

Time and Graphs

Grade Level: Third Grade

Written by: Kristina Villari, Belle Creek Charter School, Henderson, CO

Length of Unit: Six lessons (approximately a week and a half (seven days); one day = 60 minutes)

I. ABSTRACT

This unit will help students tell time to the hour, half hour, quarter hour, and to the minute by stating the time both before the hour and after the hour. Students will also have the knowledge of how much time has passed for an event by estimating time or stating the elapsed time. Creating graphs based on their own surveys will be an exciting learning experience to graphing.

II. OVERVIEW

A. Concept Objectives

1. Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems. (*Colorado Model Content Standards for Mathematics, Standard 1*)
2. Students understand how to use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem solving situations and communicate the reasoning used in solving these problems. (*Colorado Model Content Standards for Mathematics, Standard 2*)
3. Students understand how to use data collection and analysis, statistics, and probability in problem solving situations and communicate the reasoning used in solving these problems. (*Colorado Model Content Standards for Mathematics, Standard 3*)
4. Students recognize how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper and pencil, calculator, and computers, in problem solving situations, and communicate the reasoning used in solving these problems. (*Colorado Model Content Standards for Mathematics, Standard 6*)

B. Content from the *Core Knowledge Sequence*

1. Mathematics: Measurement (p. 80)
 - a. Time
 - i. Read a clock face and tell time to the minute as either A.M. or P.M.; tell time in terms of both “minutes before” and “minutes after” the hour.
 - ii. Solve problems on elapsed time (how much time has passed?).
2. Mathematics: Numbers and Number Sense (p. 78)
 - a. Create and interpret bar graphs and line graphs.

C. Skill Objectives

1. Students will define the terms hour, minute, half hour, quarter hour, second, A.M., P.M.
2. Students will be able to tell time to the hour, half hour, and quarter hour using both analog and digital clocks.
3. Students will say and write time in two different ways; after the hour and before the hour.
4. Students will be able to tell whether an event takes place in the A.M. or P.M.
5. Students will estimate with various units of time.
6. Students will be able to tell time to the minute.
7. Students will review telling time to the hour, half hour, and quarter hour.

8. Students will review stating time before the hour and after the hour.
9. Students will review estimating time and telling whether an event takes place in the A.M. or the P.M.
10. Students will make their own clocks.
11. Students will review all topics from last lesson.
12. Students will define the term elapsed time.
13. Students will find elapsed times or ending times based on elapsed time.
14. Students will be able to use tally marks to record and help organize data.
15. Students will be able to create a bar graph using tally marks.
16. Students will be able to define the terms survey, data, tally chart, and tally mark.
17. Students will be able to use tally marks to create bar graphs.
18. Students will be able to define the terms bar graph and scale.
19. Students will be able to read a bar graph.
20. Students will be able to create their own bar graph using data they have collected.
21. Students will be able to read line graphs.
22. Students will be able to create their own line graph.

III. BACKGROUND KNOWLEDGE

- A. For Teachers
 1. *What Your Third Grader Needs to Know* by E.D. Hirsch, Jr.
 2. *Scott Foresman and Addison Wesley Mathematics* by Randall I. Charles
 3. *Game Time* by Stuart J. Murphy
- B. For Students
 1. Kindergarten: Mathematics: Measurement: Time, page 18
 2. Grade 1: Mathematics: Measurement: Time, page 36
 3. Grade 2: Mathematics: Measurement: Time, page 58
 4. Grade 2: Mathematics: Numbers and Number Sense: Create and interpret simple bar graphs, page 56

IV. RESOURCES

- A. Murphy, Stuart J. *Game Time* (Lesson One)

V. LESSONS

Lesson One: Time to the Hour, Half Hour, and Quarter Hour (60 minutes)

- A. *Daily Objectives*
 1. Concept Objective(s)
 - a. Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems.
 - b. Students understand how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper and pencil, calculator, and computers, in problem solving situations, and communicate the reasoning used in solving these problems.
 2. Lesson Content
 - a. Time
 - i. Read a clock face and tell time to the minute as either A.M. or P.M.; tell time in terms of both “minutes before” and “minutes after” the hour.

3. Skill Objective(s)
 - a. Students will define the terms hour, minute, half hour, quarter hour, second, A.M., P.M.
 - b. Students will be able to tell time to the hour, half hour, and quarter hour using both analog and digital clocks.
 - c. Students will say and write time in two different ways; after the hour and before the hour.
 - d. Students will be able to tell whether an event takes place in the A.M. or P.M.
 - e. Students will estimate with various units of time.
- B. *Materials*
1. One large Judy clock
 2. One digital clock
 3. Small children's clocks
 4. Pens, pencils, colored pencils
 5. Overhead projector
 6. Dry erase markers
 7. Overhead transparencies
 8. Notebook
 9. *Game Time* by Stuart J. Murphy (or any book about time)
 10. Appendix A – Lesson One: Review Sheet (one per student, one per teacher, one transparency)
 11. Appendix B – Lesson One: Review Sheet Answer Key (one per teacher)
 12. Appendix C – Lesson One: Homework Sheet (one per student, one for teacher)
 13. Appendix D – Lesson One: Homework Sheet Answer Sheet (one per teacher)
- C. *Key Vocabulary*
1. Hour - unit of time equal to 60 minutes
 2. Minute - unit of time equal to 60 seconds
 3. Half hour - unit of time equal to 30 minutes
 4. Quarter hour - unit of time equal to 15 minutes
 5. Second - unit of time, 60 seconds = 1 minute
 6. A.M. - time between midnight and noon, ante meridiem = before noon
 7. P.M. - time between noon and midnight, post meridiem = after noon
- D. *Procedures/Activities*
1. Read the book, *Game Time* by Stuart J. Murphy and discuss how important time is to the soccer game. Time is used in order to tell when the game starts, when periods end, and when the game ends. (Spend about 10-15 minutes reading and discussing the book). Some questions you can ask are, "Why did the characters have to know what time it was?" Answer: to know how much time was left in the game, to know when the game started, to know how much time was left for each period. "Without time, do you think the outcome of the game would have been the same?" Answer: Probably not. They wouldn't have known when to end the game and the score could have been different.
 2. "Let's look at what we do during our day. Who can raise their hand and tell me what time they woke up this morning? What time did you come to school today? What time do we start school? When do we leave school?" Allow time for student responses.
 3. "See, time is all around us. Why do you think we need to know what time it is?" Allow time for student responses. "We use time to guide us in our daily activities. Without knowing what time it is, we would not know what time the

- bus, train, or light-rail comes, what time our favorite movie starts, or what time our friends' party starts. We need to know how to tell time for daily routines.
4. In kindergarten you learned to tell time to the hour. In 1st grade you learned to tell time to the ½ hour, and in 2nd grade, you learned to tell time in five minute intervals. Let us review some of those examples.” Hold large Judy clock up to the class. Pointing to the hands of the clock, ask them, “Who knows what these are called?” Students should respond with hands of the clock. “Correct, and what does the little hand tell us?” Students should respond with the hour. “And what does the big hand tell us?” Students should respond with the minute. “Great, let us practice some examples on how to tell time to the hour, half hour, and five minute intervals.” Put different times to the hour, half hour, and five minute intervals and let the students respond with the correct time. Do the same with the digital clock. Make sure when you put the time to five minute intervals you count each five minutes until you get to the correct time.
 5. “Great work! In this lesson, we will learn to tell time to the quarter hour and how to say and write time two different ways. Before we start, let us do some more review. Let us first define some key vocabulary.” Have students take out a math notebook. Teachers will write the definitions on an overhead transparency or the board while students write the definitions in their notebooks. “Who can define the word hour?” Allow time for student responses. Once students respond with the correct definition, have them write it in their notebook while you write it on the board or transparency. Once students have written the correct definition in their notebooks, ask them the definition of the next vocabulary word. Repeat with all terms **except** quarter hour. (Define terms, half hour, second, A.M. and P.M.).
 6. After all definitions have been written on the board and in notebooks, ask the students, “Do we start school at 8:30 A.M. or 8:30 P.M.? Students should respond with A.M. “That is correct, but why?” Students should respond with because it is before noon. “Great, would I go to a movie at 5:30 A.M. or 5:30 P.M.? why? Students should respond with 5:30 P.M. because it is after noon and we would not go at 5:30 in the morning.
 7. “Great, now let us look at units of time. Which is a shorter unit of time, an hour or a minute?” Students should respond with minute. “How many minutes are in an hour?” Students should respond with 60 minutes. “Which is a longer unit of time, a minute or a second?” Students should respond, minute. “How many seconds are in a minute?” Students should respond 60 seconds. “How many hours are in a day?” Students should respond with 24 hours. “I am going to write down these correlations on the board while you write them in your notebooks. 1 day = 24 hours. 1 hour = 60 minutes. 1 minute = 60 seconds, and ½ hour = 30 minutes. You can review previous questions if needed. Would it take 1 minute or 1 hour to brush your teeth? Students should respond, 1 minute. “Does lunch last about 5 minutes or 30 minutes?” Students should respond, 30 minutes. “You are really catching on. Great job! If we look back to our correlations, and we know that 30 minutes is equal to a ½ an hour, how many minutes do you think are in a quarter hour?” Students should respond with 15 minutes. “Correct, so the definition for quarter hour is 15 minutes. Write that in your notebooks.”
 8. “Let me show you visually how this works.” Teacher should then draw a circle on the board. “If you were to draw a line from the 12 to the 6 and then another line from the 9 to the 3 (teacher demonstrates this on the board) you would then make four equal pieces on the clock. There are four total parts, and 1 out of the 4

parts is $\frac{1}{4}$ which is = to a quarter hour. A quarter of an hour is 15 minutes. If you put the big hand on the 3 (5, 10, 15) it is 15 minutes past the hour. If you put the big hand on the 6, another quarter hour, it is 15 more minutes, which is 30 minutes past the hour. And if you put the big hand on the 9, which is 15 more minutes, 15 minutes plus 30 minutes is 45 minutes past the hour. Does everyone see how this works?" If you see blank faces, repeat if necessary, if students understand it, continue with examples.

