

Today's Mathematics

TWELFTH EDITION

Concepts, Methods, and Classroom Activities

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A Valuable Tool for Helping Children Learn to Read a Standard Analog Clock

A child is not ready to learn to read a standard analog clock until he or she can

1. Understand a number line segment from 0 to 60
2. Visualize number lines
3. Count by fives from 0 to 60

With these prerequisites, the following paragraphs describe an outstanding method for helping children learn to read a standard clock.

Cut twelve 2-inch-by-5-inch rectangles from colored cardboard or acetate. From the same color of cardboard, cut an arrow-shaped hand for the clock. With a paper

RESEARCH SNAPSHOT

How can the concept of elapsed time be incorporated into problem-solving situations?

Carpenter, Fennema, Franke, Levi, and Empson (1999) classified rate problems that involve elapsed time as special types of multiplication and division problems.

For example: A baby elephant gains 5 pounds each day. How many pounds will the baby elephant gain in 7 days?

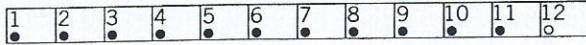
In this problem, the 7 days are not really groups, and the student solving the problem would use 5 counters to represent the 5 pounds gained after one day has passed. It is important to provide your students opportunities to solve problems that involve different kinds of quantities.

What other contexts with measurement could be used to write similar problems?

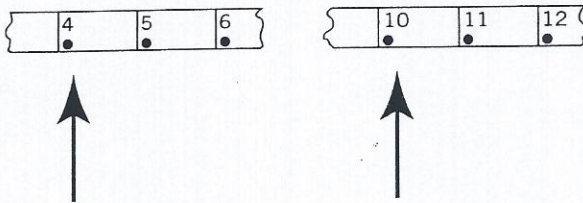
Carpenter, T. P., Fennema, E., Franke, M. L., Levi, L., & Empson, S. B. (1999). *Children's mathematics: Cognitively guided instruction*. Portsmouth, NH: Heinemann.

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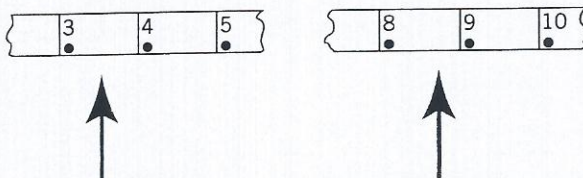
punch, punch holes uniformly in the lower left-hand and right-hand corners of each rectangle. Use brass fasteners to hook the twelve cards together. Write one numeral on the upper left-hand corner of each card. Thus you have a flexible number line segment from 1 to 12.



Introduce the children to the number line segment in a horizontal position by laying it on the floor, placing it in the chalk or marker trough, or on a flannel board. Place the arrow so that it points directly at a numeral, and have the children read the numeral.

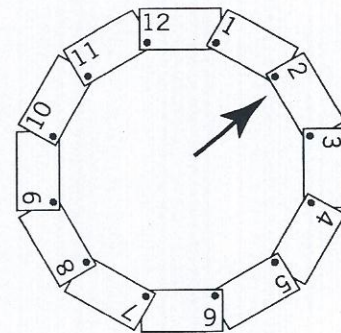


Now place the arrow so that it is pointing somewhere between two numerals.



The children need to be led to agree that when the arrow is pointing in between two numerals, then the number is read as the least value until the hand reaches the next number.

After the children are successful in reading the arrow pointing to the horizontal number line segment, connect the two ends with a brass fastener to make a circular shape and place it on the floor or on a flannel board. Place the arrow, perhaps now referred to as a "hand," in the center, and have the children practice reading the numeral the hand is pointing toward. You may need to make another set of cards with the numerals 4 to 8 oriented correctly (as opposed to being upside down as in the figure).



For the next step in teaching how to read an analog clock, introduce counting by fives beginning with 5 and counting to 55. Cut 12 more 2-inch-by-5-inch cards from a different color of cardboard. Punch holes in their lower

left-hand corners, and fasten them with brass fasteners. Print the numerals 5, 10, 15, . . . , 55 on the upper left-hand corner of the cards, and place five equally spaced marks on each card. Cut a longer arrow (hand) out of the same color of cardboard as this number line segment.

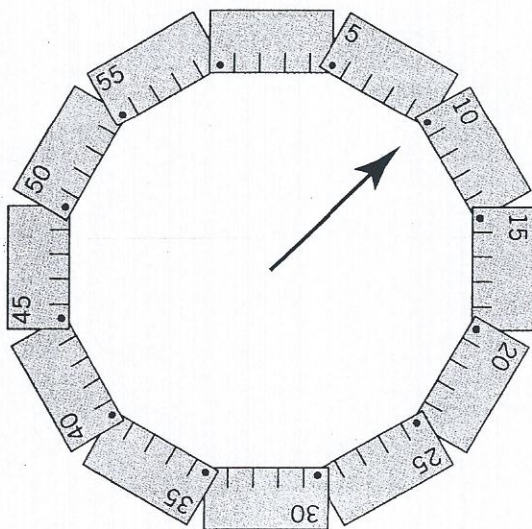


Give the children practice in reading the number the arrow is pointing toward.



