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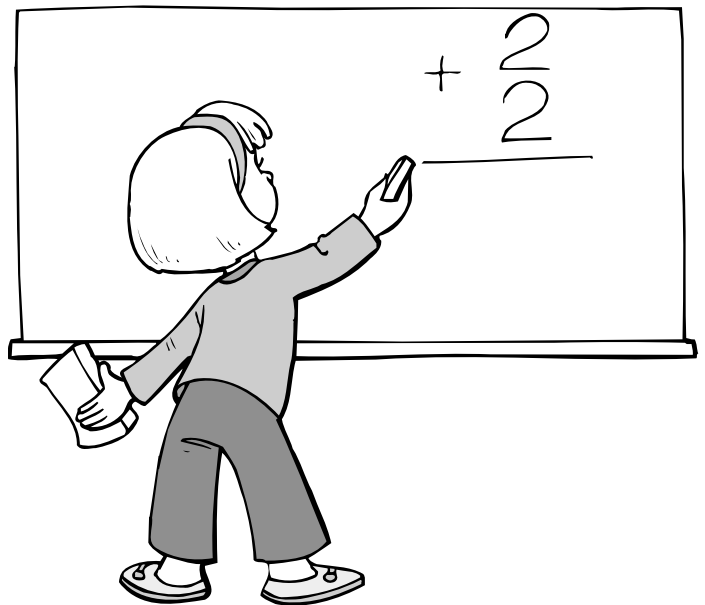
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How to Use This Book

- Provide students with both the question and the answer key for each activity. Kids should be encouraged to use the answer key to check their methodology and to help them if they get stuck.
- Encourage kids to calculate by hand! Calculators should be used only when an activity demands calculations beyond the manual ability level of the child.
- As in the answer key, kids should show their calculations and write their answers in sentence form. (When a sentence starts with a number, children should be encouraged to write out the number and put the numeral form in brackets immediately following, i.e. "Sixty [60] percent of the paper clips are in the desk drawer." Numbers under 10 should be written out with the numeral form in brackets immediately following, i.e. "There are seven [7] paper clips in the drawer.")
- If a question or answer requires the use of whole numbers, kids should be directed to round to the nearest whole number.
- Children should be instructed to read through an entire activity before beginning to answer any of the 10 questions.
- Although certain of these activities might be beyond the ability level of some children, all children should be encouraged to attempt all activities. These activities are designed to challenge. By providing kids with an answer key for each activity, even those that are difficult can be successfully completed. Provided the child

has the raw data—which he or she will derive from his or her personal circumstances and environment—he or she should be able to complete the most demanding activities. Most kids will be able to work through a number of questions in each activity without referring to the answer key. At the very least, all kids should be able to gather the raw data required for each activity.

- This book provides kids with 101 self-directed math practice activities. Teachers and parents are encouraged to offer minimal assistance with calculations. Instead they should encourage kids to use the answer key and to work through difficult questions by example.
- Educators might ask one student to put his or her answers on the board at the completion of each activity. Teachers and students can then work through the example as a class, giving participants an opportunity to reconfirm their work.

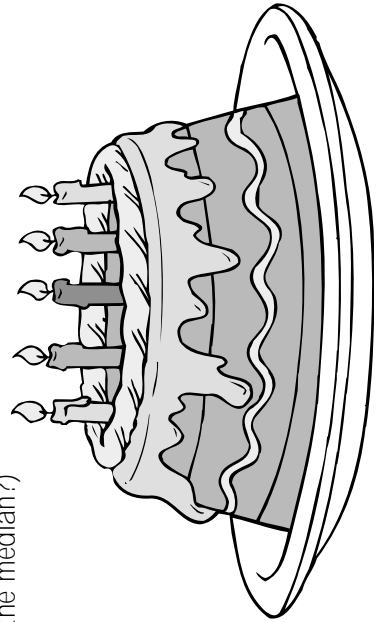


Activity 2

Birthday Blitz

Determine the birth date of every member of your household.

