CLOCK and CALENDAR SKILLS

Teaching Time to Special Students

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Introduction

Clocks and calendars . . . they can provide order, helping people to work together and communicate. Or they can be mysterious jumbles of meaningless numbers. The worksheets, games, and activities in this book have been designed to "demystify" clocks and calendars for special students and to help them improve their time-telling skills.

The first section of worksheets introduces time-telling step by step, starting with the simplest concept of recognizing time on the hour. A large clock face is included for use as a visual aid in the classroom and can be used by students as a tactile learning experience.

Moving beyond the clock-related skills, students go on to distinguish between A.M. and P.M. and learn the days of the week and the months of the year. Pages are provided so students can make their own calendars, locating special days and holidays in each month.

Emphasis is placed on the practical applications of understanding time. Worksheets teach students to set an alarm clock and use a timer. Other worksheets help students read a TV schedule and decipher a bus schedule. With the current popularity of digital clocks, numerous activities stress recognizing the time on both a traditional clock face and in digital notation. In one game, students fill out a time card, adding units of time to achieve eight-hour days and forty-hour weeks. In another game, students complete a weekly schedule.

Teacher's material accompanies each worksheet and activity, listing specific objectives of the worksheet or activity and providing detailed suggestions for introducing the material. Games are included to provide fun and to motivate students to master their new skills.

Materials in this book will be useful in working with a large cross-section of students. Many of the worksheets dealing with both clocks and calendars could be used or easily adapted for use with nonreaders. Other worksheets present problem-solving activities for more able students.

This book presents a logical development of time-telling skills, but students do not necessarily have to complete all of the material in order. Teachers can choose the worksheets or activities that meet the needs of their students.

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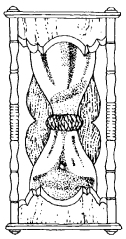
Of Clocks and Calendars

Telling the time with clocks and calendars is so much a part of our lives that most of us take it for granted. Yet clocks were not developed until the late 1200's. And the calendar used by most people in the Western world was not worked out by Pope Gregory until the 1580's.

The oldest known instruments designed for telling time were sundials, used more than 4,000 years ago. Sundials told the time my measuring the varying length of a shadow cast by the sun as it crossed the sky. Other early time-telling devices included hourglasses and water clocks. They worked by pouring either sand or water from one container into another at a steady rate. By measuring the amount of material poured, people could tell how much time had passed.



Earliest mechanical clocks had no hands or dial, but told the time by ringing a bell. The word *clock* probably comes from the French word *cloche* and the German word *Glocke*, both of which mean bell. By the mid-1300's, the dial and hour hand had been added. Minute and second hands became common by 1700.

Modern clocks range greatly in price, design, and accuracy. Most are either traditional dial clocks or digital clocks which became popular in the 1970's. Timekeeping in most clocks is determined by the frequency of some regularly repeating action, such as the swing of a pendulum. Clocks with stable frequencies keep time most accurately. Atomic clocks are the most accurate ever made. They are based on the vibrations of certain atoms or molecules, which almost always vibrate at the same rate per second. Thus, atomic clocks gain or lose only a few seconds in 100,000 years.

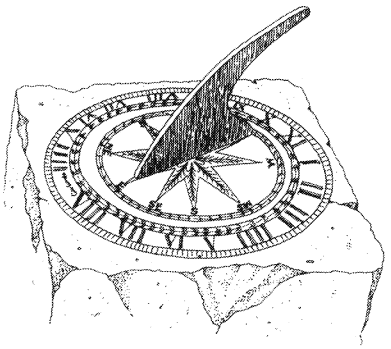
For ancient people, totally dependent on nature, the seeming rotation of the sun provided the most obvious unit of measuring time: the solar day. And the passing of the seasons dictated the length of another unit of time: the solar year. It was easy to see the changing position and shape of the moon so the lunar month became an intermediate measure of time.

We now know the time between successive full moons is about $29\frac{1}{2}$ days. Twelve lunar months would be about 354 days, almost 11 days shorter than the solar year of approximately $365\frac{1}{4}$ days. But a year of 13 lunar months would be almost 18 days longer than the solar year.

Most ancient calendars tried to compromise between the lunar and solar years, with some years of 12 months and some of 13. The Egyptians were probably the first people to adopt a predominantly solar calendar, recognizing a year of 365 days. The 12 months each had 30 days and an extra 5 days were added at the end of the year.

