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ABSTRACT

This collection of activities demonstrates how the study of elementary mathematics can be extended beyond the school and involve teachers and students in investigative, problem-based experiences. The activities include topics in geometry, concept of number, algebra, measurement, graphing, statistics, and probability, and are organized into five different math trails. With this method of organization, up to 100 elementary students can participate in the activities on the same day. Each math trail has 10 activities and each activity utilizes the particular attributes of the section of the mall in which it is situated. Students collect the necessary data at the mall and then complete the activities upon returning to their classrooms by interpreting the data and applying their previous learning and understanding in mathematics to solve a real-life mall math problem. The activities are not graded since they have potential application throughout the elementary grades. (DDR)

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# RIVER FALLS MALL
# MATH TRAILS

## Connecting Elementary Mathematics to the World




**Composed, Compiled, and Edited by Walter F. Ryan, Ph.D.**

# Acknowledgments

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# Preface

River Falls Mall Math Trials - Connecting Elementary Mathematics to the World has evolved slowly during the 1996-97 academic year. Through the incubation process, many thoughts and ideas for possible activities emerged. This work represents the choices that were made.

For me, shopping malls are wonderful places to explore applications of mathematics in the real world of students. They integrate many of the mathematics concepts studied in the nation's elementary schools. They are bustling places that allow one to observe and investigate applications of mathematics. I have always thought that shopping malls provide a unique educational value that for the most part is untapped by elementary schools.

Shopping malls are prolific in terms of the exploration and discovery mathematics activities that can be investigated within their confinements. All areas of the elementary mathematics curriculum - number, geometry, algebra, measurement, graphing, statistics, and probability can all be easily integrated into motivating and informative activities. That was the primary reason that this project was developed - to provide elementary teachers and students with enriching, interesting, motivating, and effective activities for connecting mathematics concepts to the real world. River Falls Mall Math Trails is designed to demonstrate how the study of elementary mathematics can be extended beyond the school building and allow elementary teachers and students to engage in investigative, problem-based activities with the real world.

The activities described in this project are not meant to be all-encompassing listing of the mathematics application activities that can be explored in a shopping mall. They are simply a resource for the process of beginning a study of application of school mathematics. It is hoped that the activities in River Falls Mall Math Trails will take the elementary teacher and student from a casual user of shopping malls to an appreciation of the applications of elementary mathematics that exist in shopping malls.

As you examine the activities in this project you will find that the activities are organized into five different math trails. The primary reason for this organization was the ability to accommodate large groups of participating elementary students, up to 100 elementary students at a time. Each math trail is assigned a designated area of the mall with minimal overlap among the different trails. In this way, only a small number of students are located in any section of the mall. Each math trail has ten activities and each activity utilizes the particular attributes of that section of the mall including the retail outlets. The ten activities in each mall math trail cover the different areas of study in a typical elementary mathematics classroom - number, geometry, measurement, graphing, and statistics.

The activities in the River Falls Mall Math Trails are designed so that the elementary students collect the necessary data at the mall and then complete the activities when they return to their school. Completion of the mall math activities in this way requires two to three hours at the shopping mall. At the school, the completion of the mall math activity requires elementary students to interpret the data that they collected at the mall and then apply their previous learning and understanding in mathematics to solve the real life mall math problem.

You will notice that no grade level has been identified with the activities in this project. The investigative activities in River Falls Math Trails have applications to most elementary and

middle school grade levels. The teacher should adapt and adjust the investigations to accommodate the special needs and interest of their students.

The activities outlined in this project are designed specifically for the River Falls Mall in Clarksville, Indiana. Most of the activities are adaptable to the particular environments in other shopping malls. The first step in the process of adaption is to complete an inventory of the specific attributes of your shopping mall and then select the activities that are appropriate for that mall. The final step is to rewrite the selected activities with specific directions for the chosen shopping mall.

Finally, through the use of this resource, it is hoped that the elementary teacher and student will gain an awareness and appreciation of the applications of mathematics in a shopping mall. Likewise, it is hoped that through the completion of these mall mathematics activities both the elementary students and teachers will begin to understand and value the role of mathematics in their everyday lives.

# River Falls Mall
# Math Trails

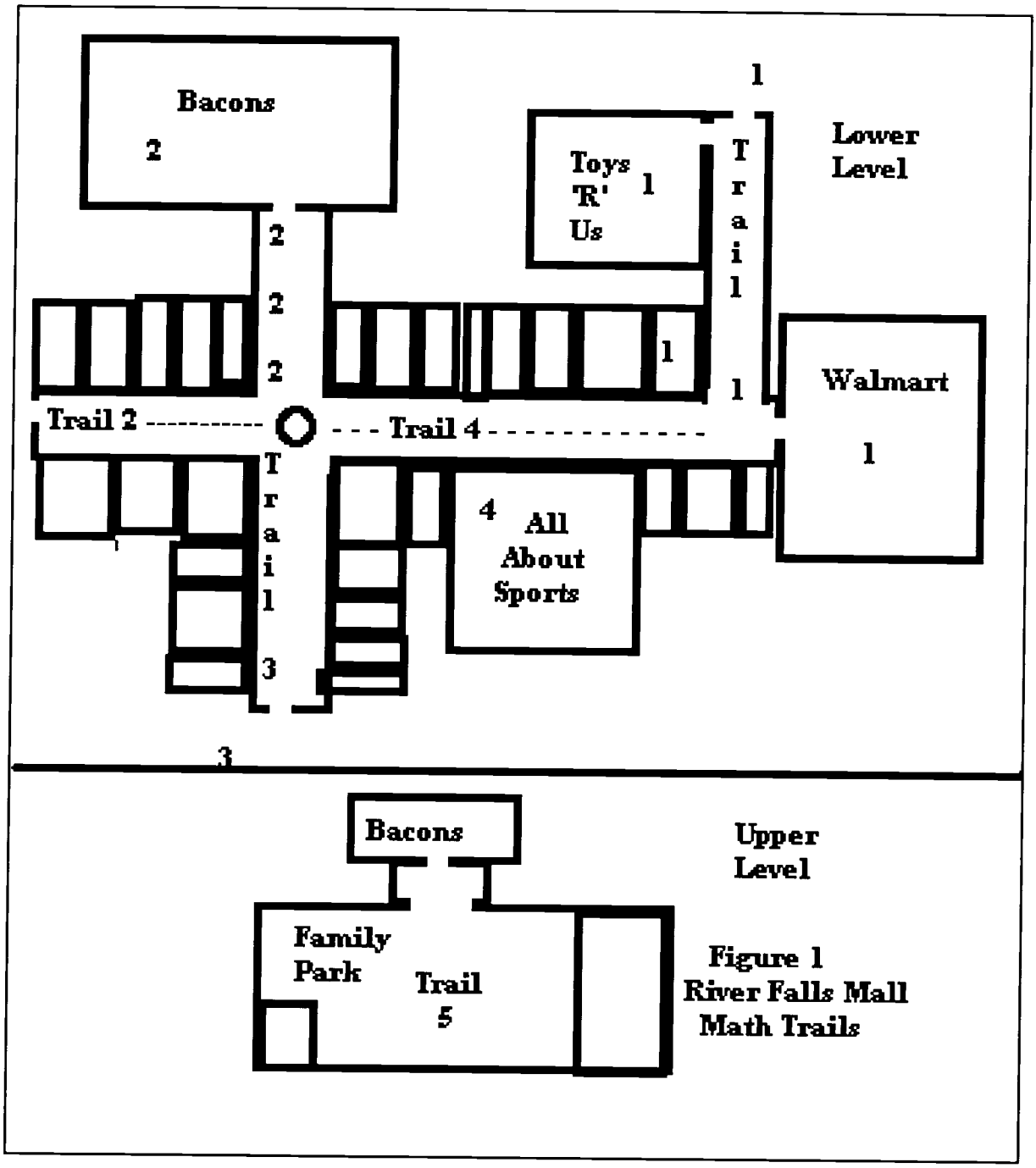


Figure 1
River Falls Mall
Math Trails

# Math Trail 1

Activities 1 and 2 are in the entire hall area of your math trail.
Activity 10 takes in the entire River Falls Mall and this activity is to be completed last.
The locations of the other activities are indicated by the numbers in the diagram below.