1. Organize this list of dates according to years, from 1900 forward.
2. Organize this list of dates according to months, from January to December.
3. Organize this list of dates according to days from 1 to 31.
4. What is the mean year of birth of the members of your family?
5. What is the median year of birth of the members of your family?
6. What is the mean birth date of the month of the members of your family?
7. What is the median birth date of the month of the members of your family?
8. Express your birth date list in dd/mm/yy format. Express each of these as a number.
9. Add together the list of dd/mm/yy figures from question 8. What is the sum?
10. What is the mean of the numbers in question 8? (What is the median?)



Answer Key

1. 1961, March 22nd (Jonathan); 1963, May 20th (Tracey); 1987, August 12th (Matthew); 1990, March 28th (Patrick); 1991, August 13th (Stephanie).
2. March 22, 1961 (Jonathan); March 28, 1990 (Patrick); May 20, 1963 (Tracey); August 12, 1987 (Matthew); August 13, 1991 (Stephanie).
3. 12th August, 1987 (Matthew); 13th August, 1991 (Stephanie); 20th May, 1963 (Tracey); 22nd March, 1961 (Jonathan); 28th March, 1990 (Patrick).
4. The mean year of birth of the members of my family is 1978. $[1961 + 1963 + 1987 + 1990 + 1991 = 9892$ (sum of birth years of family members) $/ 5$ (family members) $= 1978.4 = 1978]$
5. The median, or middle year of birth, of my family members is 1987. [1991, 1990, 1987, 1963, 1961. If there had been an even number of birth years, the median would have been half the sum of the two middle years.]
6. The mean birth date of the month of the members of my family is 19. $[28 + 22 + 20 + 13 + 12 = 95. 95$ (sum of birthdates of family members) $/ 5$ (family members) $= 19]$
7. The median birth date of the months of the members of my family. [28, 22, 20, 13, 12. If there had been an even number of birth dates, the median would have been half the sum of the two middle dates.]
8. 22/03/61 (Jonathan); 20/05/63 (Tracey); 12/08/87 (Matthew); 28/03/90 (Patrick); 13/08/91 (Stephanie). 220,361 (Jonathan); 200,563 (Tracey); 120,887 (Matthew); 280,390 (Patrick); 130,891 (Stephanie).
9. The sum of the dates in question 8 is 963,092. $[220,361 + 200,563 + 120,887 + 280,390 + 130,891 = 953,092]$
10. The mean of the numbers in question 8 is 190,618. (The median is 200,563.) $[953,092$ (sum of numbers) $/ 5$ (numbers included in sum) $= 190,618.4 = 190,618. 280,390; 220,361, 200,563; 130,891; 120,887]$

Activity 21

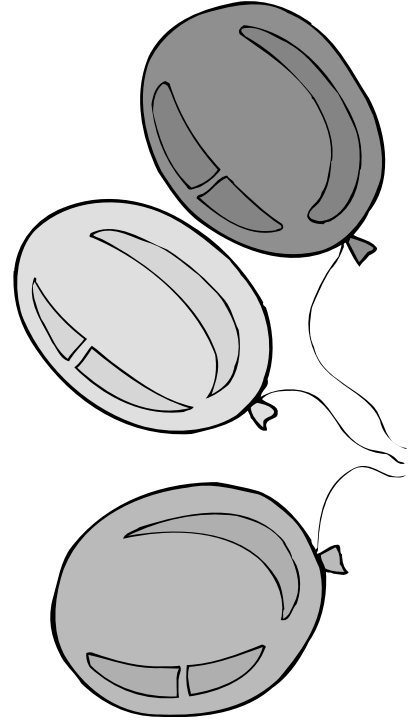
Keep it Up

Blow up a balloon or a beach ball. Ask a friend or family member to play a short game of "Keep it Up" with you.

1. Take turns hitting the balloon back and forth to each other. How many times can you hit the balloon between you before it touches down? (The object is to keep the balloon in the air for as long as possible. When the balloon touches anything other than a body part or when someone hits the balloon twice in a row, the round is over.)
2. Play four more rounds of "Keep it Up." How many hits did the two of you score in each round?
3. How many hits did you score in total over the five rounds?
4. What is your average score over the five rounds?
5. What was the median (middle) score of the five rounds?
6. What was your highest score? What was your lowest score? What is the difference between your highest and lowest scores?
7. For what percentage of the total hits does your best round account?
8. For what percentage of the total hits does your worst round account?
9. If you hit the ball twice as well in your best three rounds, what would be your hit total over the five rounds? How would this affect your five round hit average?
10. If you hit the ball twice as well in your worst three rounds, what would be your hit total over the five rounds? How would this affect your five round hit average?