9. "Are you all ready to practice some examples?" Put clock on a quarter hour, example; 9:15. "What time is it?" Students should respond nine fifteen. "That is correct. It is nine fifteen or fifteen minutes past nine. The little hand is in between the 9 and 10, so it is after the hour of 9. The big hand is on the 3. We count, 5, 10, 15...nine fifteen. Or you know it is on the quarter hour, a quarter past nine. You can say nine fifteen or a quarter past nine. You are saying the same time. Good, let us try another one." Repeat with other examples, asking the students what time it is, then clarifying the time with the placement of the hands, and counting in intervals of 5.
10. "You are all doing a great job telling time. We are saying what time it is after the hour. There is another way to state the time. Set clock back to 9:15. "Does anyone know a different way to state the time 9:15?" Allow time for student responses. "We can say nine fifteen or quarter past nine and 45 minutes to 10. Reinforce this statement. "We say the time is nine fifteen or a quarter past nine, to tell time after the hour. Then we say it is forty-five minutes to 10. That is stating the time before the hour. Again the little hand was in between the 9 and 10, so when we say time after the hour, we use the nine, when we say time before the hour, we use the 10. Let us try another example.
11. Repeat with another example. Let the students tell the time and say it both ways, before and after the hour. Reinforce the correct time by stating where the hands are located and then stating the time after the hour and before the hour. "Now, I want all of you to try some more examples with a neighbor." (Hand out student clocks.) "You will turn to your neighbor and put a time on the quarter hour on the clock. The other person will respond with the correct answer stating the time in two different ways, before the hour and after the hour. Take turns and practice a few times. I will be walking around the room making sure you are on task and telling time the correct ways. Okay, turn to your neighbor and begin telling time." The teacher will walk around the room making sure students are on task and telling time the correct ways. Once a few minutes have passed and students have started to understand the new concept, bring their focus back to the teacher.
12. "We are going to try with a few more written examples." Hand our Appendix A (Lesson One: Review Sheet). "Let's do the first one together. Then I will let you try to do the rest on your own. Then we will go over it together as a class." Teacher will read the directions and go over the first example together. Then the teacher will have the students do the rest of the examples on their own. When all students are finished, teacher can let students switch papers with a friend or have each student correct their own work. Teacher will go over all examples. Answers are on Appendix B (Lesson One: Review Sheet Answer Key). Students will hand in Appendix A, after going over it during class, for the teacher to make sure that they understand the new concepts. No grade will be given, only a check for participation. If the teacher notices a student does not seem to understand the concept, he/she can talk to the student and review with them during free time.
13. After going over the work, have students hand in their finished work to the teacher. At the end of the lesson, ask the students, "Why is it important that we

know how to tell time?" Allow time for student responses and discussion.
"What time is it now?"

14. Hand out Appendix C (Lesson One: Homework Sheet) at appropriate time. Teachers can check homework to Appendix D (Lesson One: Homework Sheet Answer Key).

E. *Assessment/Evaluation*

1. Students will hand in Appendix A (Lesson One: Review Sheet) for evaluation and a check mark for participation.
2. Students will hand in math homework Appendix C (Lesson One: Homework Sheet) to be graded as teacher decides.

Lesson Two: Time to the Minute (60 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems.
 - b. Students recognize how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper and pencil, calculator, and computers, in problem solving situations, and communicate the reasoning used in solving these problems.
2. Lesson Content
 - a. Time
 - i. Read a clock face and tell time to the minute as either A.M. or P.M.; tell time in terms of both "minutes before" and "minutes after" the hour.
3. Skill Objective(s)
 - a. Students will be able to tell time to the minute.
 - b. Students will review telling time to the hour, half hour, and quarter hour.
 - c. Students will review stating time before the hour and after the hour.
 - d. Students will review estimating time and telling whether an event takes place in the A.M. or the P.M.
 - e. Students will make their own clocks.

B. *Materials*

1. One large Judy clock
2. One digital clock
3. Pens, pencils, colored pencils
4. Scissors
5. One hole punch
6. Fasteners
7. Construction paper (multiple colors)
8. Overhead projector
9. Dry erase markers
10. Overhead transparencies
11. Notebook
12. Appendix E – Template for Clocks (one per student, one per teacher)
13. Appendix F – Lesson Two: Review Sheet (one per student, one per teacher, one transparency)
14. Appendix G – Lesson Two: Review Sheet Answer Key (one per teacher)
15. Appendix H – Lesson Two: Homework Sheet (one per student, one per teacher)

16. Appendix I – Lesson Two: Homework Sheet Answer Key (one per teacher)

C. *Key Vocabulary*

None

D. *Procedures/Activities*

1. “Yesterday you learned how to say and write time two different ways. You learned how to tell time before the hour and after the hour. For example, (set clock to 8:45) what are two different ways you can say what time this clock shows?” Students should respond, it is eight forty-five or forty-five minutes after eight **and** a quarter to nine or fifteen minutes to nine. “Excellent. The little hand is in between the 8 and 9, so time after the hour is 8 and it is 5, 10, 15, 20, 25, 30, 35, 40, 45, 45 minutes after 8. Time before the hour is 9, and it is 5, 10, 15, 15 minutes, or a quarter to 9 because we know that 15 minutes is equal to a quarter. Let’s do a couple more.” Set clock to different times and have student’s state time before and after the hour.
2. “Yesterday you also learned whether something takes place in the A.M. or the P.M. For example, would you go to the zoo at 2:15 A.M. or 2:15 P.M.?” Students should respond, 2:15 P.M. “Good, why?” Students should respond, because it is after noon, you wouldn’t go to the zoo in the morning. “Right. What does A.M. stand for? P.M.? Students should respond with, “before noon, after noon.”
3. “What else did you learn yesterday?” Students should respond, “We learned to tell time to the quarter hour and how to estimate time.” “Nice. This clock shows what time?” Place different times on the clock and have students respond. (10:45, 12:45, 3:15, and 7:15). “Great, you are all really catching on. And you also learned estimating time. Would it take approximately 1 minute or 1 hour to take a test? (1 hour) Would it take approximately 3 minutes or 15 minutes to run a mile? (15 minutes) Would it take approximately 1 second or 10 minutes to shut the door? (1second).
4. “You are all doing such great work! Today, we are going to make our own clocks so that we can use them and tell time at home, with our friends, and practice by ourselves. Take out Appendix E (Template for Clock). “We are going to follow the directions on the template.” Follow and read directions aloud from the template while students make their clocks.
5. “Good. Now we have some clocks to use during our lesson today. Today we are going to learn how to tell time to the minute. Yesterday we reviewed how to tell time by counting by 5 minute intervals. Today we will do the same thing, then after the 5 minute interval, we will change and count by ones. Set clock to 11:15. Ask students, “What time does this show after the hour?” Students should respond eleven fifteen or a quarter past/after eleven. “Correct.” Then set time to 11:17. “Who can tell me what time the clock shows now?” Allow for student responses. After students finish responding say, “It is eleven seventeen. The little hand is in between the 11 and 12, it is after 11 so we say 11, and it is 5, 10, 15, then change and count by ones, 16, 17...11:17. Let’s practice another one.” Keep practicing with all different examples until the students understand. When reviewing make sure you state where the little and big hands are placed after the hour, then count by 5’s until you need to change to 1’s. Students can respond with answers both before and after the hour. It is not necessary to answer with time before the hour because they will learn that in the next step. “Now you can all turn to a neighbor and practice telling time to the minute with them on your new clocks. I will walk around the room to make sure you are on task and are responding correctly.” Walk around the room monitoring behavior and doing

some observable evaluations. After about 5 minutes bring the students back to a whole class lesson.

6. “When stating the time to the minute, most of you were stating time after the hour. If I set the clock to this time (set clock to 12:47) how would you state the time after the hour?” Students should respond twelve forty-seven. “Excellent, the little hand is in between the 12 and 1, so time after the hour is 12 and 5, 10, 15, 20, 25, 30, 35, 40, 45, then change to 1’s, 46, 47, twelve forty-seven. But how would we figure out time before the hour?” Allow time for student responses and for them to explain their response. Then continue, “First start with the 60 minute mark and count backwards by 5’s, then change and count by 1’s. 5, 10, 11, 12, 13. It is 13 minutes to 1. Or you can just subtract. $60 - 47 = 13$, 13 minutes to 1. You can use both strategies. Let’s try a couple more examples. I would like you to state the time both before and after the hour and explain how you came up with both answers.” Set clock to different times and have students respond with answers. You can have students come up to the front of the classroom and set the large clock to a specific time and have the rest of the class tell that time.
 7. Then hand out Appendix F (Lesson Two: Review Sheet). “Now let’s try some written examples.” Answers for teacher are on Appendix G (Lesson Two: Review Sheet Answer Key). Go over directions and first example with the class. Then allow students to do other questions either on their own or with a partner. Then check answers during class. Have students hand in Appendix F in order for teacher to look over papers to make sure students understand the new topics covered in class. If there are students who do not understand the material, take those students aside during free time and explain the topics in more detail. At the end of the lesson ask, “What time will it be in 1 minute? In 12 minutes?”
 8. Hand out Appendix H (Lesson Two: Homework Sheet) when appropriate. Answers for teacher are on Appendix I (Lesson Two: Homework Sheet Answer Key).
- E. *Assessment/Evaluation*
1. Students will hand in Appendix G (Lesson Two: Review Sheet) for evaluation and a check mark for participation.
 2. Students will hand in math homework Appendix H (Lesson Two: Homework Sheet) to be graded as teacher decides.

Lesson Three: Elapsed Time (60 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students develop number sense and use numbers and number relationships in problem solving situations and communicate the reasoning used in solving these problems.
 - b. Students recognize how to link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper and pencil, calculator, and computers, in problem solving situations, and communicate the reasoning used in solving these problems.
2. Lesson Content
 - a. Time
 - i. Solve problems on elapsed time (how much time has passed?).
3. Skill Objective(s)
 - a. Students will review all topics from last lesson.