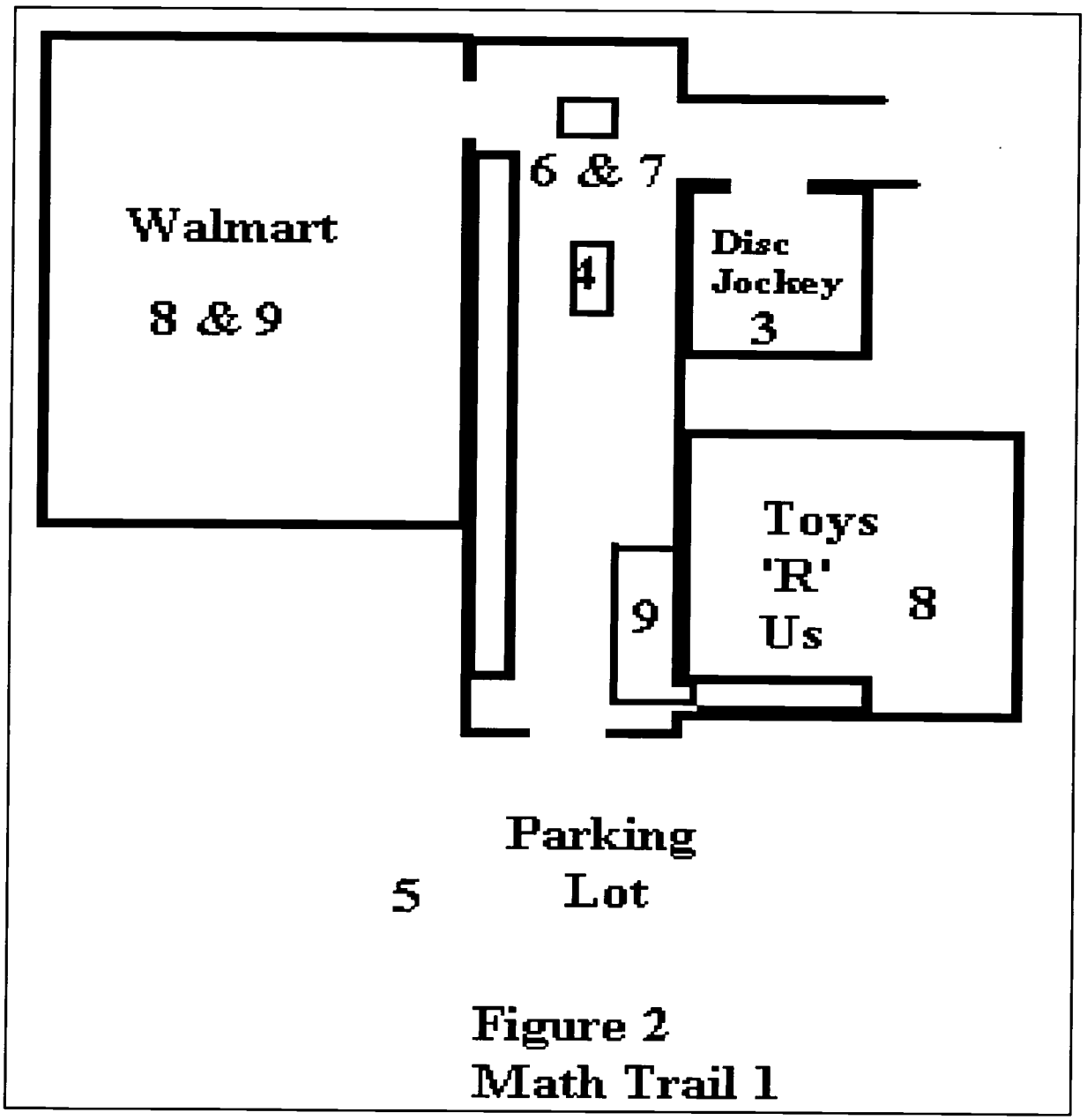


**Figure 2**
**Math Trail 1**

## Activity #1
## Bench Sit

**Areas:** Problem Solving
**Goal:** For students to use problem solving skills to solve a given problem.
**Materials:** Recording sheet, pencil or pen

**Procedure:** Find one of the benches in your trail section of the mall. By sitting on the bench determine how many people can sit comfortably on the bench. How much seating capacity is in your math trail section of the mall?

**Recording Sheet:**

Number of people that can sit on one bench _____
Number of benches in your math trail _____
Total seating capacity in your section of the mall _____

**Questions**:

1. What factors do you think affect the mall manager's decision in placing benches in different sections of the mall?

## Activity #2
## Shape Hunt

**Area:** Geometry
**Goal:** For the students to identify geometrical shapes.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Using the entire area of your trail find and identify the location of each of the following shapes (area includes hallway between Toys R' Us and Wal-Mart). If you find additional shapes not listed, add them to the bottom of the list. If you do not know the name of the shape, either count the number of sides and add it to the list or make a sketch in the space provided. Don't forget to record the location where you found each shape.

**Recording Sheet:**

| Name of Shape | Location of Shape |
|---|---|
| Equilateral triangle | |
| Isosceles triangle | |
| Scalene triangle | |
| Rectangular prism | |
| Rectangle | |
| Square | |
| Parallelogram | |
| Arc | |
| Circle | |
| Triangular prism | |
| Square prism | |
| Cylinder | |
| Hexagon | |
| Hexagonal prism | |
| Hexagonal pyramid | |
| Heptagon | |

| Other Shapes | Location |
|---|---|
| | |
| | |
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Use this space to sketch any unknown shapes.

## Activity #3
## The Sounds of Music

**Area:** Estimation
**Goal:** For students to use holistic estimation skills to guess a specified quantity.
**Materials:** Recording sheet, pen or pencil, calculator

**Procedure:** In the Disc Jockey music store the music recordings are divided into sections and the recordings in each section are organized alphabetically. Proceed to the Blues cassette section. As a group agree on an estimate for the number of cassette tapes that are contained under A-C and record this estimate on your recording sheet. Now count the actual number of cassette tapes contained under A-C and record this number on your recording sheet. Go to the Jazz section and as a group agree on an estimate for the number of cassette tapes that are contained under X-Z and record this estimate on your recording sheet. Now count the actual number of tapes contained under X-Z and record this on your recording sheet. Calculate the actual and percentage difference between your estimates and the actual numbers.

**Recording Sheet:**

| | | | |
|---|---|---|---|
| Group agreed estimate Blues | _____ | Group agreed estimate Jazz | _____ |
| Actual number of Blues | _____ | Actual number of Jazz | _____ |
| Actual difference | _____ | Actual difference | _____ |
| Percentage difference | _____ | Percentage difference | _____ |

**Question**

1. Was the group agreed estimate for Jazz closer to the actual number for Jazz than the group agreed estimate for Blues to the actual number for Blues? If so, why do you think your second estimate was closer to the actual number?

## Activity #4
## Tiles, Tiles, Tiles, and More Tiles

**Area:** Measurement and Problem Solving

**Goal:** (1)For students to understand the concept of area
(2)For students to apply the problem solving process to find the solution to a problem.

**Materials:** Recording paper, pen or pencil

**Procedure:** By the **Merry-Go-Round Horse** there is a section of floor that is tiled white and brown. Figure out how many tiles altogether are on this section of the floor. Explain how you figured out your answer. What is the total area (in tiles) of this section of the floor? How many white tiles are there on this section of the floor? How many brown tiles are on this section of the floor? What is the largest square you can make using just the white tiles?

**Recording Sheet:**

Total Number of Tiles on the Floor: _____
Number of White Tiles: _____
Number of Brown Tiles: _____
Area of Section of Floor (in Tiles) _____

Diagram of largest Square:

## Activity #5
## Everywhere I Look There is Another Vehicle

**Area:** Graphing
**Goal:** For the students to collect data and create a bar graph using the collected data.
**Materials:** Pencil or pen, recording sheet, crayons or leads, graph paper

**Procedure:** Walk out the back entrance of the mall (by Toys' R' Us). Locate the light pole to your right as you step outside. Now look to your left and locate the first 15 mph speed limit sign. Use the entire rows between these two points (the light pole and the speed limit sign) to gather the following information on each parked vehicle. Use your results to construct bar graphs.