Answer Key

1. We hit the balloon 13 times in the first round of "Keep it Up."
2. We hit the ball 16, 5, 20 and 12 times in the next four rounds respectively.
3. We scored 66 hits in total over the five rounds. [$13 + 16 + 5 + 20 + 12 = 66$]
4. Our average score over the five rounds was 13 hits. [66 hits / 5 rounds = 13.2 = 13 hits/round]
5. Our median (or middle) score of the five rounds was 13 hits. [20, 16, 13, 12, 5]
6. Our highest score was 20. Our lowest score was 5. The difference between our highest and lowest scores was 15. [$20 - 5 = 15$]
7. Our best round accounts for 30 percent of our hit total. [20 hits (best round) / 66 hits (total) $\times 100 = 30.3 = 30\%$]
8. Our worst round accounts for 8 percent of our hit total. [5 hits (worst round) / 66 hits (total) $\times 100 = 7.6 = 8\%$]
9. If we hit the ball twice as well in our best three rounds, our hit total over the five rounds would be 115. [$20 \times 2 = 40$. $16 \times 2 = 32$. $13 \times 2 = 26$. $40 + 32 + 26 + 5 = 115$] This would increase our five round hit average by 10 from 13 to 23. [115 hits (total) / 5 rounds = 23 hits/round. 23 (new average) - 13 (old average) = 10]
10. If we hit the ball twice as well in our worst three rounds, our hit total over the five rounds would be 96. [$13 \times 2 = 26$. $12 \times 2 = 24$. $5 \times 2 = 10$. $20 + 16 + 26 + 24 + 10 = 96$.] This would increase our five round hit average by 6 from 13 to 19. [96 hits (total) / 5 rounds = 19.2 = 19 hits/round. 19 (new average) - 13 (old average) = 6]



Activity 67

Food for Thought

1. How many food items are in the freezer in your refrigerator?
2. How many freezer items are fruits or vegetables? What percentage of the food items in your freezer are fruits or vegetables?
3. How many freezer items are meat or fish? What percentage of the food items in your freezer are meat or fish?
4. How many freezer items are breads or pastries? What percentage of the food items in your freezer are breads or pastries?
5. How many freezer items are snacks or treats? What percentage of the food items in your freezer are snacks or treats?
6. List the contents of your freezer by category from least to most abundant. Which category has the most items in it? Which category has the least items in it? How many more food items are in the most popular category than in the least popular category?
7. If you had twice as many fruits or vegetables, three times as many meats or fish, four times as many breads or pastries and five times as many snacks or treats in your freezer as you did in question 6, how many food items would you have in your freezer?
8. If you had $\frac{1}{5}$ as many snack or treats, $\frac{1}{4}$ as many breads or pastries, $\frac{1}{3}$ as many meats or fish and $\frac{1}{2}$ as many fruits or vegetables in your freezer as you did in question 6, how many food items would you have in your freezer?
9. If you served one of each item to each of your family members at each meal (and assuming there was enough of the item to feed your whole family and that the item was completely consumed in one meal), for how many meals would the foods in each category last?
10. Choose two vegetable, two meat or fish, two bread or pastry and two snack/treat items found in your freezer. Choosing one item from each category, how many possible meal combinations can you create?