- b. Students will define the term elapsed time.
- c. Students will find elapsed times or ending times based on elapsed time.

B. *Materials*

1. One large Judy clock
2. One digital clock
3. Pens, pencils, colored pencils
4. Overhead projector
5. Dry erase markers
6. Overhead transparencies
7. Notebook
8. Appendix J – Lesson Three: Review Sheet (one per student, one per teacher, one transparency)
9. Appendix K – Lesson Three: Review Sheet Answer Key (one per teacher)
10. Appendix L – Lesson Three: Homework Sheet (one per student, one per teacher)
11. Appendix M – Lesson Three: Homework Sheet Answer Key (one per teacher)

C. *Key Vocabulary*

1. Elapsed time - total amount of time that passes from the beginning time to the ending time

D. *Procedures/Activities*

1. “Who can tell me what they know about time?” Students should respond with they know that the little hand tells the hour and the big hand tells the minute. You can tell what minute it is by counting by 5’s then changing to 1’s or knowing the quarter hours. They know how to state time both before the hour and after the hour. Example, if the clock says, 6:42 it is 42 minutes after 6 and it is 18 minutes to 7. They know how to estimate time. For example, it would take approximately 1 hour for math class and not 5 minutes. They can tell whether something takes place in the A.M. or the P.M. For example, they get to school at 8 A.M. not 8 P.M. because they get to school before noon.
2. “Great! You have all learned a lot about time so far! Is it important to know how to tell time? Why?” Students should respond with, “Yes. We then know when things start, end, etc.” “That is right. It is important to know how to tell time. It is also important to know how much time has passed so you know if something is ending. For example, if you wanted to go to a friend’s birthday party and she said that it starts at 4 P.M. and will last about 2 hours, what time will the party be over?” Allow time for student responses. Students should respond, 6 P.M. “Correct. If you go to the party at 5:45 would the party be over?” Allow time for student responses. Students should respond, “No. You would still have 15 minutes.” “How do you know that?” Students should respond, “Because 5:45 is 15 minutes to 6.” “Excellent, let’s try some more examples.
3. “Math class starts at 10 A.M. It ends at 11:12. How long is math class?” Have each student figure out the problem at their seat. Once everyone has tried to figure it out, have a volunteer state the answer and how they came up with their answer. Correct if necessary. “That is right. Math class started at 10. From 10 to 11 is 1 hour. And it ended 12 minutes past 11. 1 hour plus 12 minutes is 1 hour and 12 minutes. Do another one at your seats. Silent reading starts at 12:47 and ends at 1:20. How long is silent reading?” Allow students time to figure out the answer at their seat. You can give them a hint: First find out how many minutes it is before the hour. Then add that answer to how many minutes it is after the hour. Then ask for a student volunteer to state their answer and how they figured it out. “Great! This was a little difficult. With this one, you figure

out how many minutes to the hour it is then add on. It is 13 minutes to 1 because $60 - 47 = 13$ and then add 20 minutes. $13 + 20 = 33$ minutes.”

4. Hand out Appendix J (Lesson Three: Review Sheet). Go over the directions and the first example with the students. Then have students complete the sheet on their own or with a partner. Answers are on Appendix K (Lesson Three: Review Sheet Answer Key). Have students hand in Appendix J to the teacher after going over it in class. The teacher will look over students' papers to make sure they understand the new topics and concepts being covered in class. If the teacher sees a lot of eraser marks or that the student's are not understanding the concepts, the teacher can take those students aside at free time and review the information. At the end of the lesson ask, "How long did math class last today?" Allow time for student responses. Then end the lesson by asking, "In what other subjects would we need to use time?" Allow time for student responses. They can respond with, social studies to know at what time in history an event took place. In science we need to know the days, months, and years for sun and moon rotation, tides, etc. In music we need to know a second to keep the beat. Advise students of these areas if they do not come up with them. Again explain to students that time is all around us. We use it in every aspect of our lives. We will learn more about passing of time in months and years and much more in later lessons.
 5. Hand out Appendix L (Lesson Three: Homework Sheet) at appropriate time. Answers are on Appendix M (Lesson Three: Homework Sheet Answer Key).
- E. *Assessment/Evaluation*
1. Students will hand in Appendix J (Lesson Three: Review Sheet) for evaluation and a check mark for participation.
 2. Students will hand in math homework Appendix L (Lesson Three: Homework Sheet) to be graded as teacher decides.

Lesson Four: Using Tally Marks to Read and Make Graphs (60 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Students understand how to use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem solving situations and communicate the reasoning used in solving these problems.
 - b. Students understand how to use data collection and analysis, statistics, and probability in problem solving situations and communicate the reasoning used in solving these problems.
 2. Lesson Content
 - a. Numbers and Number Sense
 - i. Create and interpret bar graphs and line graphs.
 3. Skill Objective(s)
 - a. Students will be able to use tally marks to record and help organize data.
 - b. Students will be able to create a bar graph using tally marks.
 - c. Students will be able to define the terms survey, data, tally chart, and tally mark.
- B. *Materials*
1. Pens, pencils, colored pencils
 2. Graph paper
 3. Overhead projector
 4. Dry erase markers

5. Transparencies
 6. Notebook
 7. Appendix N – Lesson Four: Review Sheet (one per student, one per teacher, one transparency)
 8. Appendix O – Lesson Four: Review Sheet Answer Key (one per teacher)
- C. *Key Vocabulary*
1. Survey - collecting information by asking a number of people the same question and recording their answers
 2. Data - pieces of collected information
 3. Tally chart - a chart on which data is recorded
 4. Tally mark - a mark used to record data on a tally chart
- D. *Procedures/Activities*
1. “Today we are going to talk about a new topic. We are going to learn about tally marks and using tally marks in order to create graphs. Who knows what a tally mark is?” Allow time for student responses. Correct if necessary. Then have students take out math notebooks and write down definition in notebooks while teacher writes it on board or transparency. “A tally mark is a mark used to record data on a tally chart. Let me show you an example.” Ask the class, “Raise your hand if you like Snickers bars?” The students will raise their hands. Count how many hands are raised and make a tally mark for each student. Then ask, “Who does not like Snickers bars?” Count those students hands and make a tally mark for each one of their answers. Ask the class, “Are there more students who do or do not like Snickers?” Students should respond with appropriate answer. “See here, we used tally marks to record data. I will ask you all another question. There will be three different choices, so listen carefully and answer as truthfully as possible. “Do you like math, science, or reading better? Who likes math better?” Students will raise their hands and record their answers with tally marks. Then ask, “Who likes science better?” Students will raise their hands and record their answers with tally marks. “Lastly, who likes reading better?” Students will raise hands and record their answers with tally marks. Then ask, “Which subject is liked more?” Students should respond with appropriate answer. Correct if necessary.
 2. “Great work class! You count up each tally mark and that is the number of people who picked that category.” Put the numerical number next to the tally marks. “So, with the data I just collected, how could we create a graph to represent these answers?” Allow time for student responses. Ask if a volunteer would like to come up and create that graph on graph paper. Make sure that whatever number of tally marks there are, that is how many boxes are colored in. Correct if necessary. “Ok, nice work. So we made tally marks, which is a mark used to record data on a tally chart. What could we say the definition of data is then?” Allow time for student responses. Have them record the correct definition into their notebooks. “Right, data is pieces information that is collected. And where can we put that information?” Students should respond with, “on a tally chart.” “Great, so what is the definition of a tally chart?” Students should respond with, “a chart on which data is collected.” “Very good work! Lastly, what did I do in order to record all my information? I asked you all a question. What is that called when you ask many different people the same question then record their answers?” Students should respond with, “a survey.” “Right, so write that down in your notebook. A survey is collecting information by asking a number of people the same question and recording their answers.”

3. “Let’s do some more examples.” Hand out Appendix N (Lesson Four: Review Sheet) and go over directions with the students and the first question. Show students that however many tally marks you have, that is how many boxes are colored in. Then let the students do the questions either on their own or with a partner. When all students have finished go over the questions with the class as a whole. Answers are in Appendix O (Lesson Four: Review Sheet Answer Key).
 4. After you go over the Practice Sheet with the whole class have the students break up into groups of three or four. Tell the students that they will go around the classroom and create their own tally chart. They will have to pick things within the classroom to tally. Once they finish making all the correct tally marks, they will have to graph the data. Students will hand in the graph for evaluation. They will have to have the correct number of tally marks, and the tally marks must match the colored in boxes on the graph. Ask for student volunteers to share their findings. Once everyone is finished sharing, have students hand in their data.
- E. *Assessment/Evaluation*
1. Students will hand in Appendix N (Lesson Four: Review Sheet) for evaluation and check mark for class participation.
 2. Students will collect data and use tally marks to create a tally chart. Tally chart will be graded based on correct data.

Lesson Five: Reading and Creating Bar Graphs (60 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students understand how to use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem solving situations and communicate the reasoning used in solving these problems.
 - b. Students understand how to use data collection and analysis, statistics, and probability in problem solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
 - a. Numbers and Number Sense
 - i. Create and interpret bar graphs and line graphs.
3. Skill Objective(s)
 - a. Students will be able to use tally marks to create bar graphs.
 - b. Students will be able to define the terms bar graph and scale.
 - c. Students will be able to read a bar graph.
 - d. Students will be able to create their own bar graph using data they have collected.

