Constructing Task: Time, Time, and More Time!

(Approximately 3 Days)

STANDARDS FOR MATHEMATICAL CONTENT

MCC2.MD.7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

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.

*****Mathematical Practices 1 and 6 should be evident in EVERY lesson. *****

BACKGROUND KNOWLEDGE

(Information quoted from Van de Walle and Lovin, Teaching Student-Centered Mathematics: Grades K-3, pages 243)

"Young children's problems with clock reading may be due to the curriculum. Children are usually taught first to read clacks to the hour, then the half and quarter hours, and finally to 5- and 1-minute intervals. In the early stages of this sequence, children are shown clocks set exactly to the hour or half hour. Many children who can read a clock at 7:00 or 2:30 have no idea what time it is at 6:58 or 2:33.

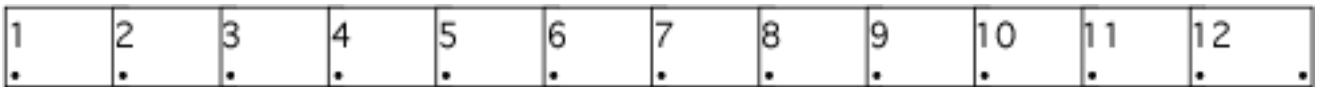
Digital clocks permit students to read times easily but do not relate times very well. To know that a digital reading of 7:58 is nearly 8 o'clock, the child must know that there are 60 minutes in an hour, that 58 is close to 60, and that 2 minutes is not a very long time. These concepts have not been developed by most first-grade and many second-grade children. The analog clock (with hands) shows "close to" times without the need for understanding big numbers or even how many minutes in an hour.

Furthermore, the standard approach to clock reading ignores the distinctly different actions and functions of the two hands. The little hand indicates broad, approximate time (nearest hour), and the big hand indicates time (minutes) before or after an hour. When we look at the hour hand, we focus on where it is pointing. With the minute hand, the focus is on the distance that it has gone around the clock or the distance yet to go for the hand to get back to the top."

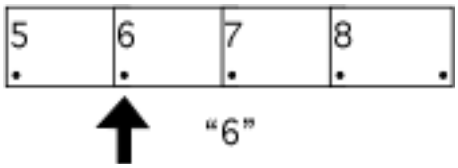
Students were first introduced to telling time in first grade. In this unit, students will build on their understanding of time by moving from telling time at the hour and half hour to telling time to the 5 minute mark. The number line is a useful way to help students understand the movement of the hands of the clock. Also, connecting the number line and the clock is helpful in developing student's number sense.

In ***Teaching Student Centered Mathematics*** by John A. Van de Walle there are many suggestions for teaching time, see pages 242-244.

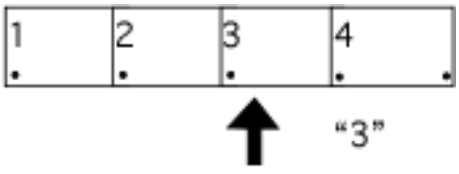
THE NUMBER-LINE CLOCK



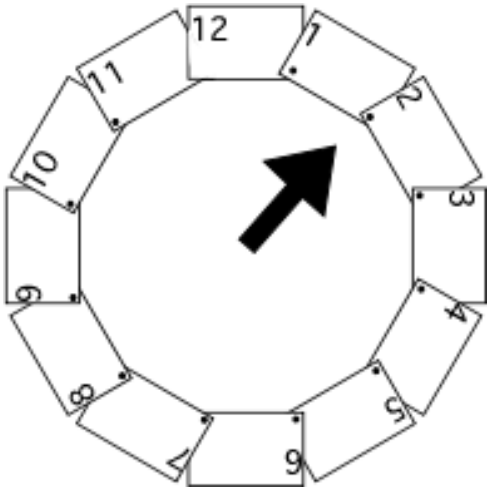
A number line clock is made up of 12 rectangles of tagboard. Punch a hole in the lower right and lower left hand corner of each card. Write the numerals 1 – 12 in black marker, one per card, in the top upper left hand corners. Use brass fastners to assemble the twelve cards to form a flexible number line.
Introduce the number line in a horizontal position by laying it on the floor, setting it in a chalk tray, or attaching it to a bulletin board. Make an arrow the same color as the numerals (black). Make the arrow short and wide. Place the arrow so it is below the line, but pointing to a specific numeral. Have students identify the numbers in order and out of order.