**Recording Sheet:**

| Brand | Model | Color | Brand | Model | Color |
|---|---|---|---|---|---|
| | | | | | |
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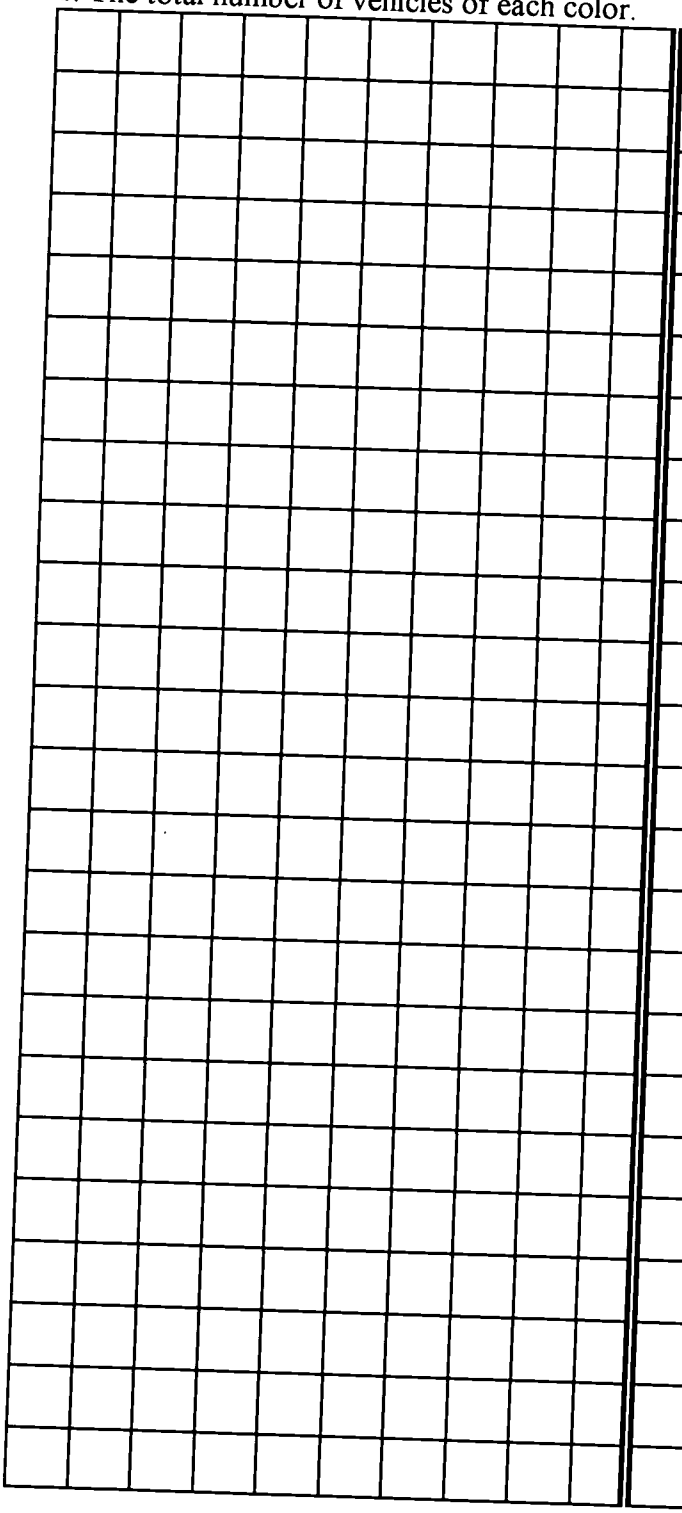
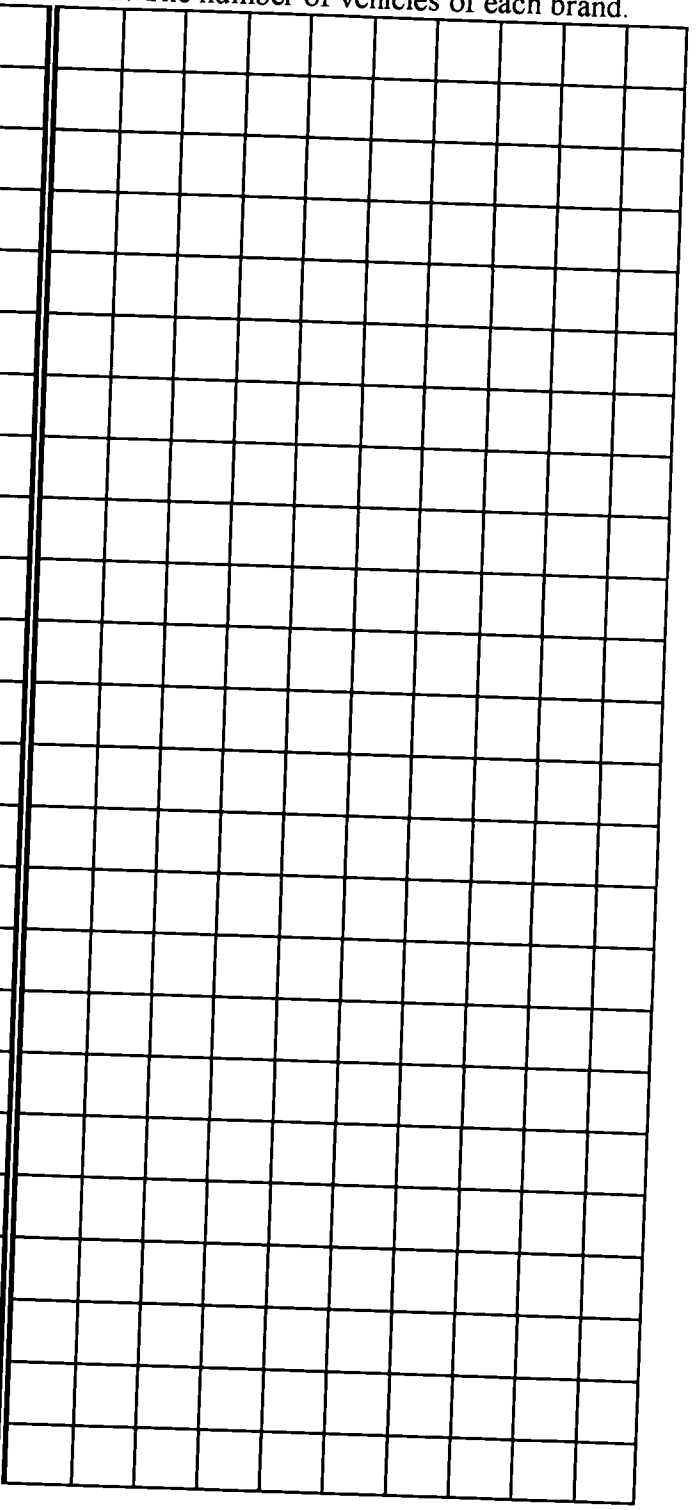
**Use the graph paper below to graph the following:**

1. The total number of vehicles of each color.



2. The number of vehicles of each brand.



**Questions:**

#1. How many vehicles in total were in the parking lot?

#2. What is the most popular color of vehicle? What is the least popular color of vehicle? What is the difference between the most popular color of vehicle and the least popular color of vehicle?

#3. What is the most popular brand of vehicle? What is the least popular brand of vehicle? What is the difference between the most popular brand of vehicle and the least popular brand of vehicle?

#4. If you wish to open a vehicle dealership how would the answers to questions #2 and #3 affect your decision?

## Activity #6
## Finding Your Way

**Area:** Coordinate Geometry
**Goal:** For the students to locate a destination by following coordinate directions.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Start by the school receipt box in front of Wal-Mart. Face the entrance to the Mall by Toys R Us. Walk forward 30 tiles. Make a 90 degree left turn. Walk forward 48 tiles. Now make a 90 degree left turn. Walk forward 7 more tiles. Where are you located now? Now design a set of directions (minimum of five) for a member of your group. Have the member of your group start at the school receipt box in front of Wal-Mart. Give suitable directions for the member of your group to end at a location of your choice.

**Recording Sheet:**

| Direction | Specific Instruction |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | |
| 14 | |

## Activity #7
## Cash Back for Schools

**Area**: Graphing
**Goal:** (1) For students to be able to analyze a bar graph.
(2) For students to be able to construct a pictograph.
**Materials:** Pencil, recording sheet, graph at mall, stickers, scissors

**Procedure:** Go to the cash back for school receipt box in front of Wal-Mart. Identify the schools that participate in the program. List them in the table provided. Next within your group design a picture graph that will give a representation of the points earned by each school. Each picture will represent 15,000 points.

**Recording Sheet:**

| Name of School | Points Earned |
|---|---|
| | |
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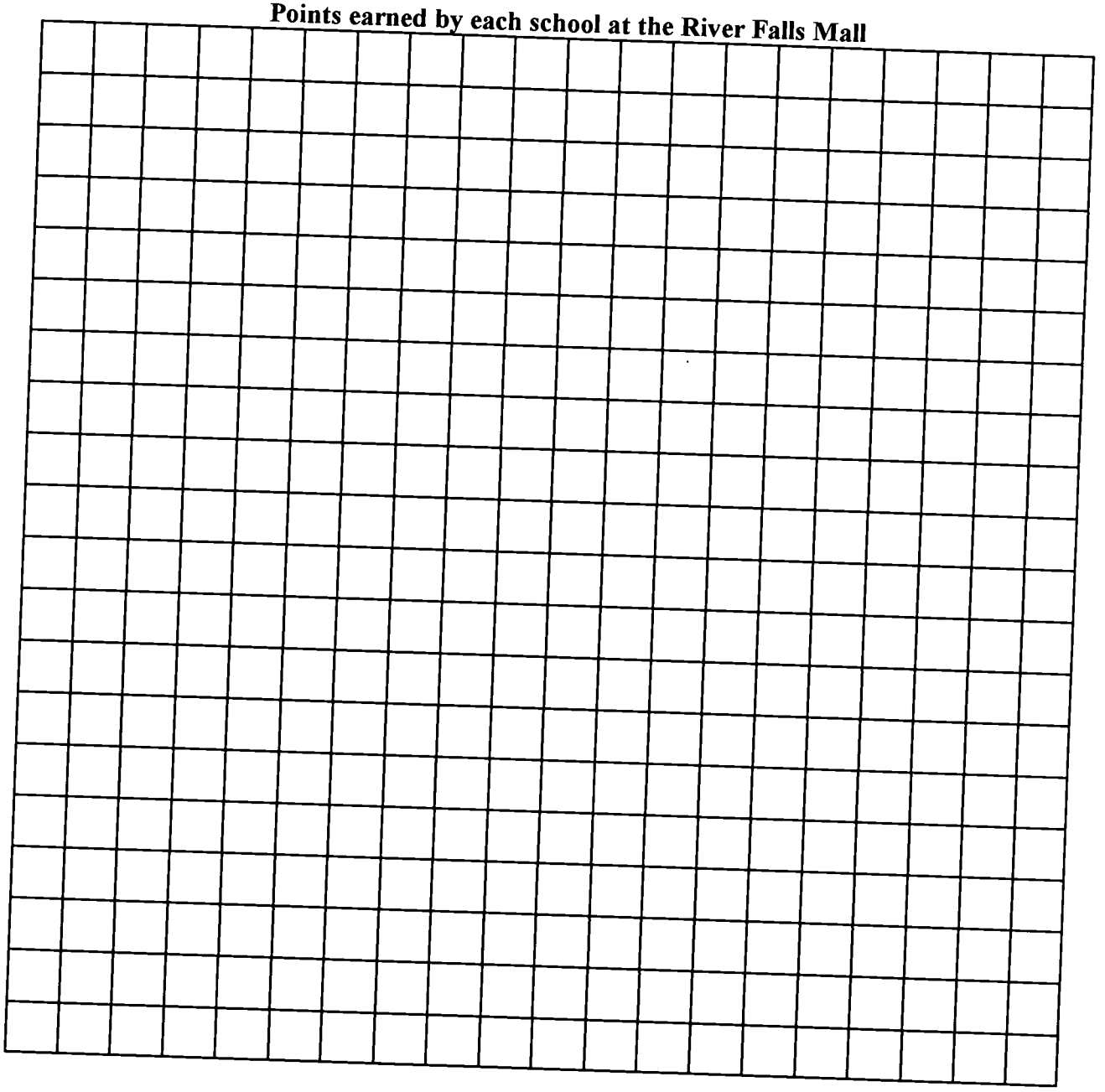
**Points earned by each school at the River Falls Mall**



**Questions:**

1. Which school has received the most points?

2. Which school has received the least points?

3. Compare the points earned from Lillian Emery and the points earned from Slate Run Elementary. Which school has the most points? How did you determine this?

4. How many different schools are shown on the graph as receiving points?

5. How many schools do you think have at least some points? Why do you think this?

6. Compare the points earned from Clarksville High School and New Albany High School. Which school has the most points? Why do you think one school has earned more points than the other?

7. If you were a principal of a school what types of activities would you organize to encourage the parents to participate in the mall points program?