B. *Materials*

1. Pens, pencils, colored pencils
2. Graph paper
3. Overhead projector
4. Dry erase markers
5. Overhead transparencies
6. Notebook
7. Appendix P – Lesson Five: Review Sheet (one per student, one per teacher, one transparency)
8. Appendix Q – Lesson Five: Review Sheet Answer Key (one per teacher)

C. *Key Vocabulary*

1. Bar graph - a graph using bars to show data
2. Scale - the numbers that show the units used on a graph

D. *Procedures/Activities*

1. “Yesterday you learned how to use tally marks to create a graph. Do you think that the direction you made your graphs are the only way to create a graph?” Students should respond, “No.” “That is correct. There are other ways to create a graph. The graphs we are going to learn about today are called bar graphs. What do you think the definition of a bar graph is?” Allow time for student responses. Then have the students take out their notebooks and record the correct definition. “A bar graph is a graph using bars to show data. Let us create some examples. We will do an easy one. We will count how many boys and how many girls we have in the class and create a bar graph.” Count how many boys and girls are in the class. Put the numerical answers on the side. Then create a bar graph. Put the one category of boys on the bottom of the graph, and one category of girls on the bottom of the graph next to it. Say, “This tells us what our two categories are that we are measuring. We have boys and girls.” Then draw a line for the numerical values. You can make intervals of 1 and go up to 20. Say, “This side tells us how many of each category we have. We have 11 girls and 10 boys. I will go up to the number 10 and put a line across for how many boys we have and fill in a bar. Then I will go over to the number 11 and make a line across to the girls and fill in that bar for 11 girls. With this graph, do we have more girls or boys?” Students should respond with girls. “Great! Let’s try another one. What else could we graph?” Allow students to give their ideas on what to graph. (They can choose what lunch everyone chose to eat today, how many different colored markers there are on their desks, etc. They can give anything to graph). You can allow them to come up to the board or transparency and fill in the answers or the teacher can fill in the graph.
2. Once they have had enough examples, hand out Appendix P (Lesson Five: Review Sheet). Go over the directions and the first example. Then have them complete the Practice Sheet on their own. Walk around the classroom making sure the students are on task and they are coming up with the correct answers. When they have had enough time to fill it out, pull the group back to a whole class lesson and go over the worksheet. Answers are on Appendix Q (Lesson Five: Review Sheet Answer Key).
3. After you go over Appendix P (Lesson Five: Review Sheet) tell students that they will be taking a survey in order to create their own bar graphs. Give them some time to think about the questions they will want to ask. Once they have decided what questions will be on their survey, have them write the questions out and come to you for approval. After the teacher has approved the topic of survey questions, the students can go around to one another in the class and ask their classmates for their responses to the survey. Try not to have multiples of the same topics. Let the students know that they will not only be asking the students in their class, but other students in the school, other people in their community, or family. They must have surveyed at least 30 people. They can do it during lunch, recess or after school, but it has to be finished by tomorrow for homework. They do not have to have the data all graphed, but the survey of 30 people does have to be completed.
4. During class, after they have gone around to all of their classmates, bring the class back together to show the students different ways in which they can graph their data. Show the students that the numbers on the side do not always have to

be in intervals of 1. They can be in intervals of 2, 3, 4, 5, etc. Give them an example of how to graph this. For example, there are 30 blue crayons, 25 red crayons, 15 yellow crayons and 5 green crayons. Ask the class, “Instead of graphing using intervals of 1 what other number can we use for our interval?” Students should respond with 5. “Correct. Who would like to come up and set the graph up for us?” Have a volunteer come up to set up the graph. Correct if necessary. “Who would like to fill in the first line of data for us? The second? The third? The fourth? Have volunteers come up for each line of data. Correct if necessary. Then tell the students, “This is another way to set up the numbers on your graph. You may use whatever interval you choose. Good luck with your survey tonight. Put the information you have gathered so far in your homework folder. It is now time for....”

5. If students do not finish graphing their data tell them that they will have an opportunity to complete it at a later date either for homework or in the next lesson.

E. *Assessment/Evaluation*

1. Students will hand in Appendix P (Lesson Five: Review Sheet) for evaluation and a check mark for participation.
2. Students will be graded on handing in their survey with the data matching the graph.

Lesson Six: Reading and Creating Line Graphs (60 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students understand how to use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem solving situations and communicate the reasoning used in solving these problems.
 - b. Students understand how to use data collection and analysis, statistics, and probability in problem solving situations and communicate the reasoning used in solving these problems.
2. Lesson Content
 - a. Numbers and Number Sense
 - i. Create and interpret bar graphs and line graphs
3. Skill Objective(s)
 - a. Students will be able to read line graphs.
 - b. Students will be able to create their own line graph.

B. *Materials*

1. Pens, pencils, colored pencils
2. Graph paper
3. Overhead projector
4. Dry erase markers
5. Overhead transparencies
6. Notebook
7. Appendix R – Lesson Six: Review Sheet (one per student, one per teacher, one transparency)
8. Appendix S – Lesson Six: Review Sheet Answer Key (one per students, one per teacher, one transparency)

C. *Key Vocabulary*

1. Line graph - a graph used to show how data changes over time

D. *Procedures/Activities*

1. “Yesterday you learned about bar graphs and how they show information that is compared to one another. Today we are going to learn about line graphs. Line graphs show how data changes over a period of time. Let us take a look at an example.
2. Look at the line graph for the month of August on Appendix R1. (Lesson Six: Class Line Graph Sheet) When we looked at bar graphs, what two places did we look for information? Students should respond with the x-axis (on the bottom of the graph) and the y-axis (on the side of the graph). Great! And then how did we know how to read that information? Students should respond with, “We looked at the bottom and found the information that we needed, then we went across to find the other part of the information that we needed.” “Exactly, great work! That is going to be the same thing we do when we read line graphs. For example, what was the temperature on Monday? What was the temperature on Tuesday? Now here comes the part that line graphs are made for, what was the difference in temperature from Monday to Tuesday?” Wait for student responses. If they are incorrect, correct them. You can then continue with more questions related to that graph such as, “What was the temperature on Wednesday? Which day had the highest overall temperature? What is the difference in temperature from the highest to the lowest?”
3. Once you are finished asking about this graph, you can move on to Appendix R (Lesson Six: Review Sheet). Teacher may reference Appendix S (Lesson Six: Review Sheet Answer Key). After you complete this Review Sheet as a class (or students may work independently or with a partner) have the students create a line graph of their own. They can use the data from their bar graph or they can make up other new information. Have them plot the points on graph paper and then draw a line connecting all of the data.

E. *Assessment/Evaluation*

1. Students will hand in Appendix R (Lesson Six: Practice Sheet) for evaluation and a check mark for participation.
2. Students will be graded on handing in their line graph with the data matching the graph.

VI. CULMINATING ACTIVITY

- A. Test: Located in Appendix T

VII. HANDOUTS/WORKSHEETS

- A. Appendix A: Lesson One: Review Sheet
B. Appendix B: Lesson One: Review Sheet Answer Key
C. Appendix C: Lesson One: Homework Sheet
D. Appendix D: Lesson One: Homework Sheet Answer Key
E. Appendix E: Template for Clock
F. Appendix F: Lesson Two: Review Sheet
G. Appendix G: Lesson Two: Review Sheet Answer Key
H. Appendix H: Lesson Two: Homework Sheet
I. Appendix I: Lesson Two: Homework Sheet Answer Key
J. Appendix J: Lesson Three: Review Sheet
K. Appendix K: Lesson Three: Review Sheet Answer Key
L. Appendix L: Lesson Three: Homework Sheet
M. Appendix M: Lesson Three: Homework Sheet Answer Key
N. Appendix N: Lesson Four: Review Sheet

- O. Appendix O: Lesson Four: Review Sheet Answer Key
- P. Appendix P: Lesson Five: Review Sheet
- Q. Appendix Q: Lesson Five: Review Sheet Answer Key
- R. Appendix R: Lesson Six: Review Sheet
- S. Appendix S: Lesson Six: Review Sheet Answer Key
- T. Appendix T: Chapter Test

VIII. BIBLIOGRAPHY

- A. Charles, Randall I., Crown, Warren, Fennell, Francis. *Scott Foresman and Addison Wesley Mathematics: Student Edition*. Glenview, Illinois: Pearson Scott Foresman, 2004. 0-328-03018-X.
- B. Charles, Randall I., Crown, Warren, Fennell, Francis. *Scott Foresman and Addison Wesley Mathematic: Teacher Edition*. Glenview, Illinois: Pearson Scott Foresman, 2004. 0-328-04850-X
- C. Hirsch, E.D. *What Your Third Grader Needs to Know*. New York, New York: Bantam Dell Publishing, 2001. 0-385-33626-8
- D. Murphy, Stuart J. *Game Time*. New York, New York: HarperCollins Publishers, 2000. 0-06-446732-5.
- E. Nagda, Ann. *Chimp Math: Learning About Time From A Baby Chimpanzee*. New York, New York: Henry Holt and Company, 2002. 0-8050-6674-8.
- F. Older, Jules. *Telling Time*. Watertown, MA: Charlesbridge, 2000. 0-88106-396-7.
- G. Pluckrose, Henry. *Math Counts: Time*. Chicago, Illinois: Children's Press, 1994. 0-516-05459-7.

Appendix A
Lesson One: Review Sheet

Name: _____

Date: _____

Write the time shown on the clock in two ways. (Time before the hour and after the hour)

1.

2.

3.

3 : 45

7 : 15

1 : 30

4. Would you most likely go to a movie at 5:30 A.M. or 5:30 P.M.? _____

5. Would math class most likely start at 2 A.M. or 2 P.M.? _____

6. Would it most likely take 1 minute or 1 hour to read a chapter book? _____

7. Would it most likely take 2 minutes or 2 hours to play a basket ball game? _____

Word Problems

8. Sally said the team baseball game started at 5:45 P.M. But Jamie said that it started at a quarter to 6. Who is right, Sally or Jamie? Explain.

9. Mark and Sandy wanted to go to the movies. The movie starts at 7:45. Write that time before the hour. _____

Agenda for the Day
Math 10:45
Reading 12:30
Science 2:00

Look at the “Agenda for the Day” Chart. Draw a picture of a clock showing the time for Reading. Would this most likely be A.M. or P.M.? Why?

Appendix C
Lesson One: Homework Sheet

Name: _____

Date: _____

Draw a picture of a clock showing the times shown on the digital clock below. Write the time both before the hour and after the hour.

1.

2.

3.