The Romans introduced a calendar borrowed from the Greeks in the mid-700's B.C. They recognized 10 months: Martius, Aprilis, Maius, Junius, Quintilis, Sextilis, September, October, November, and December. Their year had 304 days and seemed to ignore the remaining days, which fell in the middle of winter. Months were added, subtracted, and rearranged. By the first century B.C., the accumulated error caused by the inaccurate length of the year made the calendar about 3 months ahead of the seasons. While making numerous improvements in the calendar, Julius Caesar realigned the calendar with the seasons by ruling that the year we know as 46 B.C. should have 445 days. The Romans called it "the year of confusion."

On the advice of astronomers in 1582, Pope Gregory XIII made further corrections to the Julian calendar. The Gregorian calendar is so accurate that the difference between the calendar and the solar years is now only about 26 seconds.



HOUR/QUARTER PAST/HALF PAST/ QUARTER OF
Directions for Worksheet 6

Objectives

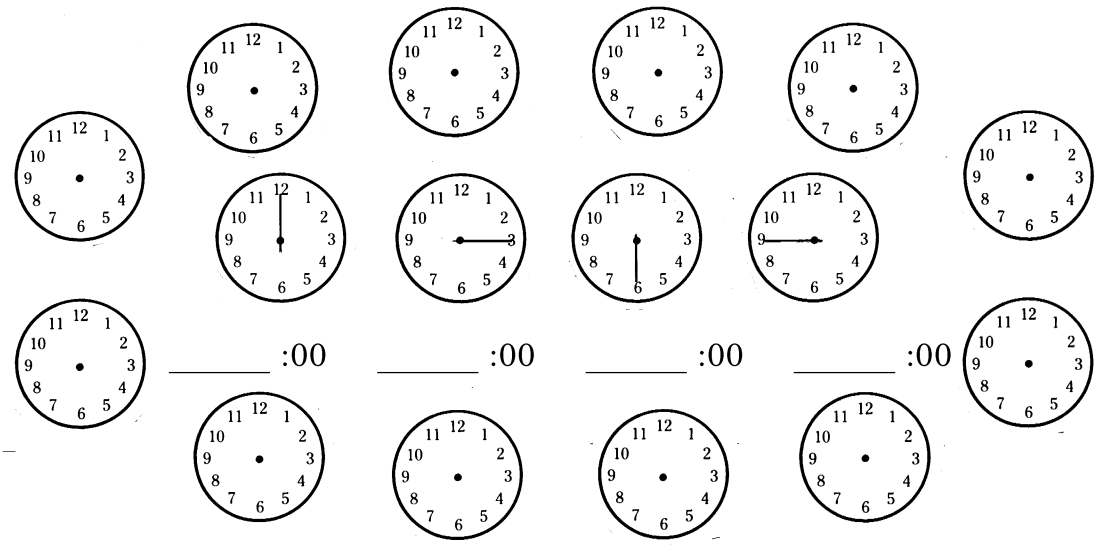
1. Students distinguish between times on the hour, quarter past, half past, and quarter of the hour.
2. Students review clock face, digital notation, and words for time on the hour, quarter past, half past, and quarter of the hour.

Materials needed

Game "Draw the Time" (see page 13)
Large cardboard clock face (see page 2)
Copy of Worksheet 6 for each student
Chalkboard and chalk
Pencil for each student

Introduce worksheet

1. Before class, draw a series of clock faces similar to those below on the chalkboard.



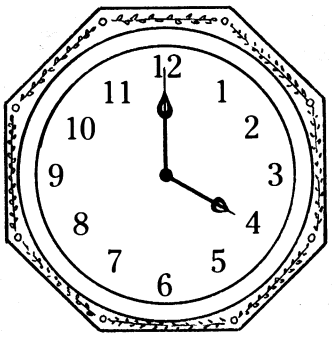
2. We've learned that the minute hand helps tell the time. Where is the minute hand pointing if it is half past the hour? (to the 6) Point to that clock in the center of the chalkboard.
3. Where does the minute hand point if it is exactly on the hour? (to the 12) Point to that clock in the center of the chalkboard.

4. Where does the minute hand point if it is quarter of the hour? (to the 9) Point to that clock in the center of the chalkboard.
5. Where does the minute hand point if it is quarter past the hour? (to the 3) Point to that clock in the center of the chalkboard.
6. Play the game "Draw the Time." For each time, have students show that time on one of the clock faces on the chalkboard.
7. If desired, have students write the digital name for each time under the clock face.
8. Students complete the worksheet by writing the indicated time on each clock face in digits and in words.

Name _____ Date _____

Reproducible Worksheet 6

What time is shown on each clock face?
Write the time in digits and in words.