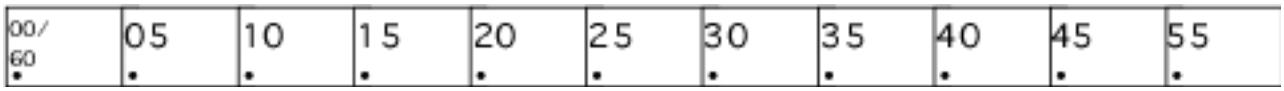
Now place the arrow between two numerals on the line. Students need to develop the understnding that the arrow continues to indicate the lesser value until the arrow arrives at the next numeral in the line.



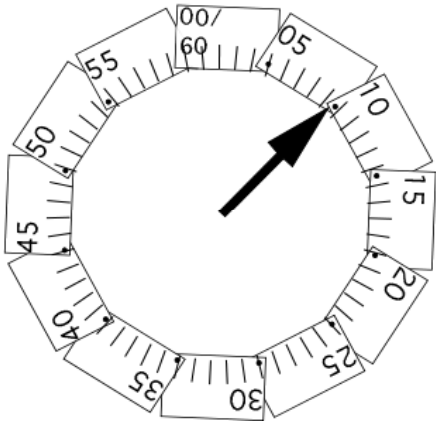
After students become proficient with the horizontal number line, connect the two ends together and arrange the numeral cards in a circlular shape. Place the "clock" on the floor or a bulletin board.



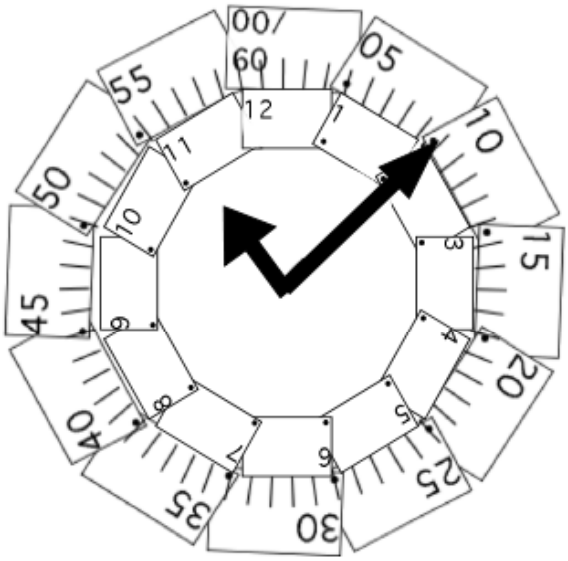
Place the arrow in the center of the circle and have the students practice reading the numeral that the arrow points toward.



Extend clock time to mintues by cutting out 12 more cards, slightly larger in length than the first set. Construct the number line using the same method as the hour number cards. Write the numerals 5 – 60/00 in a red marker in the top left corenr . Cut a longer and narrower arrow out of red construction paper. Move the arrow along the number line. First have students practice counting by 5s as you move the arrow. You can then add line segments on each card to represent minutes. One segment under the numeral, and 4 more equally spaced out on each card. Practice moving the arrow to any numeral or minute interval segment.



When students become proficient with this skill, connect the ends to make a circuler shape and practice reading the minute numerals with the long arrow in the middle of the circle.