8:15

11:45

4:30

4. Would you most likely go to a party at 4:00 A.M. or 4:00 P.M.? _____

5. Would you most likely play baseball at 6:30 A.M. or 6:30 P.M.? _____

6. Would it take approximately 1 minute or 1 hour to brush your teeth? _____

7. Would it take approximately 1 second or 1 minute to pop a bubble? _____

Match the following times to the correct definition.

60 seconds quarter an hour

60 minutes P.M.

15 minutes one day

after noon one minute

before noon one hour

24 hours A.M.

8. Tom's mom said that she would pick him up at a quarter after 4. Tom is waiting for his mom outside and it is now 4:00. Is Tom late or early? Explain.

Appendix D

Lesson One: Homework Sheet Answer Key

Name: _____

Date: _____

Draw a picture of a clock showing the times shown on the digital clock below. Write the time both before the hour and after the hour.

1.

2.

3.

A clock should be drawn with the correct time for each one of these examples.

8:15

11:45

4:30

a quarter after 8, 45 min. to 9 45 min. after 11, a quarter to 12 30 min. after 4, 30 min. to 5

4. Would you most likely go to a party at 4:00 A.M. or 4:00 P.M.? 4:00 P.M.

5. Would you most likely play baseball at 6:30 A.M. or 6:30 P.M.? 6:30 P.M.

6. Would it take approximately 1 minute or 1 hour to brush your teeth? 1 minute

7. Would it take approximately 1 second or 1 minute to pop a bubble? 1 second

Match the following times to the correct definition.

60 seconds	quarter an hour
60 minutes	P.M.
15 minutes	one day
after noon	one minute
before noon	one hour
24 hours	A.M.

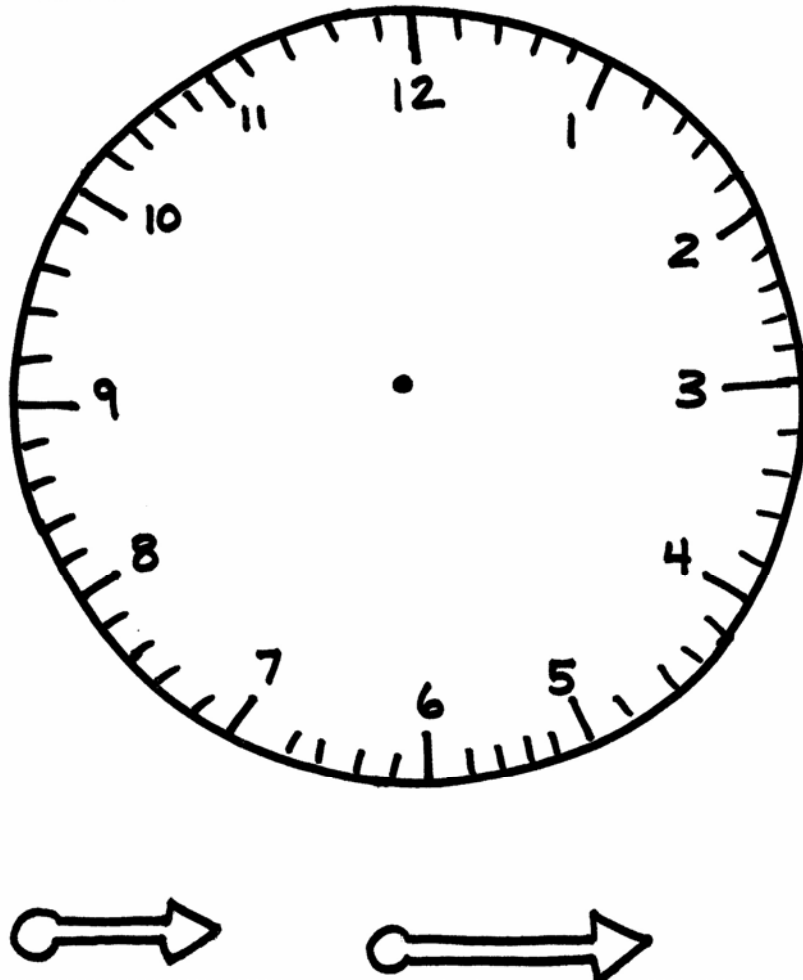
8. Tom's mom said that she would pick him up at a quarter after 4. Tom is waiting for his mom outside and it is now 4:00. Is Tom late or early? Explain.

Tom is early. A quarter after 4 is 4:15 and it is only 4:00 P.M.

Appendix E

Template for the Clock

Directions: Cut out the clock and the hands by cutting on the dark black line of the clock and the hands. Trace the outside of the clock onto a piece of construction paper. Then cut out the circle on the construction paper. Glue the clock to the construction paper. Poke a hole in the middle of the clock for the hands. Poke a hole through the hands on the circle at the end. Place a fastener through the hands then through the clock and fasten. You now have your very own clock.



Appendix F
Lesson Two: Review Sheet

Name: _____

Date: _____

Write the time shown on the clock both before the hour and after the hour.

1.

2 : 37

2.

12 : 13

3.

9 : 53

4. Is twelve past three the same as three past twelve? Explain.

Draw a picture of a clock showing these times.

5. A quarter to three.

6. Thirteen minutes to seven.

Use the diagram below to answer questions number 7 and 8.

MOVIE TIMES	
Finding Nemo	11:45, 12:37, 3:30, 5:57
Spiderman	11:30, 12:48, 3:25, 5:33
Shrek 2	11:35, 12:55, 3:43, 5:49

7. If I want to go to a movie that starts closest to 6:00 P.M. which movie am I going to see? Explain. _____

8. Does the third show of Spiderman start before or after a quarter to four? Explain.

Appendix G

Lesson Two: Review Sheet Answer Key

Name: _____

Date: _____

Write the time shown on the clock both before the hour and after the hour.

1.

2 : 37

**Thirty-seven minutes after 2
after 9
23 minutes to 3**

2.

12 : 13

**thirteen minutes after 12
47 minutes to 1**

3.

9 : 53

**fifty-three minutes
7 minutes to 10**

4. Is twelve past three the same as three past twelve? Explain.
No, twelve past three is 3:12 and three past twelve is 12:03.

Draw a picture of a clock showing these times.

5. A quarter to three.

A picture of a clock should be drawn with the correct time.

6. Thirteen minutes to seven.

A picture of a clock should be drawn with the correct time.

Use the diagram below to answer questions number 7 and 8.

MOVIE TIMES	
Finding Nemo	11:45, 12:37, 3:30, 5:57
Spiderman	11:30, 12:48, 3:25, 5:33
Shrek 2	11:35, 12:55, 3:43, 5:49

7. If I want to go to a movie that starts closest to 6:00 P.M. which movie am I going to see?
Explain. **Finding Nemo, it starts at 5:57**

8. Does the third show of Spiderman start before or after a quarter to four? Explain.
 Before. A quarter to 4 is 3:45. The movie starts at 3:25.

Appendix H
Lesson Two: Homework Sheet

Name: _____

Date: _____

Write the time shown on the clock both before the hour and after the hour.

1.

9 : 49

2.

6 : 36

3.

8 : 04

4. Is nine past seven the same as seven past nine? Explain.

Draw a picture of a clock showing these times.

5. A quarter after six.

6. twenty-three minutes to ten.

Use the diagram below to answer questions number 7 and 8.

Times the Bus Leaves to Go to the Zoo	
Bus #1	11:13, 12:27, 3:22, 5:19
Bus #2	11:23, 12:37, 3:42, 5:39
Bus #3	11:33, 12:47, 3:52, 5:49

7. If I want to catch a bus that is leaving around a quarter after 3, what bus would I take? Explain. _____

8. Could I catch a bus between half past 3 and a quarter to 4? Explain.

Appendix I
Lesson Two: Homework Sheet Answer Key

Name: _____

Date: _____

Write the time shown on the clock both before the hour and after the hour.

1.

9 : 49

49 minutes past 9
11 minutes to 10

2.

6 : 36

36 minutes after 6
24 minutes to 7

3.

8 : 04

4 minutes after 8
56 minutes to 9

4. Is nine past seven the same as seven past nine? Explain.
No, nine past seven is 7:09 and seven past nine is 9:07.

Draw a picture of a clock showing these times.

5. A quarter after six.

A picture of a clock should be drawn with the correct time.

6. twenty-three minutes to ten.

A picture of a clock should be drawn with the correct time.

Use the diagram below to answer questions number 7 and 8.

Times the Bus Leaves to Go to the Zoo	
Bus #1	11:13, 12:27, 3:22, 5:19
Bus #2	11:23, 12:37, 3:42, 5:39
Bus #3	11:33, 12:47, 3:52, 5:49

7. If I want to catch a bus that is leaving around a quarter after 3, what bus would I take?
 Explain. **I would take the third bus of bus #1 because it is leaving at 3:22 which is only a few minutes after 3:15.**

8. Could I catch a bus between half past 3 and a quarter to 4? Explain. **Yes, I can take bus #2 which leaves at 3:42 which is after 3:30 and before 3:45.**

Appendix J
Lesson Three: Review Sheet

Name: _____

Date: _____

Find the elapsed time.

1. The play starts at 7:30 P.M.
The play ends at 8:30 P.M.

2. The game starts at 4:45.
The game ends at 5:55.

3. Math class starts at 12:35 P.M.
Math class ends at 1:23 P.M.

4. The movie starts at 4:33.
The movie ends at 6:34.

Answer the word problems below.

5. The train leaves from Denver, Colorado at 5:30 P.M. and arrives in Durango, Colorado at 11:00 P.M. How long did the train ride take?

6. When the train arrived at 3:00 P.M., Mike had been at the station for 45 minutes. When did he arrive at the station?

7. The girls wanted to get to the movie early so that they could see the previews. The movie started at 7:00 P.M. and they arrived at the movie 17 minutes before the movie started. What time did the girls arrive?

8. Which is longer 70 minutes or one hour?

9. Which is shorter 90 minutes or 2 hours?

10. The game was 40 minutes long. It started at 4:45. What time did it end?

Appendix K
Lesson Three: Review Sheet Answer Key

Name: _____

Date: _____

Find the elapsed time.