## Activity #8
## Comparison Shopping

**Area:** Problem Solving
**Goal:** For students to understand the process of finding the best value when shopping for an item.
**Materials:** Recording sheet, pencil or pen, calculator

**Procedure:** Go to Toys-R-Us and locate the five (5) items listed on the recording sheet. Find the price of each of the items and record the prices on the recording sheet. Add the prices of the five items to find the total price. Calculate 5% sales tax. Add the sales tax to the total price of the items to find the total price including sales tax (this is the price you pay in Indiana). The sales tax in Kentucky is 6%. Now calculate the total price for Kentucky. Walk down to Wal-Mart and find the same five items. Repeat the same procedure at Wal-Mart.

**Recording Sheet:**

| Items | Price - Toys-R-Us | Price - Wal-Mart |
|---|---|---|
| 1. Parker Brothers Regular Monopoly | | |
| 2. Clue | | |
| 3. Risk | | |
| 4. UNO Stack O | | |
| 5. Twister | | |
| **Total Price of Items** | | |
| 5% Sales Tax | | |
| **Total Price Including Sales Tax** | | |
| | | |
| **Total Price of Items** | | |
| 6% Kentucky Sales Tax | | |
| **Total Price Including Ky. Sales Tax** | | |

**Questions:**

1. How much money do you save by purchasing items in Indiana instead of Kentucky?

2. Which store has the best overall total price including sales tax(Indiana)? How much would you save by buying at the store with the lower total price(Indiana)?

3. Are some of the individual items less expensive at the store with the higher total price? If so, which items were less expensive and by how much?

4. If you bought each item for the lower price irrespective of the store, what would be the total price including sales tax(Indiana)? How much would you save in this way compared to buying all the items at the more expensive store(Indiana)?

## Activity #9
## Painting Blues

**Areas:** Measurement, Problem Solving
**Goal:** For students to use problem solving skills to determine the cost of painting a given area.
**Material:** Measuring tape, recording sheet, pencil or pen, calculator

**Procedure:** You have been asked by the mall manager to submit a bid on painting a section of the mall wall. Use the section of the wall beginning at the right corner as you leave Toys R' Us and ending at the start of the display case. Use your measuring tape to find the length and width of one tile (to the next inch). Now figure the length and width of the rectangular section of the wall to the next foot. Calculate the area of this wall section to the next square foot. You are to use **Color Place Our Best Interior Latex Semi-Gloss Enamel Soft White** to paint this section. Go to the hardware section of Wal-Mart and find a gallon of this paint. How many square feet does a gallon of this paint cover? How many full gallons of paint do you need to buy? How much will the paint cost you? Assuming you would like to make a profit on this painting job how much will you bid on this contract?

**Recording Sheet:**

1. Length of one tile (to the next inch) _____
2. Number of tiles in length of rectangular section of wall _____
3. Length of rectangular section of wall (to the next inch) _____
4. Length of rectangular section of wall (to the next foot) _____
5. Width of one tile (to the next inch) _____
6. Number of tiles in width of rectangular section of wall _____
7. Width of rectangular section of wall (to the next inch) _____
8. Width of rectangular section of wall (to the next foot) _____
9. Area of rectangular section of wall (square feet) _____
10. Number of square feet covered by one gallon of paint _____
11. Number of gallons of paint needed _____
12. Cost of one gallon of paint _____
13. Total cost of paint _____
14. Your bid _____

**Questions:**

1. What other things might influence your bid?

2. If Wal-Mart sells the paint by the quart, compare the price of a gallon of paint to the cost of four quarts.

3. Would your cost of paint be less if you could buy paint by the quart? Why or why not? By the five gallon bucket? Why or Why not?

## Activity #10
## Shop 'Til You Drop

**Area:** Problem Solving
**Goal:** For students to learn the benefits of value shopping
**Materials:** Ledger sheet, pencil or pen, calculator

**Procedure:** Your ledger will have a beginning balance of $200. Using all of the stores in the mall, try to buy as many practical items as possible without going over your $200. All group members must agree to purchase the item. List each item and its price on your ledger. Be sure to subtract each total price from your existing balance. Your "shopping spree" should end with the purchase of a lunch in the upstairs food court. Be sure to save enough of your $200 to include a well balanced lunch.

**Recording Sheet:**

| Purchase | Price | 5% Sales Tax | Total Cost | Balance ($200) |
|---|---|---|---|---|
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# Math Trail 2

Activities 1 and 2 are in the entire hall area of your math trail.
Activity 10 takes in the entire River Falls Mall and this activity is to be completed last.
The location of the other activities are indicated by the numbers in the diagram below.

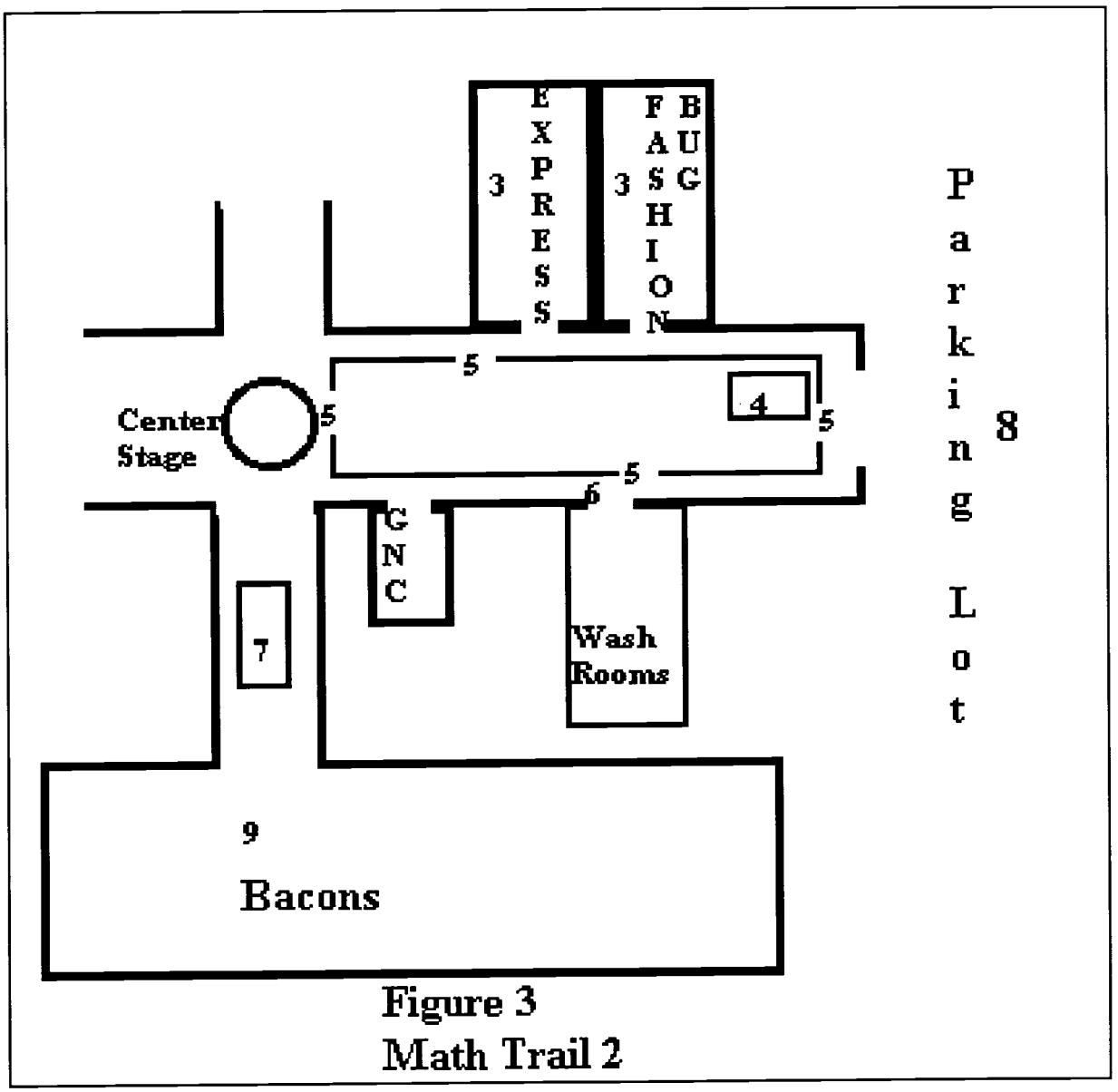


Figure 3
Math Trail 2

**Activity #1**
**Bench Sit**

**Areas:** Problem Solving
**Goal:** For students to use problem solving skills to solve a given problem.
**Materials:** Recording sheet, pencil or pen

**Procedure:** Find one of the benches in your trail section of the mall. By sitting on the bench determine how many people can sit comfortably on the bench. How much seating capacity is in your math trail section of the mall?

**Recording Sheet:**

Number of people that can sit on one bench _____
Number of benches in your math trail _____
Total seating capacity in your section of the mall _____

**Questions**:

1. What factors do you think affect the mall manager's decision in placing benches in different sections of the mall?

**Activity #2**
**Shape Hunt**

**Area:** Geometry
**Goal:** For the students to identify geometrical shapes.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Using the entire area of your trail find and identify the location of each of the following shapes (area includes hallway by the side entrance beside Fashion Bug and around the corner to Bacon's). If you find additional shapes not listed, add them to the bottom of the list. If you do not know the name of the shape, either count the number of sides and add it to the list or make a sketch in the space provided. Don't forget to record the location where you found each shape.

**Recording Sheet:**

| Name of Shape | Location of Shape |
|---|---|
| Oval | |
| Square prism | |
| Heptagon | |
| Rectangle | |
| Trapezoidal prism | |
| Square | |
| Cylinder | |
| Rectangular prism | |
| Circle | |
| Scalene triangle | |
| Quadrilateral | |
| Parallelogram | |
| Hexagon | |
| Hexagonal prism | |
| Hexagonal pyramid | |
| Cylinder | |

| Other Shapes | Location |
|---|---|
| | |
| | |
| | |
| | |
| | |

Use this space to sketch any unknown shapes.