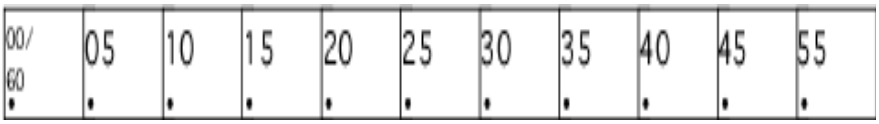


11:10

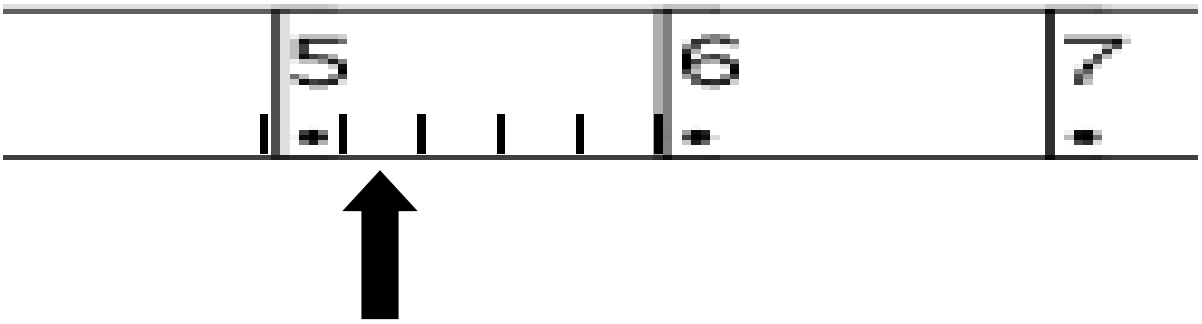
When students have had many experiences with each "clock", place the 00/60 – 55 minute clock around the outside of the 1- 12 hour clock. Use both hands to read the hour and the minute time. Also provide opportunities for students to practice moving the hands to a "digitally-printed" time on the board or flashcard: 5:35, 10:25, etc.

An Important Thought about Hours and Minutes

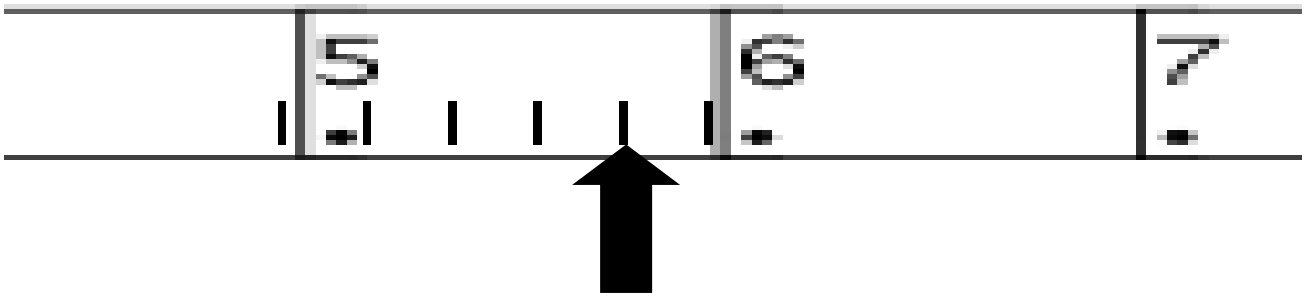
Students rarely understand that all of the sixty "minute marks" actually occur in the space of one hour traveled by the hour hand. Use the diagram below to explore this idea.



Teachers have also used clocks with only an hour hand to help students understand this concept.



Look at the arrow on the "5 o'clock segment. The hour hand has traveled 1/5 of the distance to 6:00. One-fith of 60 minutes is 12 minutes. The time is 5:12.



This hour hand has traveled almost 4/5 of the hour's distance. The time is approximately 5:45. The time is between 5:36 and 5:48.

**In 2nd Grade, students are only working to master telling time to the nearest five minutes, students are not expected to master telling time to the nearest minute or use fractional notation in reference to time. This is just content information for the teacher.

ESSENTIAL QUESTIONS

- How can counting by five help me to determine time in an hour?
- What does telling time to the nearest five minutes mean?
- How can I determine the number of hours in a day?

MATERIALS

- *The Grouchy Lady Bug* by Eric Carle or similar book
- Zippered plastic bags for time memory game storage
- Time Memory cards
- Class set of Judy Clocks

- How Long Is a Minute? task sheet
- *The Grouchy Ladybug* clock task sheet
- Brass fasteners needed for *The Grouchy Ladybug* clocks

GROUPING

Small Groups

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

This task is designed to take a few days. Students need daily experience with reading a clock and problem solving situations involving time.

Part I
Gather students together for reading of Eric Carle's *The Grouchy Ladybug* or similar book. Write the times from ***The Grouchy Ladybug*** on a large class chart and review the story. Give each child (or partners) the ladybug clock task sheet and assign each child a time from the story. Instruct them to record the activity that happened at that time. Students will cut out an analog and a digital clock, record the correct time and then write a sentence to describe what was happening in the story at that time on a large white sheet of construction paper. As the story is read a second time, each student should read his or her time aloud, lining up the sheets across the front of the room to retell the story. It would be helpful to have the class in a circle for this part of the task, so everyone can see all the pages. These pages can be put together to create a class book along with an illustration of each activity.