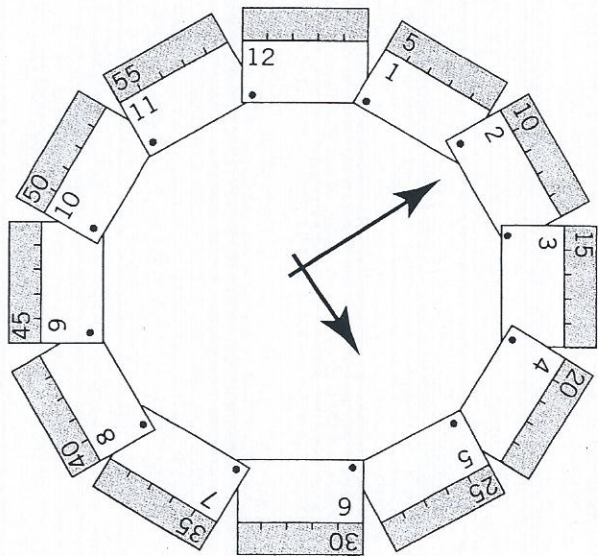
Read this point as 27.

Continue having the children practice reading the arrow as it points toward marks between the numerals written on the number line segment. After the children are successful in reading the number line segment horizontally, change the arrangement to a circular one.



Place the long arrow, now referred to as a hand, in the middle of the clock and have the children practice reading the number the hand is pointing toward.

Now place the number line segment with numerals from 1 to 12 on top of the segment that has numerals from 5 to 55. Place the two arrows or hands together, and discuss how they are different. The hands are not “big” and “little”; one is called the “short hand” and the other the “long hand”. Read the short hand first with the top number line segment; then read the long hand using the number line segment that is underneath. For example, this clock is read as 5:10:



Now the children have developed all the necessary skills they need to read a clock. Continually provide opportunities for them to tell time.

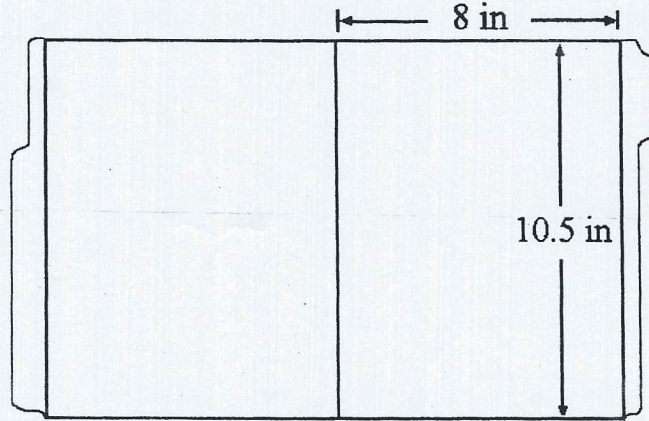
After they have become efficient in reading the clock, the idea of “to the hour” may be introduced. It is much more difficult for children to understand this, so wait until they are proficient in reading “after the hour” before introducing to the hour.

One other aspect of time that should be explored is the notion of elapsed time. For example, if the students go to school from 9:00 A.M. to 3:15 P.M., how many hours and minutes are they in school? There are a number of mental strategies that they can incorporate here. For example, they can determine how long until noon, determine how long after noon, and then add the two results together.

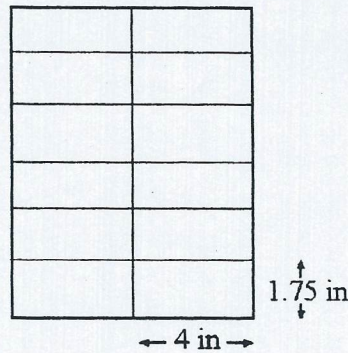
Reading an Analog Clock Aid Instructions:

Make the "hour" numberline

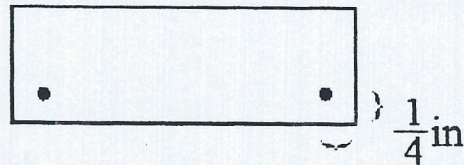
1. Cut the red file folder to size (two separate sheets $8'' \times 10\frac{1}{2}''$)



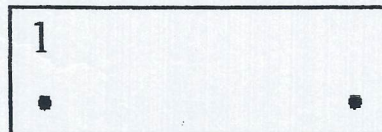
2. On each sheet, mark off and then cut out 12 rectangles, each $4'' \times 1\frac{3}{4}''$