## Activity #3
## Salary Size-Up

**Area:** Problem Solving
**Goal:** For students to use problem solving skills to compare employment compensation at different stores.
**Materials:** Recording sheet, pen or pencil, calculator

**Procedure:** Proceed to Express store and ask the manager how much money a beginning sales clerk would make per hour. Also ask the manager if they would receive any salary increases during the first year. Record the starting hourly wage, each increase in hourly wage, the length of time that you needed to work at Express to receive the increase, and the resulting new hourly wage on your recording sheet. Now proceed to Fashion Bug and ask the manager at Fashion Bug the same questions. Record your findings on your recording sheet. Multiply each hourly wage by 40 hours to determine your gross salary for one week at each store for each different hourly wage.

**Recording Sheet:**

| Store | Length of Employment (Months) | Hourly Wage Increase | Hourly Wage | Weekly Hours Worked | Gross Salary |
|---|---|---|---|---|---|
| Express | 0 | $0.00 | | 40 | |
| Express | | | | 40 | |
| Express | | | | 40 | |
| Express | | | | 40 | |
| Fashion Bug | 0 | $0.00 | | 40 | |
| Fashion Bug | | | | 40 | |
| Fashion Bug | | | | 40 | |
| Fashion Bug | | | | 40 | |

**Questions:**

1. When you first start working at the stores, in which store would you make the most money per week (gross salary)? What is the difference in gross salary between the store that has the highest weekly gross salary and the lowest weekly gross salary?

2. In which store would you receive the largest increase in salary during your first year of employment? How much was this increase?

3. Do any of the two stores have other work incentives like commission sales, medical plans, etc? Would these extra work incentives affect your choice of store for employment?

## Activity #4
## Tiles, Tiles, Tiles, and More Tiles

**Area:** Measurement and Problem Solving

**Goal:** (1)For students to understand the concept of area
(2)For students to apply the problem solving process to find the solution to a problem.

**Materials:** Recording paper, pen or pencil

**Procedure:** By the entrance to the mall, by the **River Falls Mall Directory** there is a section of floor that is tiled white and brown. Figure out how many tiles altogether are on this section of the floor. Explain how you figured out your answer. What is the total area (in tiles) of this section of the floor? How many white tiles are there on this section of the floor? How many brown tiles are on this section of the floor? What is the largest square you can make using just the white tiles?

**Recording Sheet:**

Total Number of Tiles on the Floor: _____
Number of White Tiles: _____
Number of Brown Tiles: _____
Area of Section of Floor (in Tiles) _____

Diagram of largest Square:

## Activity #5
## Health Walk

**Areas:** Measurement and Problem Solving
**Goal:** For students to use measuring and problem solving skills to solve a real life problem.
**Materials:** Measuring tape, recording sheet, pencil or pen

**Procedure:** Many people use the mall for health walks. Assume that mall patrons wanted to walk a total of 2 kilometers. Assume that the walking path is rectangular. The walking path begins at the set of four brown tiles to your right as you enter the mall. Follow the inner white tile strip through the mall hall passing Fashion Bug, Structure, and Express on your right. When you reach the end of Compagnie Internationale Express you will notice two sets of four brown tiles. Turn left at the second set of four brown tiles and walk across the hall toward GNC. When you reach the inner white tile strip turn left and walk back towards the mall entrance. On your right you will pass the mall restrooms. Proceed to the end of the white tile strip. Turn left at the set of four brown tiles and go back to the starting point. Find the total distance you walk in one trip (to the nearest meter). How many complete trips around this path would the mall patrons have to walk to reach their target of 2 kilometers (2000 meters)?

**Recording Sheet:**
Distance around the path once (nearest meter) _____
Number of complete trips for 2 kilometer (2000 meters) _____

**Question:**
1. Design a flyer that would attract the community to walk at the mall. Include information that would motivate the community to use the mall not only for shopping.

## Activity #6
## Finding Your Way

**Area:** Coordinate Geometry
**Goal:** For the students to locate a destination by following coordinate directions.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Begin at the entrance of the hallway to the restrooms. Start on the 3rd tile from the right of the wall as you are facing the telephones in the center of the hallway. Walk forward 27 tiles, make a 90 degree right turn and proceed forward 46 tiles. Now make a 90 degree left turn and go forward 43 more tiles. Identify your location. Now make a similar set of directions for one of your group members. Have your group member start at the entrance of the hallway to the restrooms. Have at least ten separate directions.

**Recording Sheet:**

| Direction | Specific Instruction |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | |
| 14 | |
| 15 | |

## Activity #7
## Going, Going, Gone

**Area:** Measurement/Problem Solving
**Goal:** For students to use measuring and problem solving skills to calculate the vertical speed of a mall escalator.
**Materials:** Recording Sheet, pen or pencil, centimeter ruler, stopwatch, calculator

**Procedure:** In front of Bacon's store, near Kirlin's Hallmark, there is a set of stairs leading to the second level of the mall. Measure the height of one step to the nearest centimeter. Determine the total number of steps to the top of the stairway. Calculate the height of the second floor from the first floor to the nearest centimeter. Walk down the steps to the first floor and proceed to the escalator. Use your stopwatch to time how long it takes to ride the escalator from the first floor to the second floor. Repeat the timing procedure four times. Calculate the average time. Use the vertical height of the second floor from the first floor and your average time for the escalator to calculate the vertical speed of the escalator to the nearest centimeter per second.

**Recording Sheet:**

| | |
|---|---|
| Height of One Step | centimeters |
| Number of Steps | |
| Vertical Height | centimeters |
| Time Trial 1 | seconds |
| Time Trial 2 | seconds |
| Time Trial 3 | seconds |
| Time Trial 4 | seconds |
| Time Trial 5 | seconds |
| Average Time | seconds |
| Vertical Speed of Escalator | centimeters per second |

**Questions:**
#1. How could you calculate the horizontal speed of the escalator? The diagonal speed?

## Activity #8
## Everywhere I Look There is Another Vehicle

**Area:** Graphing
**Goal:** For the students to collect data and create a bar graph using the collected data.
**Materials:** Pencil or pen, recording sheet, crayons or leads, graph paper

**Procedure:** Walk out the side entrance of the mall. Locate the end of the sidewalk to your right as you step outside. Now look to your left and locate the end of the parking lot by this entrance. Use the entire rows between these two points to gather the following information on each parked vehicle.

**Recording Sheet:**

| Brand | Model | Color | Brand | Model | Color |
|---|---|---|---|---|---|
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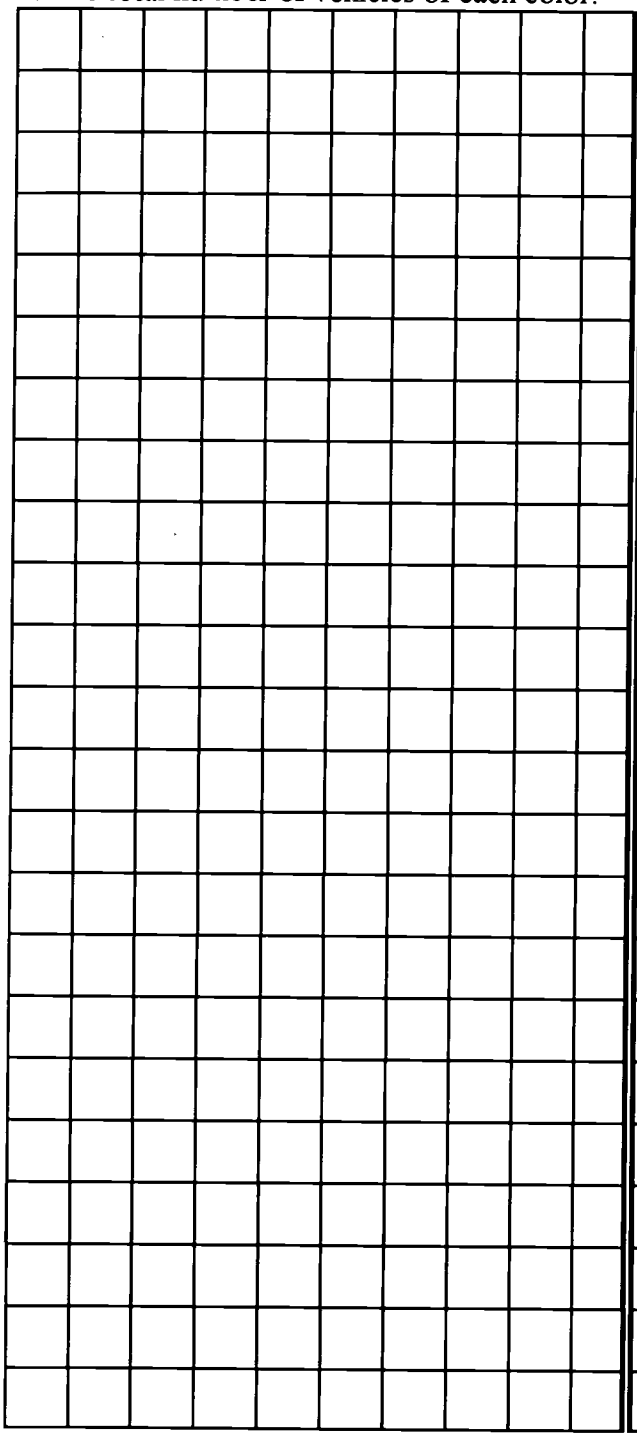
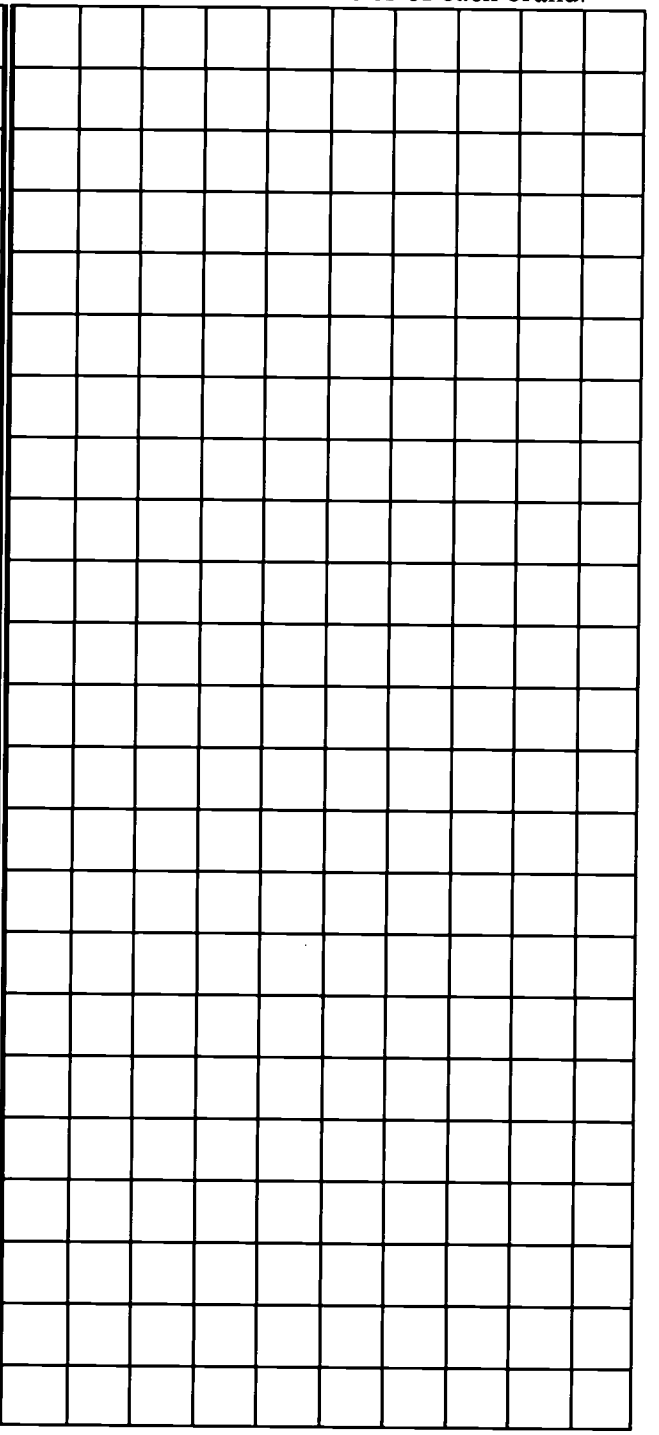
**Use the graph paper below to graph the following:**