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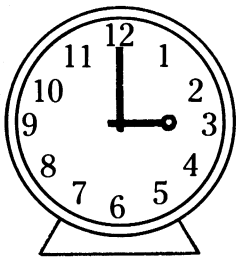

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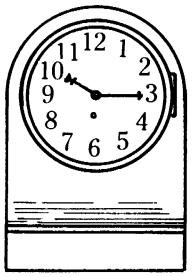

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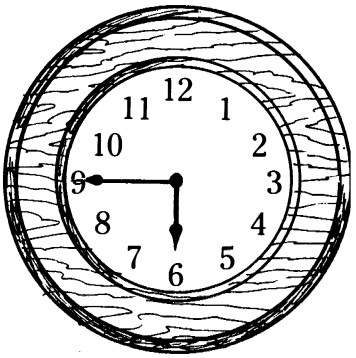

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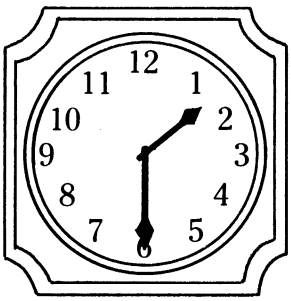

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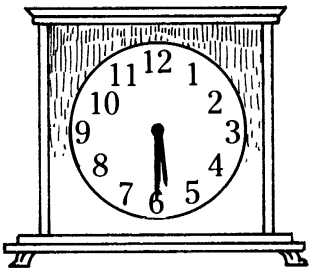

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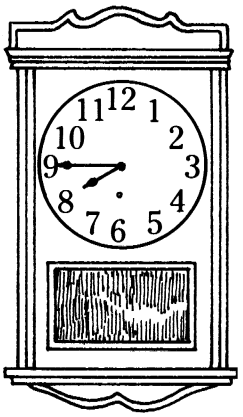

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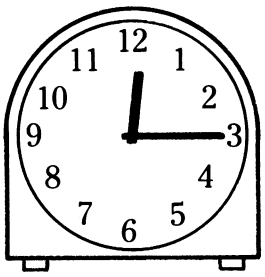

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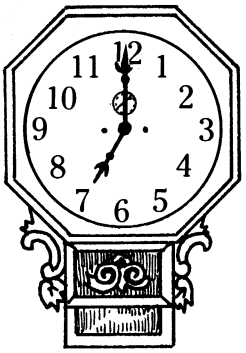

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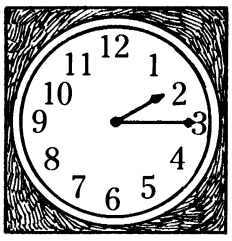

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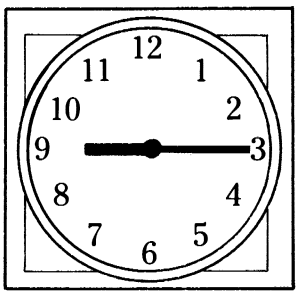

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USING A TIMER
Directions for Worksheet 19

Objectives

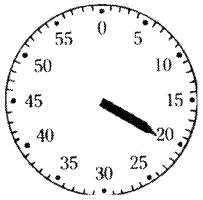
1. Students distinguish between a clock face and a timer.
2. Students set a timer for various times.
3. Students identify times when a timer would be helpful.

Materials needed

Chalkboard, chalk, and an eraser
Timer
Copy of Worksheet 19 for each student
Pencil for each student

Introduce worksheet

1. Before class, draw a large timer on the chalkboard. (See diagram below.)



2. What does this circle on the board look like? (It looks a little like a clock face.) What is different from a clock face? (It only has one hand; the numbers are not the same.)
3. This is a timer. Do you have a timer at your house—perhaps in the kitchen? (Show actual timer.) What are some ways that a timer is used? (For cooking, for timing exercise or practice, as a reminder to do something in half an hour, etc.)
4. The timer is used for timing short periods of time. What do you think the numbers stand for? (minutes)
5. Look at the timer on the board. How do you suppose we can tell what it is set for? (by looking at the arrow) Where is the arrow pointing? (to the 20) So how many minutes is the timer set for? (20 minutes) If this were a real timer, how would we know when 20 minutes has passed? (Bell would go off.)
6. Have someone in the class set the real timer for 20 minutes. Set it aside while class continues.
7. Let's go back to the timer on the board. (Erase arrow.) Would someone show how to set the timer for 35 minutes? (Have student draw arrow pointing to 35.)

8. What if you wanted to remember to call a friend in 45 minutes? Set the timer for that.
9. Continue with several other settings on the timer, letting students take turns drawing the arrow at the proper setting.
10. Check the real timer. How much time is left of the original 20 minutes? Ask students to figure out how much time has passed.
11. Students complete the worksheet by drawing arrows on each timer to the indicated setting.