3. For each cut rectangle, punch holes on the lower left and right corners approximately $\frac{1}{4}''$ from the edges.



4. Write the numerals 1 through 12, one numeral on each rectangle, on the top left corner of each rectangle.



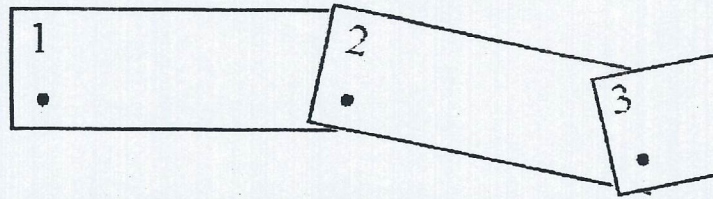
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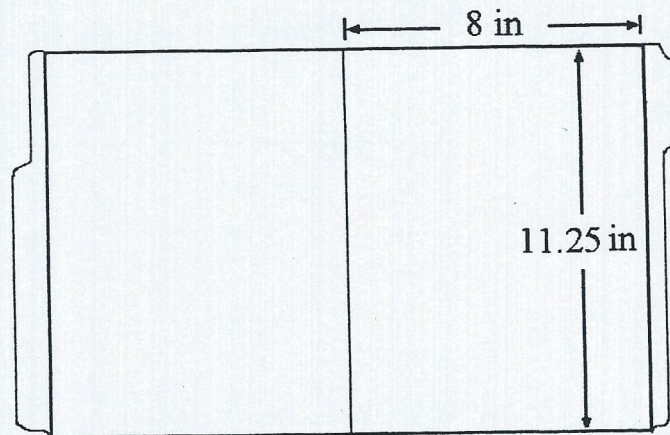
5. Fasten the rectangles together with brass fasteners so that hole on the right of the first rectangle is matched with the hole on the left of the next rectangle. Each new rectangle should be placed on top of the previous one.



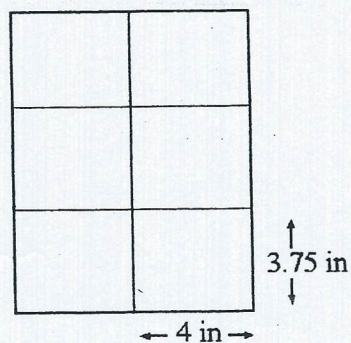
6. When these rectangles are fully fastened, they can be “stretched” to form an hour numberline. When this numberline is reshaped into a circle, the numerals written as described above will be upside-down and/or sideways. Take the other sheet and create a new set of BLANK rectangles hooked together and, AFTER placing the rectangles in a circular arrangement, THEN write the numerals on this new numberline oriented properly.

Make the “minute” numberline

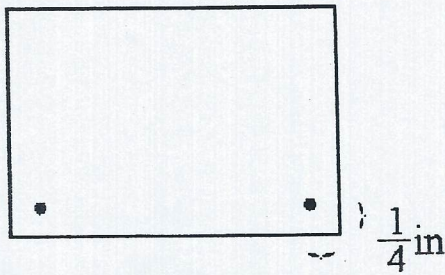
1. Cut two yellow file folders to size (four separate sheets 8” x 11¼”)



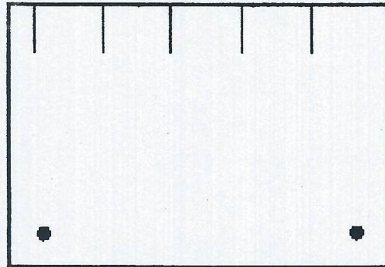
2. On each of two sheets, mark off and then cut out 6 rectangles, each 4” x 3¾”



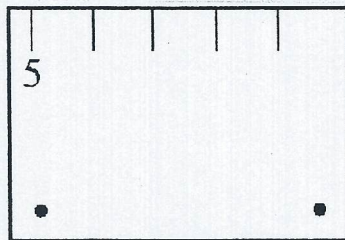
3. For each cut rectangle, punch holes on the lower left and right corners approximately $\frac{1}{4}$ " from the edges.



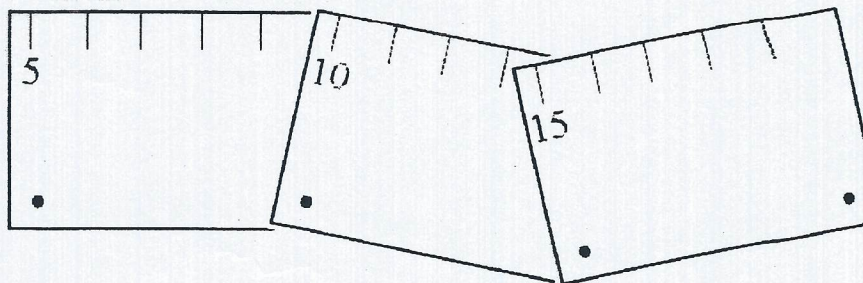
4. Place five "tick marks" on the top of each rectangle. These will not be evenly spaced on the left and right to allow for some overlap when the rectangles are fastened together.



5. Label each rectangle (except for one that is to be left blank) with numerals that are multiples of five beginning with 5 up to and including 55.



6. Fasten the rectangles together with brass fasteners so that hole on the right of the first rectangle is matched with the hole on the left of the next rectangle. Each new rectangle should be placed on top of the previous one.



7. When these rectangles are fully fastened, they can be "stretched" to form a minute numberline. When this numberline is reshaped into a circle, the numerals written as described above will be upside-down and/or sideways. Take the other sheet and create a new set of BLANK rectangles hooked together and, AFTER placing the rectangles in a circular arrangement, THEN write the numerals on this new numberline oriented properly.