1. The total number of vehicles of each color.



2. The number of vehicles of each brand.



**Questions:**

#1. How many vehicles in total were in the parking lot?

#2. What is the most popular color of vehicle? What is the least popular color of vehicle? What is the difference between the most popular color of vehicle and the least popular color of vehicle?

#3. What is the most popular brand of vehicle? What is the least popular brand of vehicle? What is the difference between the most popular brand of vehicle and the least popular brand of vehicle?

#4.If you wish to open a vehicle dealership how would the answers to questions #2 and #3 affect your decision concerning the types and colors of vehicles that you would sell?

## Activity #9
## Extra! Extra! Read All About It!

**Area:** Problem Solving
**Goal:** For students to compose an ad to promote a popular department store item.
**Materials:** Pencil or pen,. calculator, bristle board

**Procedure:** Calvin Klein's CK One cologne/perfume (6.7 fl. oz.) has been a popular item for several months. However, lately the product has decreased in popularity and this has affected its sales dramatically. As the manager of Bacon's department store, it is your job to write an ad campaign that will promote the item and attract as many customers as possible. The ad should focus on sales, accessory items, promotions, etc. Check with the sales clerk at the Mens Cologne Counter in Bacon's and get as much information about the cologne as possible. Make sure you get the price of the cologne. Decide on the sale price for the cologne and the expected number of bottles of cologne that you will sell at the sale price.

**Question:**
1. How much money will the store lose by selling Calvin Klein's CK One cologne/perfume (6.7 fl. oz.) at the sale price? What are the reasons that the store will sell the item at a sale price?

**Activity #10**
**Shop 'Til You Drop**

**Area:** Problem Solving
**Goal:** For students to learn the benefits of value shopping
**Materials:** Ledger sheet, pencil or pen, calculator

**Procedure:** Your ledger will have a beginning balance of $200. Using all of the stores in the mall, try to buy as many practical items as possible without going over your $200. All group members must agree to purchase the item. List each item and its price on your ledger. Be sure to subtract each total price from your existing balance. Your "shopping spree" should end with the purchase of a lunch in the upstairs food court. Be sure to save enough of your $200 to include a well balanced lunch.

**Recording Sheet:**

| Purchase | Price | 5% Sales Tax | Total Cost | Balance ($200) |
|---|---|---|---|---|
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# Math Trail 3

Activities 1 and 2 are in the entire hall area of your math trail.
Activity 10 takes in the entire River Falls Mall and this activity is to be completed last.
The locations of the other activities are indicated by the numbers in the diagram below.

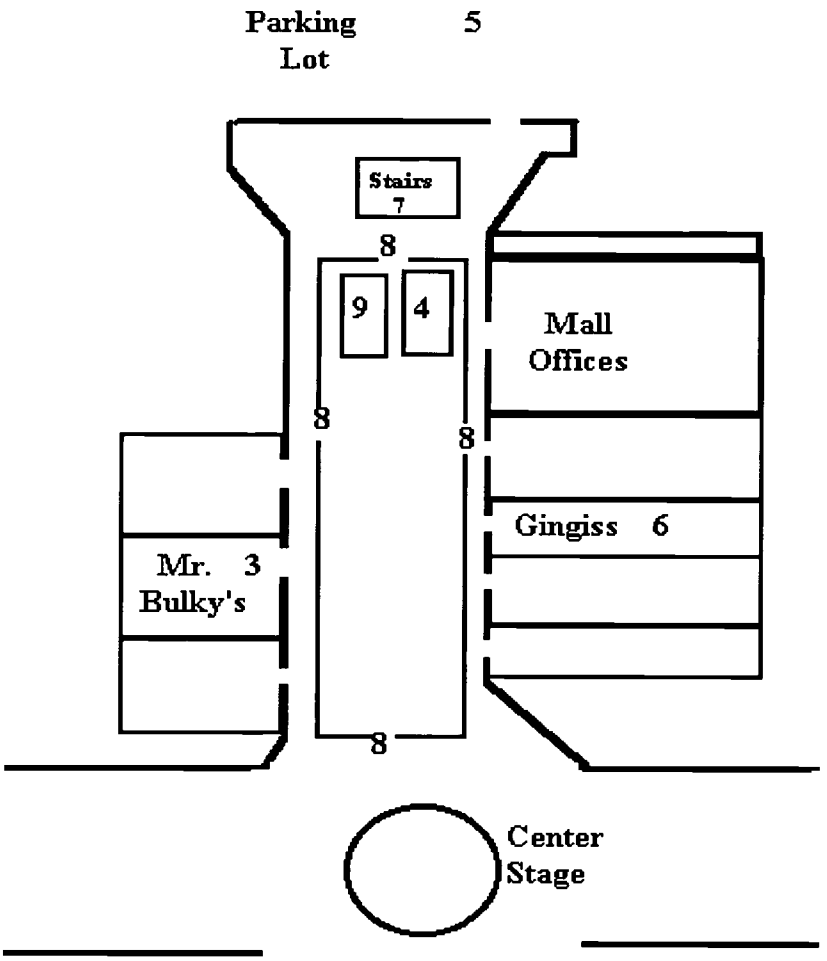


**Figure 4**
**Math Trail 3**

**Activity #1**
**Bench Sit**

**Areas:** Problem Solving
**Goal:** For students to use problem solving skills to solve a given problem.
**Materials:** Recording sheet, pencil or pen

**Procedure:** Find one of the benches in your trail section of the mall. By sitting on the bench determine how many people can sit comfortably on the bench. How much seating capacity is in your math trail section of the mall?

**Recording Sheet:**

Number of people that can sit on one bench _____
Number of benches in your math trail _____
Total seating capacity in your section of the mall _____

**Questions**:

1. What factors do you think affect the mall manager's decision in placing benches in different sections of the mall?

**Activity #2**
**Shape Hunt**

**Area:** Geometry
**Goal:** For the students to identify geometrical shapes.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Using the entire area of your trail find and identify the location of each of the following shapes (area includes hallway from the front entrance to the elevator in front of the center stage). If you find additional shapes not listed, add them to the bottom of the list. If you do not know the name of the shape, either count the number of sides and add it to the list or make a sketch in the space provided. Don't forget to record the location where you found each shape.

**Recording Sheet:**

| Name of Shape | Location of Shape |
|---|---|
| Sphere | |
| Hexagon | |
| Hexagonal prism | |
| Hexagonal pyramid | |
| Square | |
| Rectangle | |
| Rectangular prism | |
| Cylinder | |
| Trapezoid | |
| Circle | |
| Octagon | |
| Square prism | |
| Equilateral triangle | |
| Scalene triangle | |
| Triangular Prism | |
| Parallelogram | |

| Other Shapes | Location |
|---|---|
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Use this space to sketch any unknown shapes

## Activity #3
## Candy Delight

**Area:** Estimation
**Goal:** For students to use holistic estimation skills to guess a specified quantity.
**Materials:** Recording sheet, pen or pencil

**Procedure:** In Mr. Bulky's store there are many containers of candy. Find the Psych Jawbreakers container. As a group agree on an estimate for the number of pieces of candy that are in this container and record this estimate on your recording sheet. Now count the actual number of pieces of candy in the Psych Jawbreakers container and record this on your recording sheet. Next find the Ball Dozer Jawbreakers container. As a group agree on an estimate for the number of pieces of candy that are in this container and record this number on your recording sheet. Now count the actual number of pieces of candy in the Ball Dozer Jawbreakers and record this on your recording sheet. Calculate the actual and percentage difference between your estimates and the actual numbers.