- | | |
|---|---|
| 1. The play starts at 7:30 P.M.
The play ends at 8:30 P.M.
<u>The play was one hour long.</u> | 2. The game starts at 4:45.
The game ends at 5:55.
<u>The game was 1 hour 10 min.</u> |
| 3. Math class starts at 12:35 P.M.
Math class ends at 1:23 P.M.
<u>Math was 48 minutes long.</u> | 4. The movie starts at 4:33.
The movie ends at 6:34.
<u>The movie was 2 hours and 1 min.</u> |

Answer the word problems below.

5. The train leaves from Denver, Colorado at 5:30 P.M. and arrives in Durango, Colorado at 11:00 P.M. How long did the train ride take? **5 and ½ hours (5:30-10:30 = 5 hours + 30 minutes = 5 ½ hours)**
6. When the train arrived at 3:00 P.M., Mike had been at the station for 45 minutes. When did he arrive at the station? **2:15, forty-five minutes before 3 is 2:15.**
7. The girls wanted to get to the movie early so that they could see the previews. The movie started at 7:00 P.M. and they arrived at the movie 17 minutes before the movie started. What time did the girls arrive? **6:43, 60 – 17 = 43, 43 minutes after 6, 17 minutes before 7.**
8. Which is longer 70 minutes or one hour? **70 minutes, 1 hour = 60 minutes**
9. Which is shorter 90 minutes or 2 hours? **90 minutes, 2 hours = 120 minutes (60 + 60 = 120)**
10. The game was 40 minutes long. It started at 4:45. What time did it end? **5:25, count by 5's from 45 until you count to 40 more minutes.**

Appendix L
Lesson Three: Homework Sheet

Name: _____

Date: _____

Find the elapsed time.

1. The play starts at 6:30 P.M.
The play ends at 8:30 P.M.

2. The game starts at 3:45.
The game ends at 4:35.

3. Math class starts at 10:35 P.M.
Math class ends at 11:23 P.M.

4. The movie starts at 1:33.
The movie ends at 3:35.

Answer the word problems below.

5. The train leaves from Littleton, Colorado at 12:30 P.M. and arrives in Denver, Colorado at 1:05 P.M. How long did the train ride take?

6. When the train arrived at 6:00 P.M., Mike had been at the station for 35 minutes. When did he arrive at the station?

7. The girls wanted to get to the movie early so that they could see the previews. The movie started at 8:00 P.M. and they arrived at the movie 19 minutes before the movie started. What time did the girls arrive?

8. Which is longer 90 minutes or one hour?

9. Which is shorter 100 minutes or 2 hours?

10. The game was 40 minutes long. It started at 6:35. What time did it end?

Appendix M
Lesson Three: Homework Sheet Answer Key

Name: _____

Date: _____

Find the elapsed time.

- | | |
|--|---|
| 1. The play starts at 6:30 P.M.
The play ends at 8:30 P.M.
<u>The play was two hours long.</u> | 2. The game starts at 3:45.
The game ends at 4:35.
<u>The game was 50 min. long.</u> |
| 3. Math class starts at 10:35 P.M.
Math class ends at 11:23 P.M.
<u>Math was 48 minutes long.</u> | 4. The movie starts at 1:33.
The movie ends at 3:35.
<u>The movie was 2 hours and 2 min.</u> |

Answer the word problems below.

5. The train leaves from Littleton, Colorado at 12:30 P.M. and arrives in Denver, Colorado at 1:05 P.M. How long did the train ride take? **35 minutes**
6. When the train arrived at 6:00 P.M., Mike had been at the station for 35 minutes. When did he arrive at the station? **5:25**
7. The girls wanted to get to the movie early so that they could see the previews. The movie started at 8:00 P.M. and they arrived at the movie 19 minutes before the movie started. What time did the girls arrive? **7:41**
8. Which is longer 90 minutes or one hour? **90 minutes, 1 hour = 60 minutes**
9. Which is shorter 100 minutes or 2 hours? **100 minutes, 2 hours = 120 minutes (60 + 60 = 120)**
10. The game was 40 minutes long. It started at 6:35. What time did it end? **7:15**

Appendix N
Lesson Four: Review Sheet

The data below was collected in a survey asking, “What is your favorite food; pizza, hamburgers, or hot dogs?” The responses are listed below. Use the data and create a tally chart.

Hamburger, hot dog, hamburger, hamburger, pizza, pizza, pizza, pizza, hot dog, hamburger, hamburger, hamburger, pizza, pizza, hamburger, hot dog, hot dog, pizza, pizza, hamburger.

Create Tally Chart in Box Below:

1. How many people liked hot dogs?
2. How many people liked hamburgers?
3. How many people liked pizza?
4. What item was liked the most?
5. How many people were asked the survey question?
6. How many more people like pizza than hot dogs?
7. What answer would you have given?

Appendix O
Lesson Four: Review Sheet Answer Key

The data below was collected in a survey asking, “What is your favorite food; pizza, hamburgers, or hot dogs?” The responses are listed below. Use the data and create a tally chart.

Hamburger, hot dog, hamburger, hamburger, pizza, pizza, pizza, pizza, hot dog, hamburger, hamburger, hamburger, pizza, pizza, hamburger, hot dog, hot dog, pizza, pizza, hamburger.

Create Tally Chart in Box Below:

Favorite Food: Pizza, Hamburgers, or Hot Dogs		
Food	Tally	Number
Hamburger	 111	8
Pizza	 111	8
Hot Dog	1111	4

1. How many people liked hot dogs? **4**

2. How many people liked hamburgers? **8**

3. How many people liked pizza? **8**

4. What item was liked the most? **Pizza and Hamburgers were the same**

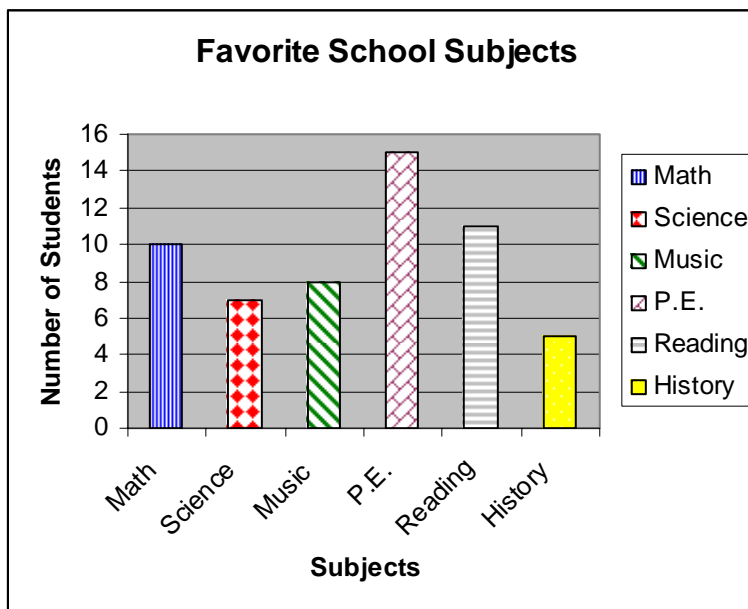
5. How many people were asked the survey question? **20**

6. How many more people like pizza than hot dogs? **4**

7. What answer would you have given to the survey? **Answers will vary**

Appendix P
Lesson Five: Review Sheet

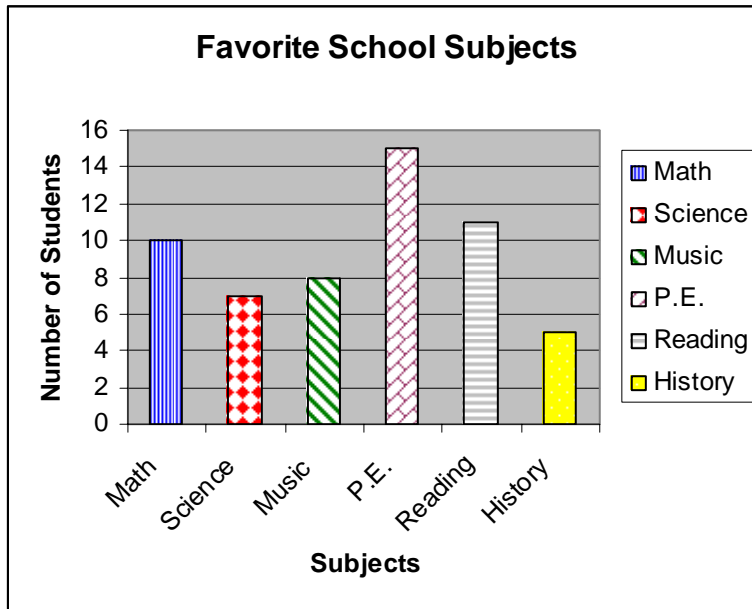
Use this bar graph to answer the questions below.



1. How many students were surveyed?
2. What subjects are being surveyed?
3. Which subject is liked by the students the most?
4. Which subject is liked by the students the least?
5. How many students like Math more than Music? Explain.
6. What is your favorite subject?
7. What type of graph is this called?
8. Did more than eight students like History? Science?