Part II
(Activity found from Van de Walle and Lovin, Teaching Student-Centered Mathematics: Grades K-3, pages 244)
Use two real clocks, one with only an hour hand and one with two hands. (Break off the minute hand from an old clock.) Cover the two-handed clock. Periodically during the day, direct attention to the one-handed clock. Discuss the time in approximate language. Have students predict where the minute hand should be. Uncover the other clock and check. This could be added into your classroom procedures.
Once students are familiar with predicting where the minute hand should be, then review time after the hour in 5-minute intervals. Review counting by 5's around the clock. Instead of predicting that the minute hand is pointing at the 4, encourage students to say it is about 20 minutes after the hour. As skills develop, suggest that students always look first at the little or hour hand to learn approximately what time it is and then focus on the minute hand for precision.

Part III
Students will create a time match game. The teacher should prepare 5 or more pages of the pre-made set of clock cards for the children to program with different times. Each pair of students should have the same number of digital clock cards as analog clock cards. Stress the importance of programming each pair of cards with the same time (preferably with times other than on the hour or half hour.) It is important to check the clock cards before students begin playing the match game.

Student Directions

- You and a partner will use the stack of clocks to play a memory game.
- Lay all the cards face down on the floor in an array.
- Player number 1 turns over two cards and will say the time shown on each card as it is turned over. An appropriate statement might be, "The analog clock shows 5:20. The digital clock shows 8:10."
- If both cards revealed by the first player match then the cards are picked up by the player and two more cards may be turned over.
- If the cards turned over do not match then the cards are turned face down and it becomes the second player's turn.
- Continue the game until all cards have been picked up.
- The person with the most sets of cards at the end of the game wins.

FORMATIVE ASSESSMENT QUESTIONS

- What time is it on this clock? How do you know?
- Explain to me how to tell time.
- The hour hand is in between two numbers on a clock, how do I know what time it is?

DIFFERENTIATION

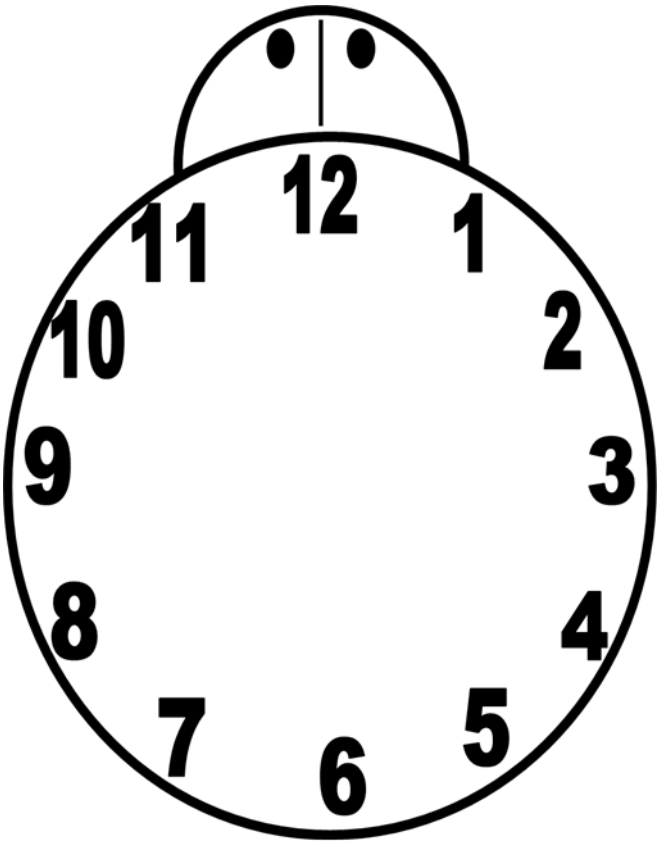
Extension

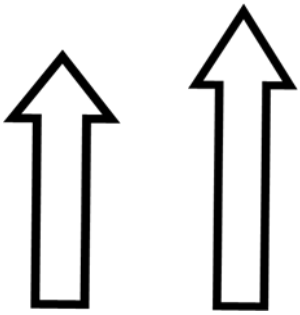
- Students can use clock times to create a story about a day on the farm, at the beach or somewhere else. This can also be link to writing by creating a story of taking on another animal/character's point of view, such as the ladybug.

