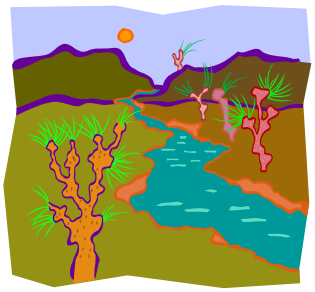


SCAFFOLDING TASK: By the Riverside

Approximately 1-2 Days

STANDARDS FOR MATHEMATICAL CONTENT

MCCK.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings[1], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

MCCK.OA.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

MCCK.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

MCCK.OA.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

MCCK.OA.5 Fluently add and subtract within 5

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students need to develop an understanding of part-whole relationships as they recognize that a set of objects (5) can be broken into smaller sub-sets (3 and 2) and still remain the total amount (5). In addition, this objective asks students to realize that a set of objects (5) can be broken in multiple ways (3 and 2; 4 and 1, 5+0). Thus, when breaking apart a set (decomposing), students use the understanding that a smaller set of objects exists within that larger set (inclusion).

Commutative property might be identified during this task. Have students discuss whether or not to include commutative properties as possible combinations. There is no right or wrong answer, students should construct viable arguments and explain why their combination of eyes, legs and

tails is correct. In addition, students must be willing to analyze and critique the reasoning of others.

ESSENTIAL QUESTIONS

- How can I represent problems using objects, pictures, and numbers?
- How can strategies help us solve problems?
- How can you model a math problem with objects or pictures?
- How do you know when your answer makes sense?
- What is a number relationship? How can number relationships help me?

MATERIALS

- *By the Riverside* Recording sheet (optional)
- Accessible manipulatives

GROUPING

Whole/individual/small group task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

It is useful to think of problem-based lessons as consisting of three main parts: *before, during, and after.* If you allot time for each part, it is quite easy to devote a full period to one seemingly simple problem. (Van de Walle p.15-19)

The Before Phase: get students mentally prepared for the task, be sure the task is understood, and be certain that you have clearly established expectations beyond simply getting an answer.

The During Phase: the first and most important thing here is *let go and observe!* Give students a chance to work without your guidance. Give them an opportunity to use *their* ideas and not simply follow directions. Your second task is to listen. Find out how different children or groups are thinking, what ideas they are using, and how they are approaching the problem. In this phase hints may be provided but not solutions and students should be encouraged to test ideas.

The After Phase: this is often where some of the best learning takes place. During the after phase students share emerging ideas and the community of class learners is developed. This will not develop quickly or easily and will be developed over time.

(*For a more detailed description of the three-phase problem-based learning model, see Van de Walle Teaching Student-Centered Mathematics K-3 pp 15-19)*

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Begin by discussing water and where water can be found. Have the students share experience of their trips to a place with water. As students share experiences, have them include any animals

they might see while on the trip. Set the scene by explaining to students about a time you went hiking to river and have them explore the possible animal combinations you may have seen.

> *By the riverside, a hiker saw 8 eyes and more than 9 legs. What animals could the hiker have possibly seen by the riverside?*

Comment: Because this task has eyes AND legs, students need to be more organized with their thinking than with the *Old Farmer McDonald* task in a previous unit. When students are creating animal combinations allow them to be as creative as possible, as long as they can justify their answer. (Example: a student could see 2 eyes, 1 tail and no legs…if they saw a fish)

In closing, after students have explored the possible combinations and shared with classmates, ask them what the most legs the hikers could have seen might be? Have them explain their thinking.

FORMATIVE ASSESSMENT QUESTIONS

- What strategy did you use?
- What is the largest amount of animals the hiker could have seen?
- What is the smallest amount of animals the hiker could have seen?
- Could there be (1, 3, 5, 7, 9) legs seen during the hike?

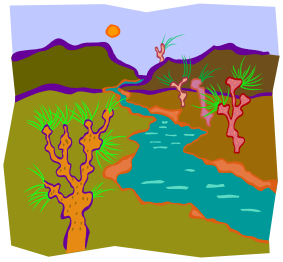
DIFFERENTIATION

Extension

- Have students create a specific combination of animals by the riverside and play *Guess What's by the River*.
    - Example: The combination of animals by the riverside is one deer and a duck so I would tell my partner "I have 6 legs and 4 eyes by the riverside. What did I see?"
    - Example: The combination of animals by the riverside is three deer and two ducks so I would tell my partner "I have 16 legs and 10 eyes by the riverside. What did I see?" As students work through the extension ask them if they notice any patterns.

Intervention

- Print out pictures of forest animals or use animal figurines to manipulate while trying find out the correct combination of forest animals. You could also give students a specific number of animals seen on the hike which would limit the possible combinations.



By The Riverside

By the riverside, a hiker saw 8 eyes and more than 9 legs.
What animals could the hiker have possibly seen by the riverside?