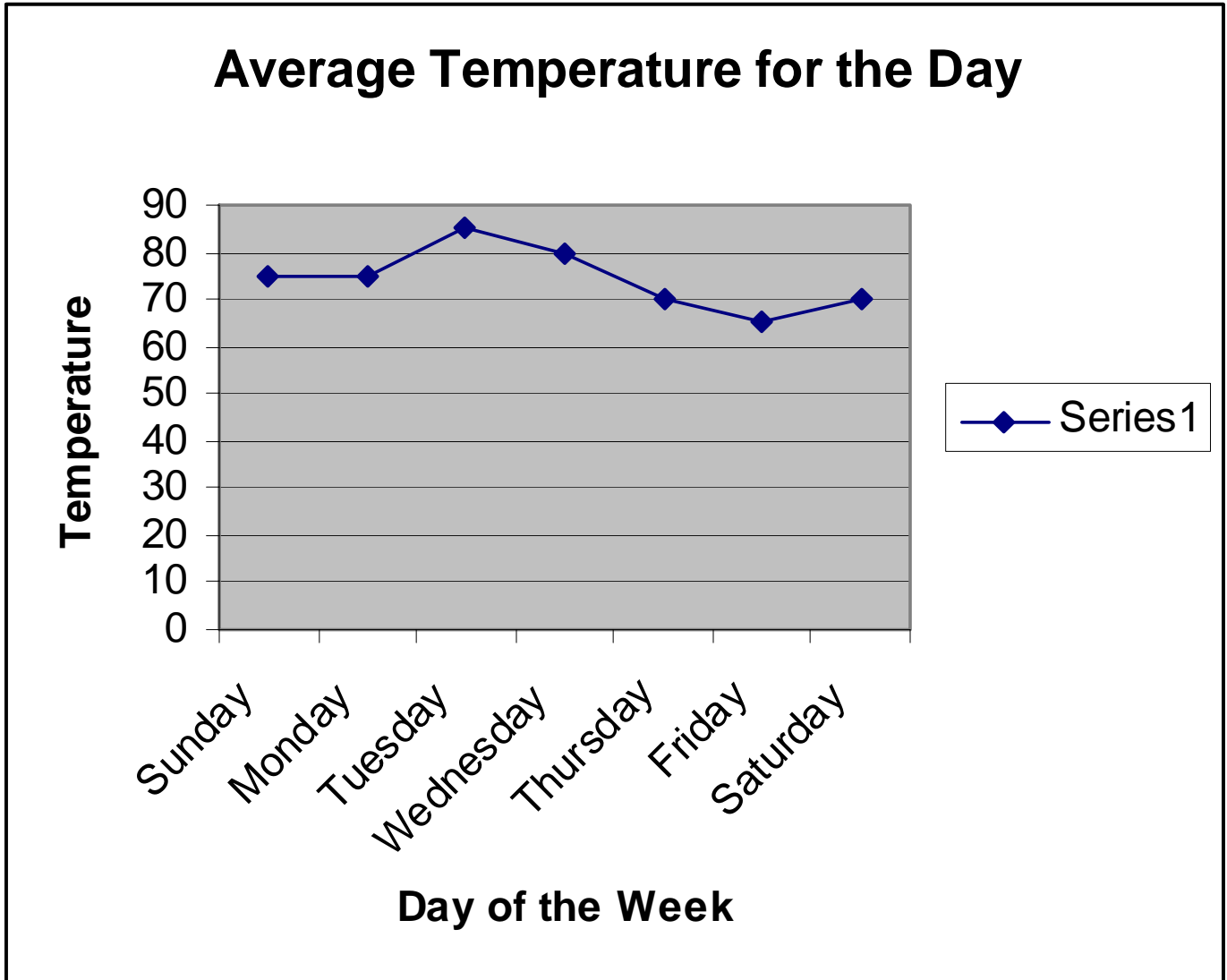
Appendix Q
Lesson Five: Review Sheet Answer Key

Use this bar graph to answer the questions below.



1. How many students were surveyed? **56**
2. What subjects are being surveyed? **Math, Science, Music, P.E. Reading, History**
3. Which subject is liked by the students the most? **P.E.**
4. Which subject is liked by the students the least? **History**
5. How many students like Math more than Music? Explain. **2 because $10 - 8 = 2$**
6. What is your favorite subject? **Answers will vary.**
7. What type of graph is this called? **Bar graph**
8. Did more than six students like History? Science? **No. Yes.**

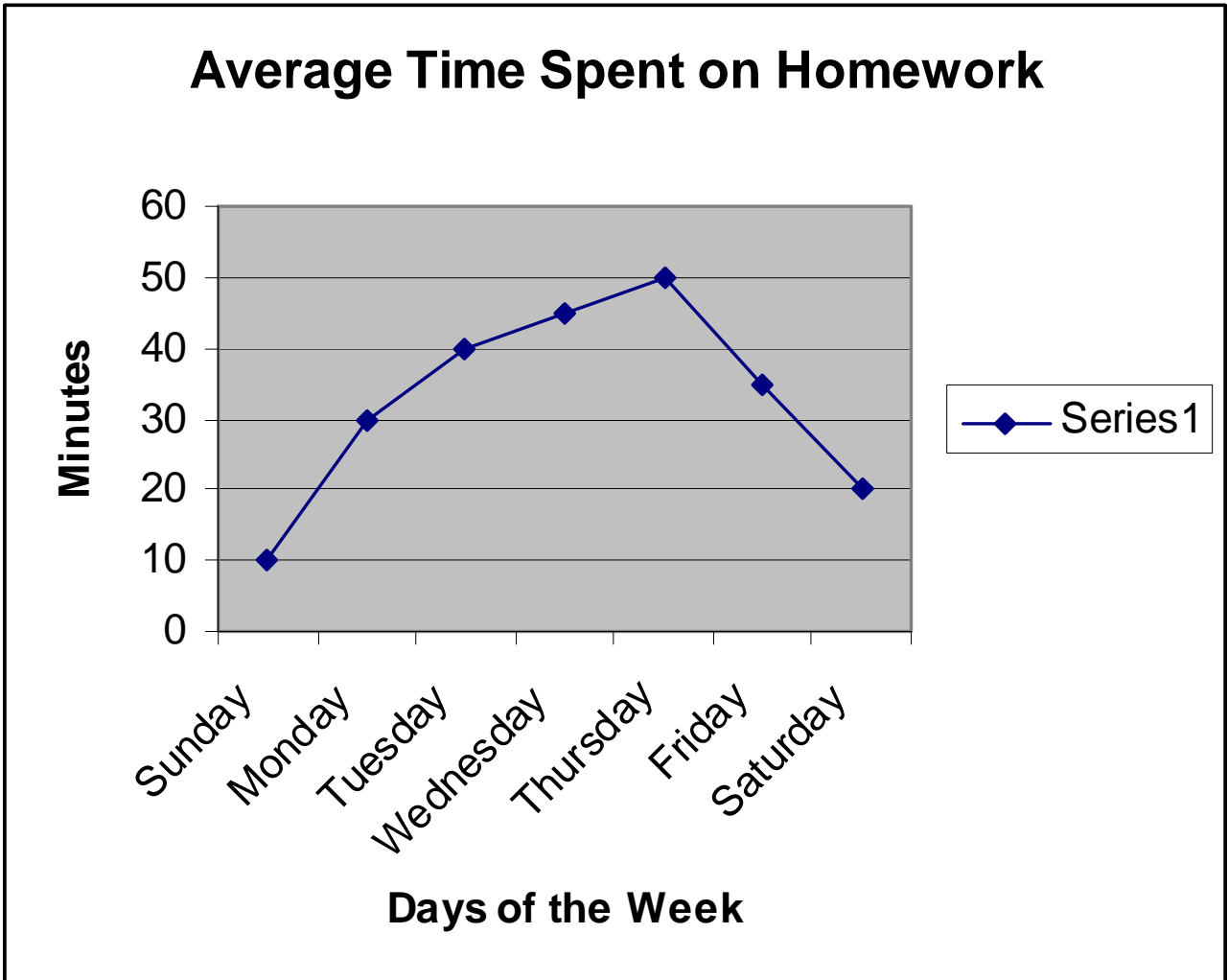
Appendix R1
Lesson Six: Class Line Graph Sheet



1. What was the average temperature for Monday?
2. What was the average temperature for Tuesday?
3. What is the difference in temperature from Monday to Tuesday?
4. What day had the highest average temperature? What was the temperature?
5. What day had the lowest average temperature? What was the temperature?
6. What is the difference between the highest and lowest average temperatures?

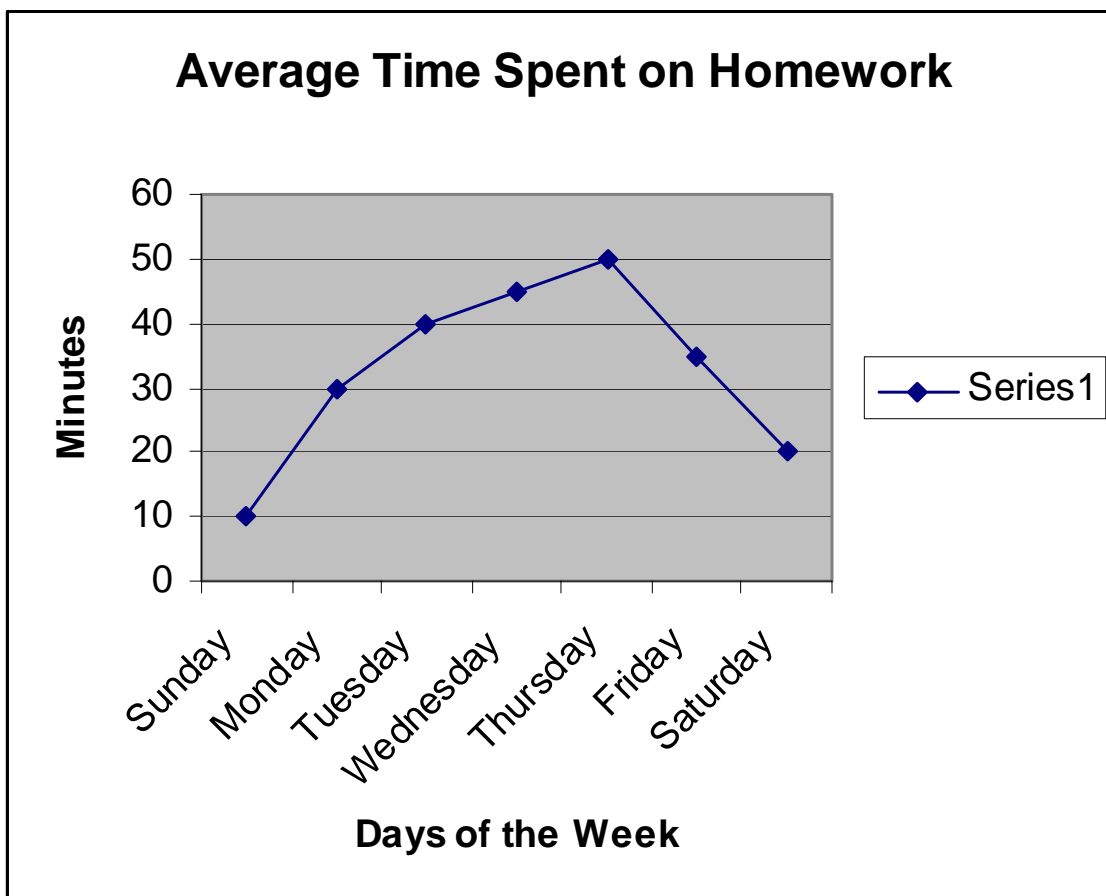
Answers: 75 degrees, 85 degrees, 10 degrees, Tuesday at 85 degrees, Friday at 65 degrees, 20 degrees.