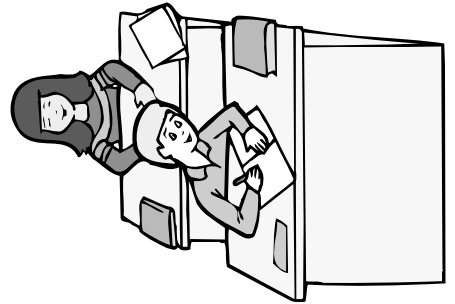
Answer Key

1. There are 36 food items in the freezer in my refrigerator.
2. Eleven (11) of the freezer items are fruits or vegetables. Thirty-one (31) percent of the food items in my freezer are fruits/vegetables. [$\frac{11}{36} \times 100 = 30.5 = 31\%$]
3. Fifteen (15) of the freezer items are meat or fish. Forty-two (42) percent of the food items in my freezer are meat/fish. [$\frac{15}{36} \times 100 = 41.6 = 42\%$]
4. Four (4) of the items in my freezer are breads or pastries. Eleven (11) percent of the food items in my freezer are breads/pastries. [$\frac{4}{36} \times 100 = 11.1 = 11\%$]
5. Six (6) of the items in my freezer are snacks or treats. Seventeen (17) percent of the food items in my freezer are snacks/treats. [$\frac{6}{36} \times 100 = 16.6 = 17\%$]
6. From least to most abundant the contents in my freezer are: meats/fish; fruits/vegetables; snacks/treats; breads/pastries. The meat/fish category has the most items in it. The breads/pastries category has the fewest items in it. There are 11 more of the most popular item than the least popular item. [$15 - 4 = 11$]
7. If I had twice as many fruits/vegetables, three times as many meats/fish, four times as many breads/pastries and five times as many snacks/treats in my freezer as I did in questions 2-5, I would have 113 food items in my freezer. [11 (fruits/vegetables) \times 2 = 22. 15 (meats/fish) \times 3 = 45. 4 (breads/pastries) \times 4 = 16. 6 (snacks/treats) \times 5 = 30. $22 + 45 + 16 + 30 = 113$]
8. If I had $\frac{1}{5}$ as many snack/treats, $\frac{1}{4}$ as many breads/pastries, $\frac{1}{3}$ as many meats/fish and $\frac{1}{2}$ as many fruits/vegetables in my freezer as I did in questions 2-5, I would have 13 food items in my freezer. [$6 \times \frac{1}{5} = 1.2 = 1$. $4 \times \frac{1}{4} = 1$. $15 \times \frac{1}{3} = 5$. $11 \times \frac{1}{2} = 5$. $5 = 6$. $1 + 1 + 5 + 6 = 13$]
9. If I served one of each item to each of my family members at each meal, the fruits/vegetables would last for two (2) meals [11 fruits/vegetables / 5 family members = 2.2 = 2 meals], the meats/fish would last for three (3) meals [15 food items / 5 family members = 3], the bread/pastries would last for less than one meal [4 food items / 5 family members = 0.8], and the snack/treats would last for one (1) meal. [6 food items / 5 family members = 1.2 = 1]
10. If I chose frozen corn and frozen peas, ground beef and fish sticks, toaster danishes and a loaf of bread, and juice bars and frozen yogurt, I can create 16 possible meal combinations. [4 (one item from each category) \times 4 (categories) = 16]

Activity 76

School Timing

1. On an average day, how much time do you spend at school? (To calculate: measure from the time you set foot on school property in the morning to the time you step off school property in the afternoon.) Express your answer in hours and minutes.
2. How much time do you spend at recess? (Include before- and after-school time.)
3. How much time do you spend at lunch?
4. How much time do you spend doing extra-curricular activities?
5. How much time each day do you spend in actual studies?
6. In a week, how much time do you spend in actual studies?
7. How much time do you spend at lunch and recess in one week?
8. How much time do you spend in actual studies over the course of a month?
9. How much time do you spend at lunch and recess over the course of a month?
10. How much time do you spend in actual studies over the course of the school year? (Make sure you take holidays into account in your calculation!)

