

QUESTIONS/SUGGESTIONS TO GUIDE YOUR READING

Chapter One

1. Discuss the differences between an instructional model that focuses on teaching mathematics and one that focuses on learning mathematics.
2. What is meant by the statement "Children should construct their own mathematical knowledge?"
3. Describe the teacher's role in a teaching/learning environment where children construct their own knowledge.
4. Describe three levels at which knowledge can be represented and provide examples of each.
5. What is the essential difference between a concept development activity and a reinforcement activity?
6. How should advancing technology affect the emphases on mathematics learning objectives in the curriculum?
7. What is meant by didactic teaching? What are the limitations of this style of teaching?
8. Describe each of the four types of activities presented in this chapter. Give examples of each.
9. Why should children manipulate and make observations using concrete objects?

Chapter Two

1. Explain what is meant by conservation of the as-many-as relation. Give examples.
2. List the classification tasks discussed in this book and give example activities for each. Identify materials you might use and questions you might ask.
3. Identify a collection of objects. Name three general attributes that could be used to classify the objects. Identify some specific attributes for each of the general attributes you choose.
4. Describe at least four difficulties children may encounter when learning the number concepts for 0-10.
5. Describe the prenumber tasks children should be able to perform before being introduced to numerals for numbers.
6. Explain what is meant by this statement: A child could correctly decide that one set of objects has more than another set of objects for the wrong reasons.

Chapter Three

1. Describe an activity using play money that teaches place value concepts. Specify the appropriate grade level for your objectives and possible questions you might ask.
2. What is a numeration system and what is its purpose?
3. List five significant features of our base ten numeration

- system.
4. The NCTM recommends that students develop sound number sense abilities. What concepts in this chapter would you stress to make sure students do so?
 5. What is the difference between the two learning objectives—identifies the place value of digits in a base-ten numeral and interprets a numeral in various ways using nonstandard names? Give your answer using the number 3584.

Chapters Four and Five

1. Why is it important for children to be able to rename 7 as $6 + 1$, $5 + 2$, $4 + 3$? Give examples to verify your claims.
2. How does the fact that addition is a commutative operation help a child find $2 + 9$?
3. Carefully describe an activity for teaching the family of facts for 6. (This should include all appropriate addition facts.) Indicate what materials you would use and include questions you would ask.
4. Give the different interpretations for addition and subtraction. Write a simple story (work) problem that demonstrates the meaning of each.
5. Explain how a knowledge of the identity element for addition, counting, and commutative property for addition can reduce the amount of memorization required. Sketch the table and indicate where these three ideas help.

Chapters Six and Seven

1. Name the different interpretations for multiplication and division. Write a word problem and a number sentence for each one. Explain how the numbers in the number sentence relates to the numbers in the word problem.
2. Explain how knowledge of the multiplication properties of 0 and 1 and the commutative property of multiplication helps reduce the amount of memorization required to learn the basic facts of multiplication. Sketch a multiplication and relate your discussion to it.
3. Explain and sketch how you can use exactly twelve objects to demonstrate the four basic facts of multiplication and the four related division sentences.
4. Discuss why division by zero is meaningless.

Chapters Nine and Ten

1. Give logical explanations for each of the following without using algorithms, rules, or rote procedures.
 - A. Which is smaller: $\frac{3}{4}$ or $\frac{3}{8}$? Explain your reasoning
 - B. Which is larger: $\frac{7}{7}$ or $\frac{9}{10}$? Explain your reasoning.
 - C. Name a number represented by a fraction or a decimal that you know is close to $\frac{47}{98}$.
 - D. Which is larger: $\frac{4}{9}$ or $\frac{21}{20}$? Explain your reasoning.
 - E. Why is $\frac{5}{8}$ equal to $\frac{15}{24}$?
 - F. What are some things that a numerator of a fraction tells us?
 - G. What are some things that a denominator of a fraction tells us?
 - H. Why do we find common denominators when we add or subtract fractions?
 - I. What is meant by simplifying a fraction?
2. Show how you could use paper folding to convince children $\frac{2}{3} = \frac{4}{6}$.
3. Show how you could use coins to illustrate the computation for $0.42 - 0.27$.
4. How could you illustrate to children that $0.27 \cdot 0.09$?
5. Explain why $\frac{2}{3}$ divided by $\frac{5}{7} = \frac{2}{3} \times \frac{7}{5}$.
6. Use rectangular regions approach to demonstrate $\frac{2}{3} \times \frac{4}{5}$.

Chapter Eleven

1. Describe and sketch a model for problem solving.
2. What problem-solving commitments should a teacher make to ensure that problem-solving activities are nurtured in their classrooms?
3. Give some examples of exercises or assignments that are often called problems but are not really problems.
4. Define cognition and metacognition and explain how they differ.

Chapter Sixteen

1. Explain the following:
 1. Measurement involves the use of an appropriate standard unit.
 2. Measurement is approximate.
 3. Some measures are direct, but some are indirect.
2. Why is the cubic decimeter an important unit of measurement in the metric system?
3. Explain the Celsius scale for measuring temperature by relating it to the Fahrenheit scale.
4. How does the term "conservation" apply to the measurement of length?
5. Estimation should be a deliberate part of activities

- involving measurement. What is this true?
6. Why might a traditional circular clock be more useful for teaching time than a digital clock?
 7. What is area?

Chapter Nineteen

1. Discuss what is meant by assessment of performance. Indicate conditions that ensure valid outcomes.
2. Describe at least four possible limitations of pencil and paper testing.
3. Explain how assessment activities affect what students perceive as important to learn.
4. Describe at least three strategies for assessing performance other than pencil and paper testing.
5. What is the difference between assessing mathematical knowledge and diagnosing mathematical difficulties?
6. Suppose a teacher determines the types of errors a student made on an addition test. Does that mean the teacher has diagnosed? Why or why not?
7. Describe cultural expectations and influence from parents that might lead to different opportunities in mathematics for boys and girls.
8. List some strategies for conquering gender bias in mathematics.