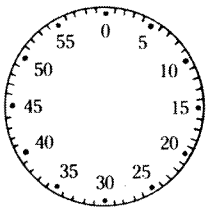
Note

The dials on some timers are on the center that moves. The numbers on those timers go in the opposite direction. While working on the same principle, they might be confusing to use with this worksheet.

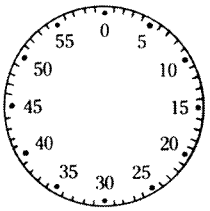
Name _____ Date _____

Reproducible Worksheet 19

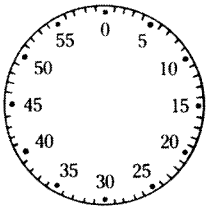
Draw an arrow to set each timer for the needed time.



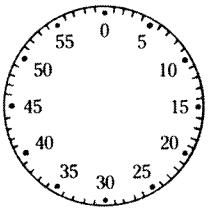
Bake the cookies
10 minutes.



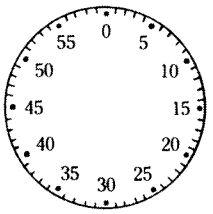
Boil the corn
5 minutes.



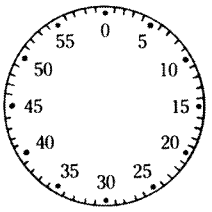
Exercise for half
an hour.



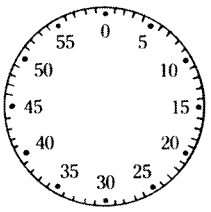
Practice piano
20 minutes.



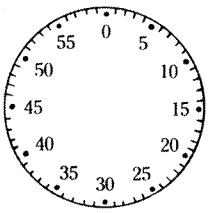
Bake bread
50 minutes.



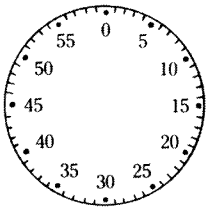
Do homework
35 minutes.



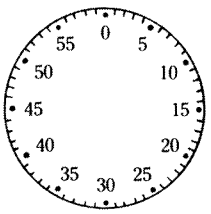
Nap for
45 minutes.



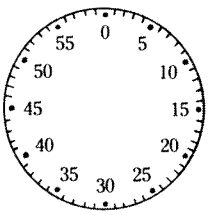
Bake the potatoes
55 minutes.



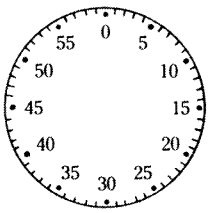
Bake the cake
40 minutes.



Read a book
15 minutes.



Talk on the phone
10 minutes.



Bake muffins
25 minutes.

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WRITING DATES WITH NUMBERS
Directions for Worksheet 31

Objectives

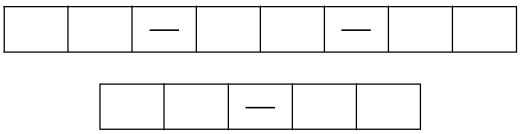
1. Students use numbers to write dates.
2. Students practice filling in forms.

Materials needed

Copies of Worksheet 31 for each student
Pencil for each student
Chalkboard and chalk

Introduce worksheet

1. Before class, make a few of the following boxes on the chalkboard. Make several of each type.



2. Write the date "October 22, 1948" on the chalkboard beside one of the longer blocks. How can this long date be written in these six squares? (Write very small.)
3. The number in the middle is easy. There are two digits, so let's just write them in the middle.
4. How about the year? Can we use just part of it? If we use just the last two digits, it will fit. (Write "48" in last two boxes.)
5. How can we change October to a number? If January is 1, February is 2, etc., what number will October be? (10) So let's write a 10 in the first squares to represent the 10th month—October.
6. Let's try another date. December 25, 1993. How would that be written? (12-25-93)
7. What about this date—March 30, 1950. The "30" is easy. So is the year—"50." What number represents March? (3) Leave the first block empty and put the "3" in the second block.
8. How about January 3, 1932? (Leave the first square blank, then a "1" for January. Leave the third square blank, then a "3." Write "32" for the year.)
9. Sometimes we don't need to include the specific date. Just the month and year is all that is wanted. What month did you start school? Include the month and the year and write the date in one of these blocks with four squares.
10. Continue until students can easily rewrite dates using numbers.
11. Students will complete the worksheet by filling out the forms.