Appendix R2
Lesson Six: Review Sheet



1. What is the title of our graph?
2. What day of the week did this student spend the most time on homework?
3. What day of the week did this student spend the least amount of time on homework?
4. What is the difference in minutes between the most time spent on homework and the least amount of time spent on homework?
5. On which day did this student spend 30 minutes on homework?

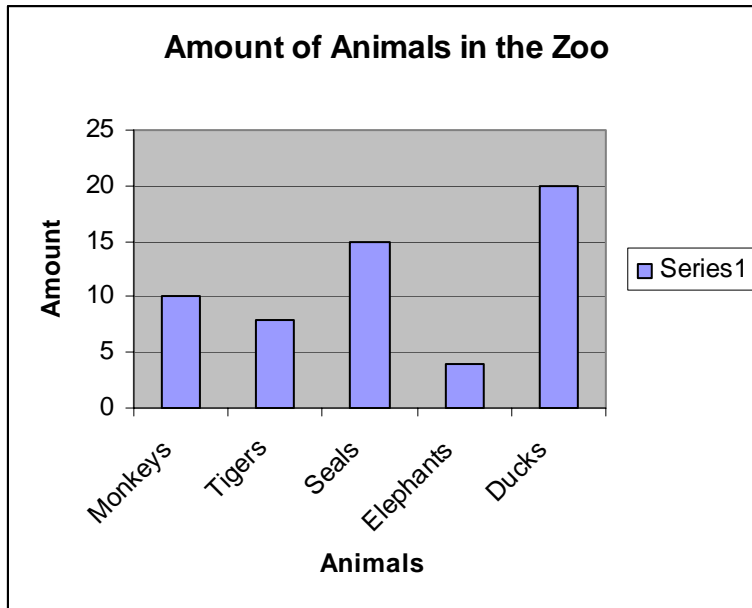
Appendix S
Lesson Six: Review Sheet Answer Key



1. What is the title of our graph? **Average Time Spent on Homework**
2. What day of the week did this student spend the most time on homework? **Thursday**
3. What day of the week did this student spend the least amount of time on homework? **Sunday**
4. What is the difference in minutes between the most time spent on homework and the least amount of time spent on homework? **40 minutes**
5. On which day did this student spend 30 minutes on homework? **Monday**

Appendix T, page 2

Use the bar graph to answer questions 9-11.



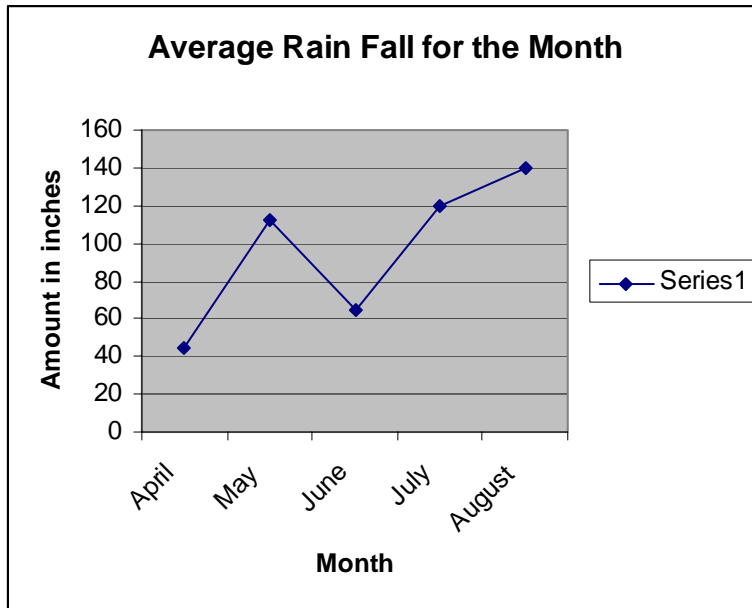
9. Which animal in the zoo can you find 15 of? _____

10. Which animal can you find the most of? _____

11. How many more seals are there than monkeys? _____

Appendix T, page 3

Use the line graph to answer the questions 12-15.



12. What was the average rainfall amount in June? _____

13. What is the difference in rainfall from August to April? _____

14. What month had about 110 inches of rain? _____

15. What month had the least amount of rainfall? _____

Appendix T, page 4
Test Answer Key

Name: _____

Date: _____

Directions: Answer the questions below about time.

1. Would you most likely go to a movie at 5:30 A.M. or 5:30 P.M.? _____ **5:30 P.M.** _____
2. Would it most likely take 2 minutes or 2 hours to play a basket ball game? ___ **2 hours** _____
3. Write this time in two different ways: seven fifteen. ___ **7:15, a quarter past 7, 45 min. to 8** _____
4. Draw a clock showing the time: a quarter to nine. _____
5. Write the time half past twelve. _____ **12:30** _____

Answer the following questions on elapsed time.

6. The train leaves at 5:00 p.m. and arrives at your final stop at 6:45 p.m. How long is the train ride? _____ **1 hour and 45 minutes** _____
7. The movie starts at 7:00 p.m. and ends at 9:15. I arrived at the movies fifteen minutes before the movie. How long was I at the movies? _____ **2 and a half hours** _____

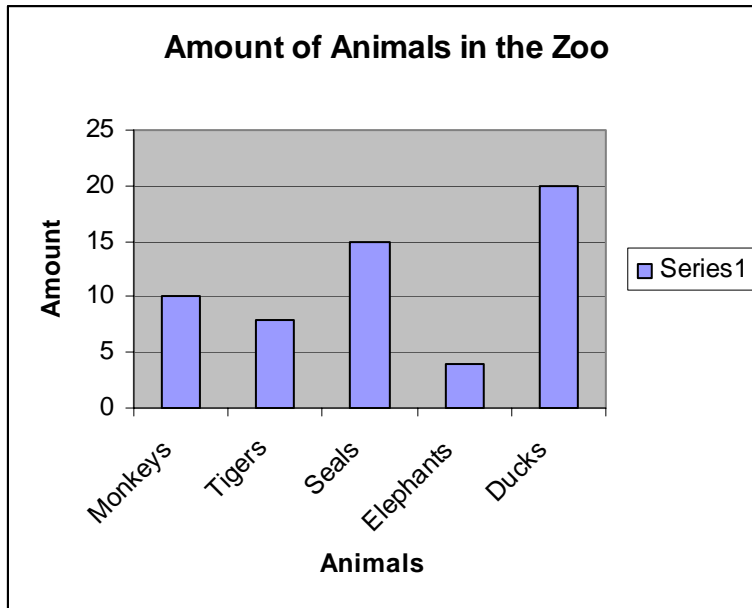
Use the data below to create a tally chart.

8. There were many different animals at the zoo. There were 3 elephants, 5 zebras, 8 monkeys, 9 seals, and 15 ducks. Use tally marks to create a tally chart using the information given.

Animals at the Zoo
Elephants
Zebras
Monkeys
Seals
Ducks

Appendix T, page 5

Use the bar graph to answer questions 9-11.



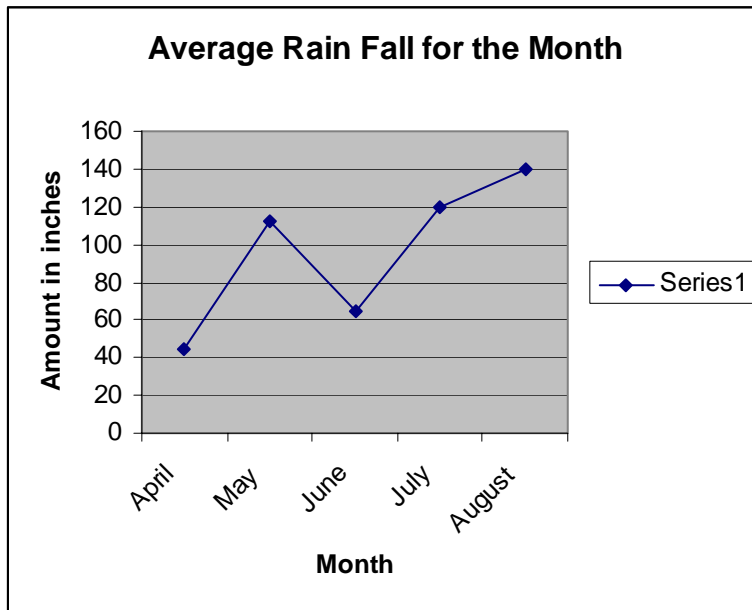
9. Which animal in the zoo can you find 15 of? _____ **Seals** _____

10. Which animal can you find the most of? _____ **Ducks** _____

11. How many more seals are there than monkeys? _____ **5** _____

Appendix T, page 6

Use the line graph to answer the questions 12-15.



12. What was the average rainfall amount in June? _____ **60 inches** _____
13. What is the difference in rainfall from August to April? _____ **100 inches** _____
14. What month had about 110 inches of rain? _____ **May** _____
15. What month had the least amount of rainfall? _____ **April** _____