**Recording Sheet:**

Estimate 1

Group agreed estimate Psych Jawbreakers _____
Actual number of Psych Jawbreakers _____
Actual difference between estimate and actual _____
Percentage difference between estimate and actual _____

Estimate 2

Group agreed estimate Ball Dozer Jawbreakers _____
Actual number of Ball Dozer Jawbreakers _____
Actual difference between estimate and actual _____
Percentage difference between estimate and actual _____

**Question**

1. Was the group agreed estimate for Ball Dozer Jawbreakers closer to the actual number for Ball Dozer Jawbreakers than the group agreed estimate for Psych Jawbreakers to the actual number for Psych Jawbreakers? If so, why do you think your second estimate was closer to the actual number?

## Activity #4
## Tiles, Tiles, Tiles, and More Tiles

**Area:** Measurement and Problem Solving

**Goal:** (1)For students to understand that the concept of area
(2)For students to apply the problem solving process to find the solution to a problem.

**Materials:** Recording paper, pen or pencil

**Procedure:** By the **Rent a Stroller** by the **River Malls Directory** there is a section of floor that is tiled white and brown. Figure out how many tiles altogether are on this section of the floor. Explain how you figured out your answer. What is the total area (in tiles) of this section of the floor? How many white tiles are there on this section of the floor? How many brown tiles are on this section of the floor? What is the largest square you can make using just the white tiles?

**Recording Sheet:**

Total Number of Tiles on the Floor _____
Number of White Tiles _____
Number of Brown Tiles _____
Area of Section of Floor (in Tiles) _____

Diagram of Square:

## Activity #5
## Everywhere I Look There is Another Vehicle

**Area:** Graphing
**Goal:** For the students to gather data and create a bar graph.
**Materials:** Pencil, recording sheet, crayons or leads, graph paper

**Procedure:** Go out the front entrance by the restaurant. Look to your left and locate the light pole with the blue paint. Now look to your right and locate the light pole with the yellow paint. Use the entire rows between these two points (the two light poles) record the following information on each parked vehicle.

**Recording Sheet**

| Brand | Model | Color | Brand | Model | Color |
|---|---|---|---|---|---|
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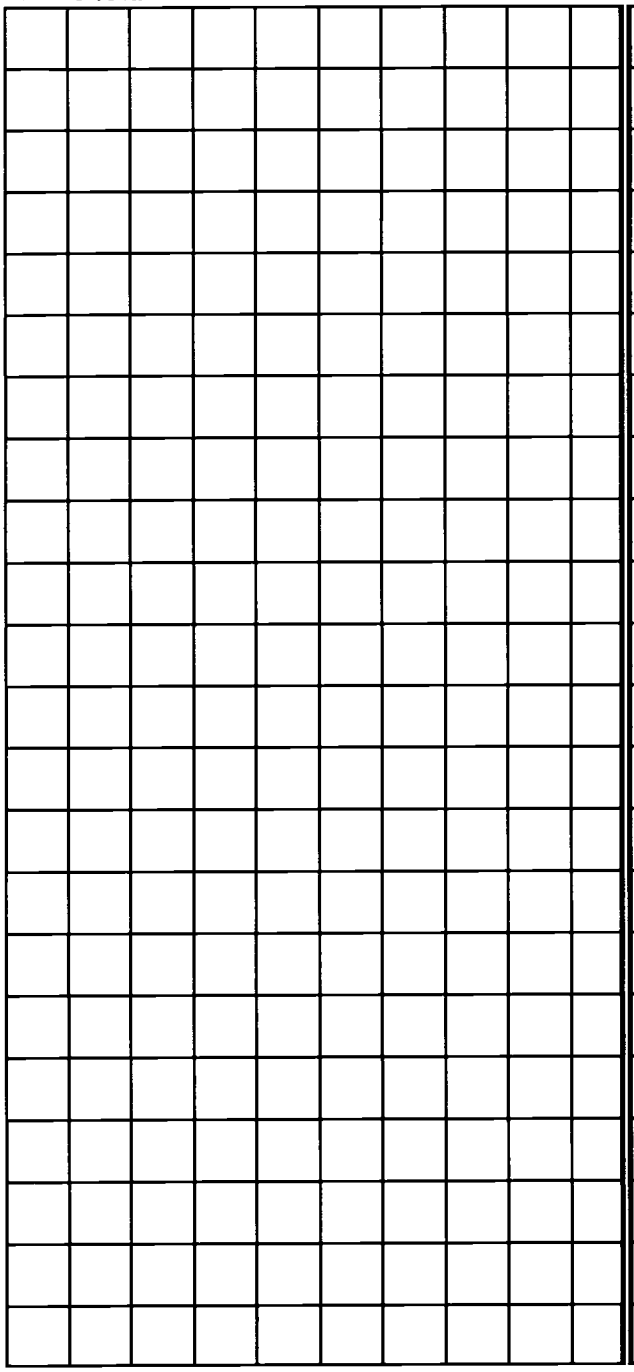
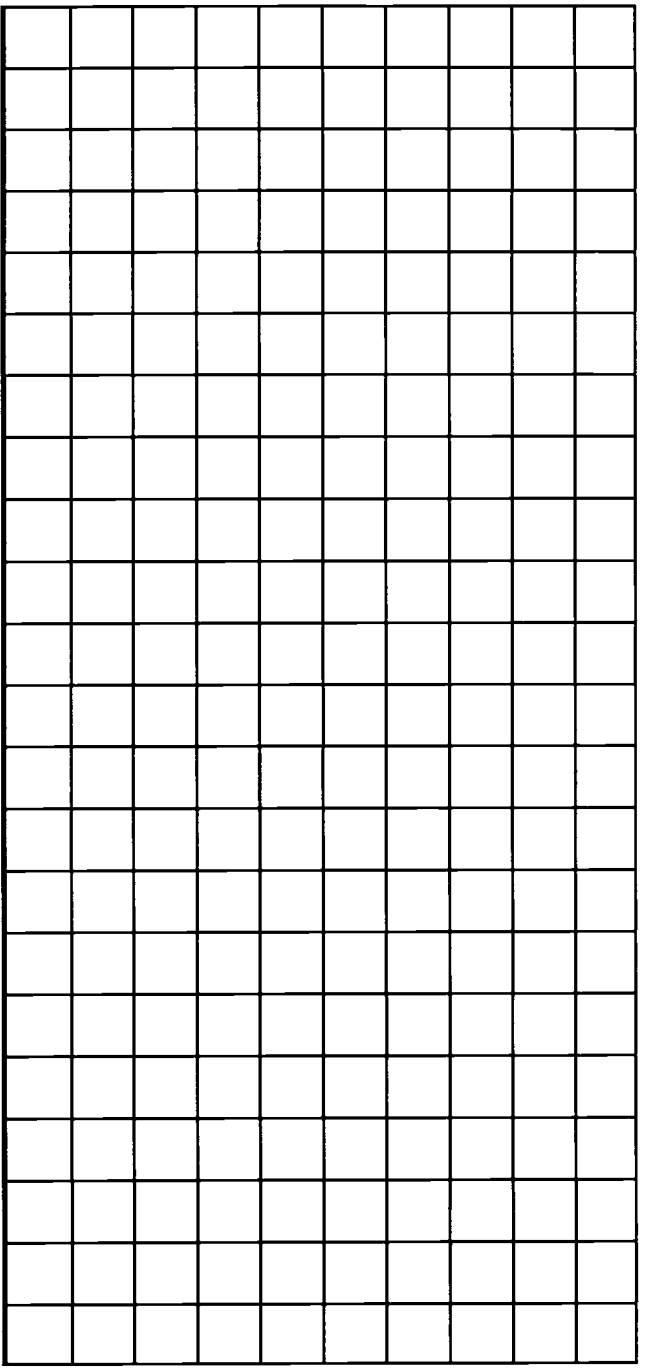
**Use the graph paper below to graph the following:**

1. The total number of vehicles of each color.



2. The number of vehicles of each brand.



**Questions:**

#1. How many vehicles in total were in the parking lot?

#2. What is the most popular color of vehicle? What is the least popular color of vehicle? What is the difference between the most popular color of vehicle and the least popular color of vehicle?

#3. What is the most popular brand of vehicle? What is the least popular brand of vehicle? What is the difference between the most popular brand of vehicle and the least popular brand of vehicle?

#4. If you wish to open a vehicle dealership how would the answers to questions #2 and #3 affect your decision concerning the types and colors of vehicles that you would sell?

**Activity #6**
**Will You Marry Me?**

**Area:** Problem Solving
**Goal:** For students to use problem solving skills to determine the total cost of renting specific items.
**Materials:** Recording sheet, pencil or pen, calculator

**Procedure:** Go to the Gingiss store and get the information from the clerk concerning the costs for dressing your wedding party. Your wedding party includes the groom, five groomsmen, two ushers, a ring bearer and the two fathers. Calculate the total cost of renting traditional black tuxedos without any accessories for the wedding party. Now calculate the total cost for the wedding party if you also order the extra accessories, shoes, vests, and shirts. Don't forget to include the 5% sales tax in your calculations.