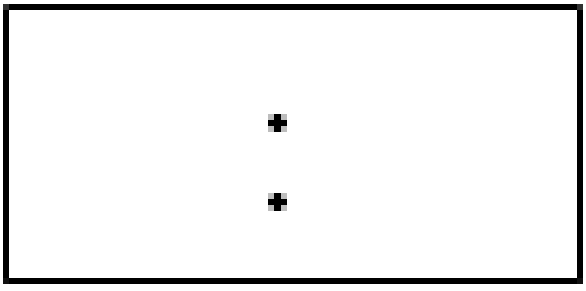
Intervention

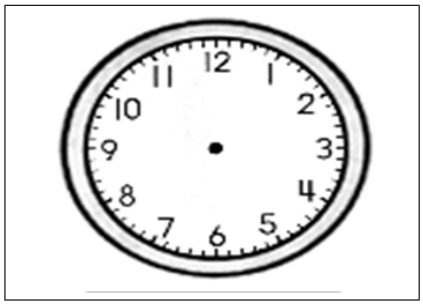
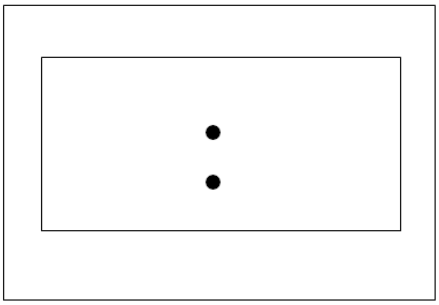
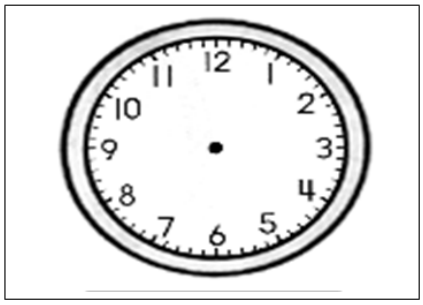
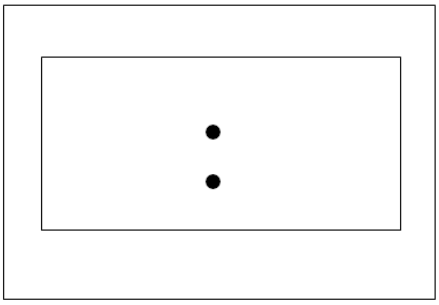
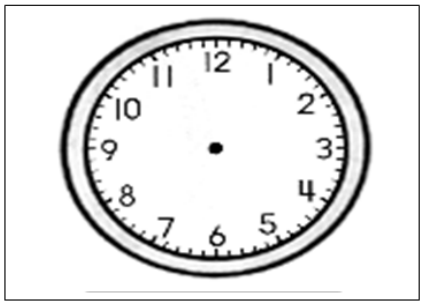
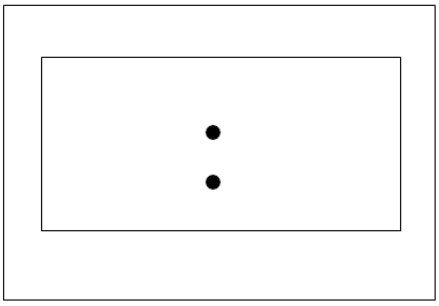
- Have students add the one minute increments around their "Grouchy Ladybug" clock, this will allow students to count one by one.
- Allow students to use Judy Clocks or other commercially made clocks to model the time that is on the analog clock, so they can see the hands clearly. These clocks are great because they show how the hour hand and minute hand work together. They will also be able to see that when the minute hand is pointing to a number, they count by 5s to locate the minute. Students could also model the time that is on the digital clock using the Judy clock, so they will know what the analog clock will look like.
- A website that provides a CRCT computerized format of analog clocks is located at http://www.fi.edu/time/journey/JustInTIme/min-quiz.html .This quiz could be used as quick assessment of telling time.
- More telling time activities with lesson plans and games are located at http://www.fi.edu/time/journey/JustInTime/contents.html. This site offers practice on telling time to the hour, half hour, and five minute intervals.

The Grouchy Ladybug Clock







 Analog Clock	 Digital Clock
 Analog Clock	 Digital Clock
 Analog Clock	 Digital Clock