**Answer Key**

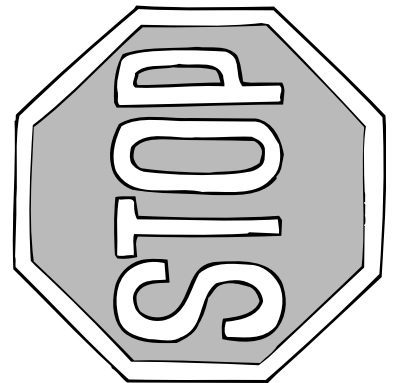
1. On an average day, my sons are on school property from 8:20 a.m. to 4:00 p.m. They spend 8 hours, 40 minutes (or 520 minutes) [8:20 a.m. - 4:00 p.m.] at school. [8 hours x 60 minutes/hour = 480 + 40 minutes = 520 minutes]
2. They spend 1 hour, 15 minutes (or 75 minutes) at recess.
3. They spend 1 hour (or 60 minutes) at lunch.
4. They spend 10 minutes doing extra-curricular activities.
5. They spend 6 hours, 15 minutes (or 375 minutes) each day doing actual studies. [520 (total time at school) - 75 (recess) - 60 (lunch) - 10 (extra curricular) = 375 minutes. 375 minutes / 60 minutes/hour = 6.25. 6 hours with 0.25 hours remainder. 0.25 x 60 minutes/hour = 15 minutes. 6 hours, 15 minutes]
6. In a week, my sons spend 31 hours, 15 minutes (or 1875 minutes) in actual studies. [375 minutes/day x 5 days/week = 1875 minutes/week. 1875 minutes / 60 minutes/hour = 31.25. 31 hours, 15 minutes]
7. They spend 11 hours, 15 minutes (or 675 minutes) at lunch and recess in one week. [60 minutes/day (lunch) x 5 days/week = 300 minutes lunch. 75 minutes/day (recess) x 5 days/week = 375 minutes recess. 300 + 375 = 675 minutes. 675 minutes / 60 minutes/hour = 11.25. 11 hours, 15 minutes]
8. They spend 125 hours (or 7500 minutes) in actual studies over the course of a month. [1875 minutes/week x 4 weeks/month = 7500 minutes/month. 7500 minutes / 60 minutes/hour = 125 hours/month]
9. They spend 45 hours (or 2700 minutes) at lunch and recess over the course of a month. [675 minutes/week x 4 weeks/month = 2700 minutes/month. 2700 / 60 = 45 hours/month]
10. They spend 1125 hours (or 67,500 minutes) in actual studies over the course of the school year. [7500 minutes/month x 9 months/year = 67,500 minutes/year. 67,500 minutes/year / 60 minutes/hour = 1125 hours/year]

Activity 93

A Sign of the Times

As you are riding or walking home from school write down the numbers on every speed limit sign that you see and count the number of stop signs that you see.

1. How many speed limit signs did you see?
2. What is the sum of the numbers on the speed limit signs?
3. What is the mean speed along your route?
4. Multiply the sum of the signs by the number of speed limit signs that you saw. What is the product?
5. What was the highest speed limit that you saw? What was the lowest speed limit that you saw? What is the difference between the highest and lowest speed limit sign?
6. How many stop signs did you see?
7. Did you see more speed limit signs or stop signs? How many more?
8. What was the ratio of speed limit signs to stop signs on your trip home?
9. Combine the number of speed limit and stop signs that you saw? What is the sum?
10. Of all the signs that you saw, what percentage were speed limit signs? Of all the signs that you saw, what percentage were stop signs?



Answer Key

1. I saw 8 speed limit signs between the boys' school and home.
2. The sum of the speed signs is 300. $[30 + 30 + 50 + 30 + 30 + 30 + 50 + 50 = 300]$
3. The mean speed along my route is 30 miles per hour. $[300 \text{ (combined speed of eight signs)} / 8 \text{ (signs)} = 37.5 = 38 \text{ mph}]$
4. Multiplying the sum of the speed limit signs by the number of speed limit signs that I saw yields a product of 2400. $[300 \text{ (sum of speed signs)} \times 8 \text{ (speed signs)} = 2400]$
5. The highest speed limit that I saw was 50 mph. The lowest speed sign that I saw was 30 mph. The difference between the highest and lowest speed sign is 20 miles per hour. $[50 \text{ mph (highest)} - 30 \text{ mph (lowest)} = 20 \text{ mph}]$
6. I saw 46 stop signs.
7. I saw 38 more stop signs than speed limit signs. $[46 \text{ signs (stop)} - 8 \text{ signs (speed)} = 38 \text{ signs}]$
8. The ratio of speed limit signs to stop signs on my way home was 4:23. $[8/46 / 2/2 = 4/23. = 4:23]$
9. The sum of the number of speed limit signs and stop signs that I saw on my way home is 54. $[8 \text{ signs (speed)} + 46 \text{ signs (stop)} = 54 \text{ signs}]$
10. Of all the signs that I saw, 15 percent were speed limit signs $[8 \text{ signs (stop)} / 54 \text{ signs (total)} \times 100 = 14.8 = 15\%]$ and 85 percent were stop signs $[46 \text{ signs (speed)} / 54 \text{ signs (total)} \times 100 = 85.2 = 85\%]$

