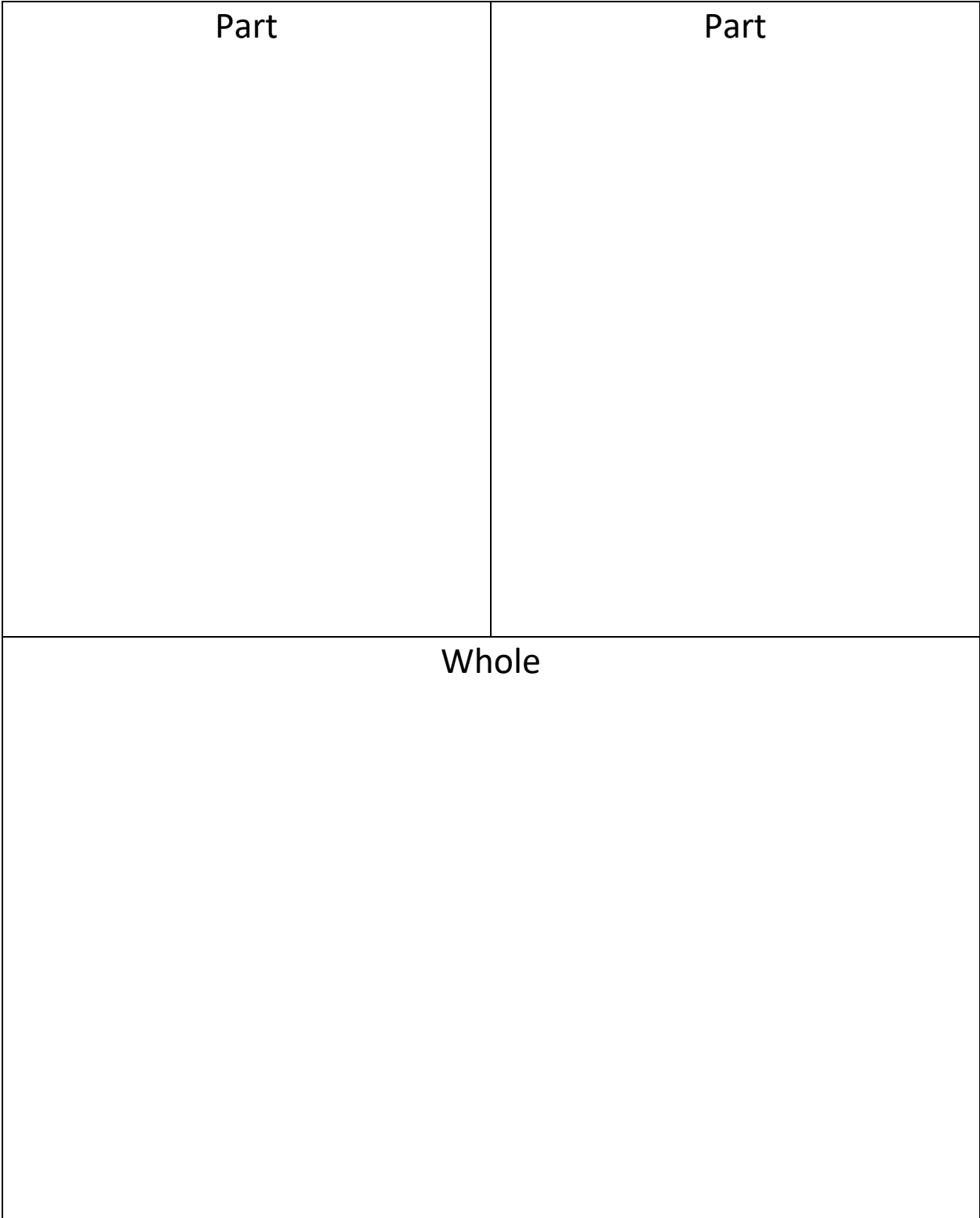
Name: _____

Story Problem Activity Sheet

Marsha had 1 cracker. Brad gave her 8 of his crackers. How many crackers does Marsha have now?	Marsha had 10 bouncy balls. She gave 3 to Brad. How many bouncy balls does Marsha have left?
Sally has 3 green balloons and 3 yellow balloons. How many balloons does she have?	Johnny has 5 balloons. Some of them are blue and some of them are red. How many balloons can be blue and how many can be red?