**Recording Sheet:**

| Dress Item | Person | Price | 5% Sales Tax | Total Price |
|---|---|---|---|---|
| Tuxedo | Groom | | | |
| | Groomsmen | X5= | | |
| | Ushers | X2= | | |
| | Ring Bearer | | | |
| | Fathers | X2= | | |
| Shoes | Groom | | | |
| | Groomsmen | X5= | | |
| | Ushers | X2= | | |
| | Ring Bearer | | | |
| | Fathers | X2= | | |
| Vests | Groom | | | |
| | Groomsmen | X5= | | |
| | Ushers | X2= | | |
| | Ring Bearer | | | |
| | Fathers | X2= | | |

| Dress Item | Person | Price | 5% Sales Tax | Total Price |
|---|---|---|---|---|
| Shirts | Groom | | | |
| | Groomsmen | X5= | | |
| | Ushers | X2= | | |
| | Ring Bearer | | | |
| | Fathers | X2= | | |

**Questions:**

1. What is the total cost for the rental of traditional tuxedos for the wedding party?

2. What is the total cost for the rental of traditional tuxedos and the extra accessories for the wedding party?

3. What is the additional cost to rent the extra accessories for the wedding party?

2. Is there a certain time of the year that Gingiss offers discounts? If so, how much is the discount? Why do you think that Gingiss offers discounts at this time?

3. What is the busiest month of the year for the Gingiss tuxedo store? Why do you think this is the busiest month?

## Activity #7
## Going, Going, Gone

**Area:** Measurement/Problem Solving
**Goal:** For students to use measuring and problem solving skills to solve a real life problem.
**Materials:** Recording Sheet, pen or pencil, centimeter ruler, stopwatch

**Procedure:** In the front entrance there is a set of stairs leading to the second level of the mall. Measure the height of one step to the nearest centimeter. Determine the total number of steps to the top of the stairway. Calculate the height of the second floor from the first floor to the nearest centimeter. Proceed to the escalator. Use your stopwatch to time how long it takes to ride the escalator from the second floor to the first floor (to the nearest second). Repeat the timing procedure four more times. Calculate the average time (to the nearest second). Use the vertical height of the second floor from the first floor and your average time for the escalator to calculate the vertical speed of the escalator to the nearest centimeter per second.

**Recording Sheet:**

| | |
|---|---|
| Height of One Step | centimeters |
| Number of Steps | |
| Vertical Height | centimeters |
| Time Trial 1 | seconds |
| Time Trial 2 | seconds |
| Time Trial 3 | seconds |
| Time Trial 4 | seconds |
| Time Trial 5 | seconds |
| Average Time | seconds |
| Vertical Speed of Escalator | centimeters per second |

**Questions:**
#1. How could you calculate the horizontal speed of the escalator? The diagonal speed?

## Activity #8
## Health Walk

**Areas:** Measurement and Problem Solving
**Goal:** For students to use measuring and problem solving skills to solve a real life problem.
**Materials:** Measuring tape, recording sheet, pencil or pen

**Procedure:** Many people use the mall for health walks. Assume that mall patrons wanted to walk a total of 2 kilometers. Assume that the walking path is rectangular. The walking path begins on the set of white tile strip by the floor divider in front of the entrance to the washrooms and the mall office. Follow the inner white tile strip through the mall hall passing Gingiss, The Apple Attic, Sports Fanatics and Nite Life Boutique. When you reach the end of the elevator on your right you will notice two sets of four brown tiles. Turn left at the second set of four brown tiles and walk across the hall. When you reach the inner white tile strip turn left and walk back towards the mall entrance. On the your right you will pass Mr. Bulky's and Bravo Hair Stylists. Proceed until you reach the mall floor divider and turn left at the set of four brown tiles and go back to starting point. Find the total distance that you walk in one trip (to the nearest meter). How many complete trips around this path would the mall patrons have to walk to reach their target of 2 kilometers (2000 meters)?

**Recording Sheet:**
Distance around the path once (nearest meter) _____
Number of complete trips for 2 kilometer (2000 meters) _____

**Question:**
1. Design a flyer to attract the community to walk at the mall. Include information to motivate the community to use the mall other than shopping.

## Activity #9
## Cash Back for Schools

**Area:** Graphing
**Goal:** (1) For students to be able to analyze a bar graph.
(2) For students to be able to construct a pictograph.
**Materials:** Pencil or pen, recording sheet, graph at mall, stickers, scissors

**Procedure:** Go to the cash back for school receipt box in front of Mr. Bulky's. Identify the schools that participate in the program. List them in the table provided. Next within your group design a picture graph that would give a different representation of the points earned (each picture represents 15,000 points).

**Recording Sheet:**

| Name of School | Points earned |
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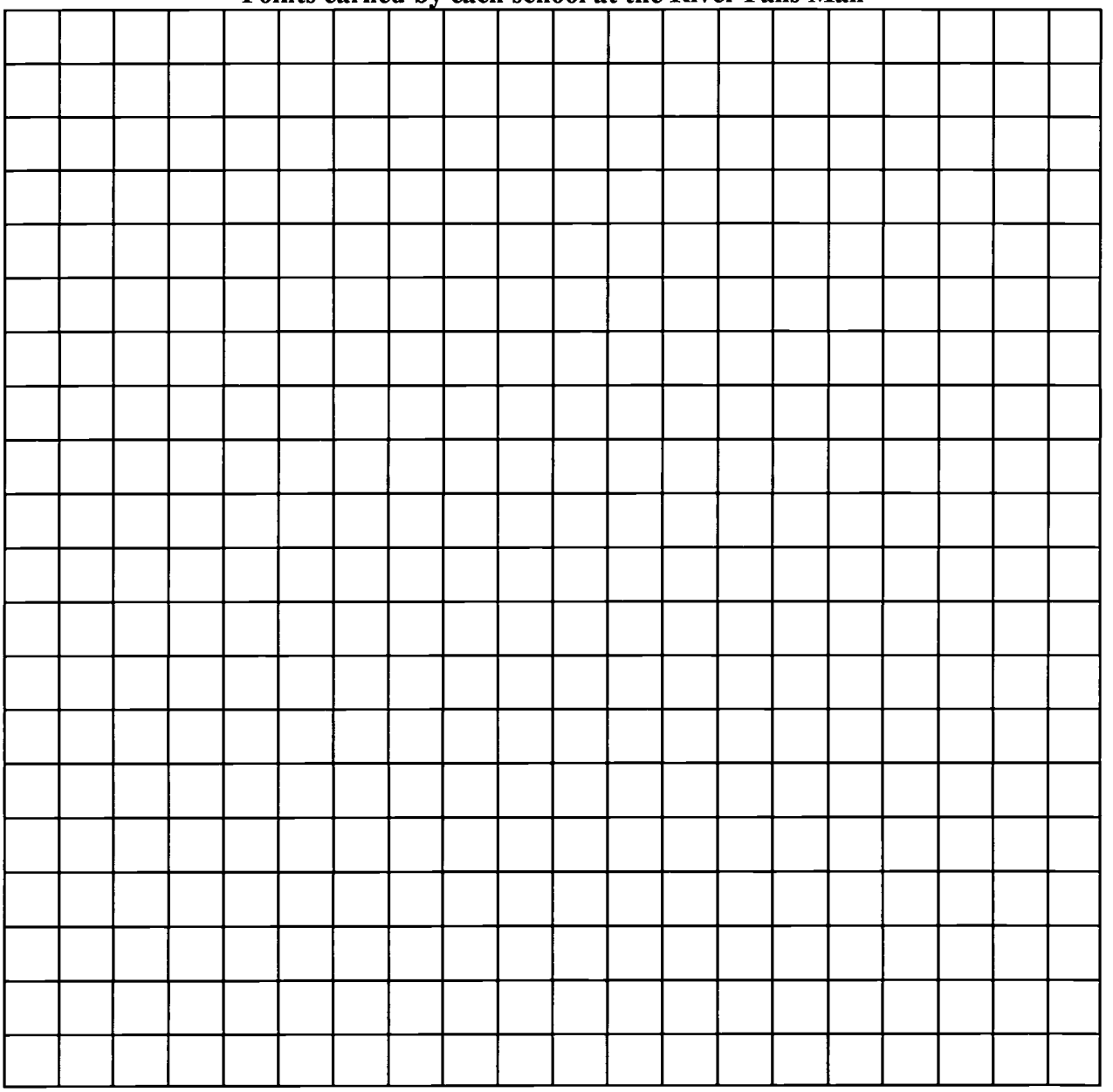
**Points earned by each school at the River Falls Mall**



**Questions:**

1. Which school(s) has received the most points?

2. Which school(s) has received the least points?

3. Compare the points earned from Lillian Emery and the points earned from Slate Run Elementary. Which school has the most points? How did you determine this?

4. How many different schools are shown on the graph as receiving points?

5. How many schools do you think have at least some points? Why do you think this?

6. Compare the points earned from Clarksville High School and New Albany High School. Which school has the most points? Why do you think one school has earned more points than the other?

7. If you were a principal of a school what types of activities would you organize to encourage the parents to participate in the mall points program?

## Activity #10
## Shop 'Til You Drop

**Area:** Problem Solving
**Goal:** For students to learn the benefits of value shopping
**Materials:** Ledger sheet, pencil or pen, calculator

**Procedure:** Your ledger will have a beginning balance of $200. Using all of the stores in the mall, try to buy as many practical items as possible without going over your $200. All group members must agree to purchase the item. List each item and its price on your ledger. Be sure to subtract each total price from your existing balance. Your "shopping spree" should end with the purchase of a lunch in the upstairs food court. Be sure to save enough of your $200 to include a well balanced lunch.

**Recording Sheet:**

| Purchase | Price | 5% Sales Tax | Total Cost | Balance ($200) |
|---|---|---|---|---|
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# Math Trail 4

Activities 1 and 2 are in the entire hall area of your math trail.
Activity 10 takes in the entire River Falls Mall and this activity is to be completed last.
The locations of the other activities are indicated by the numbers in the diagram below.

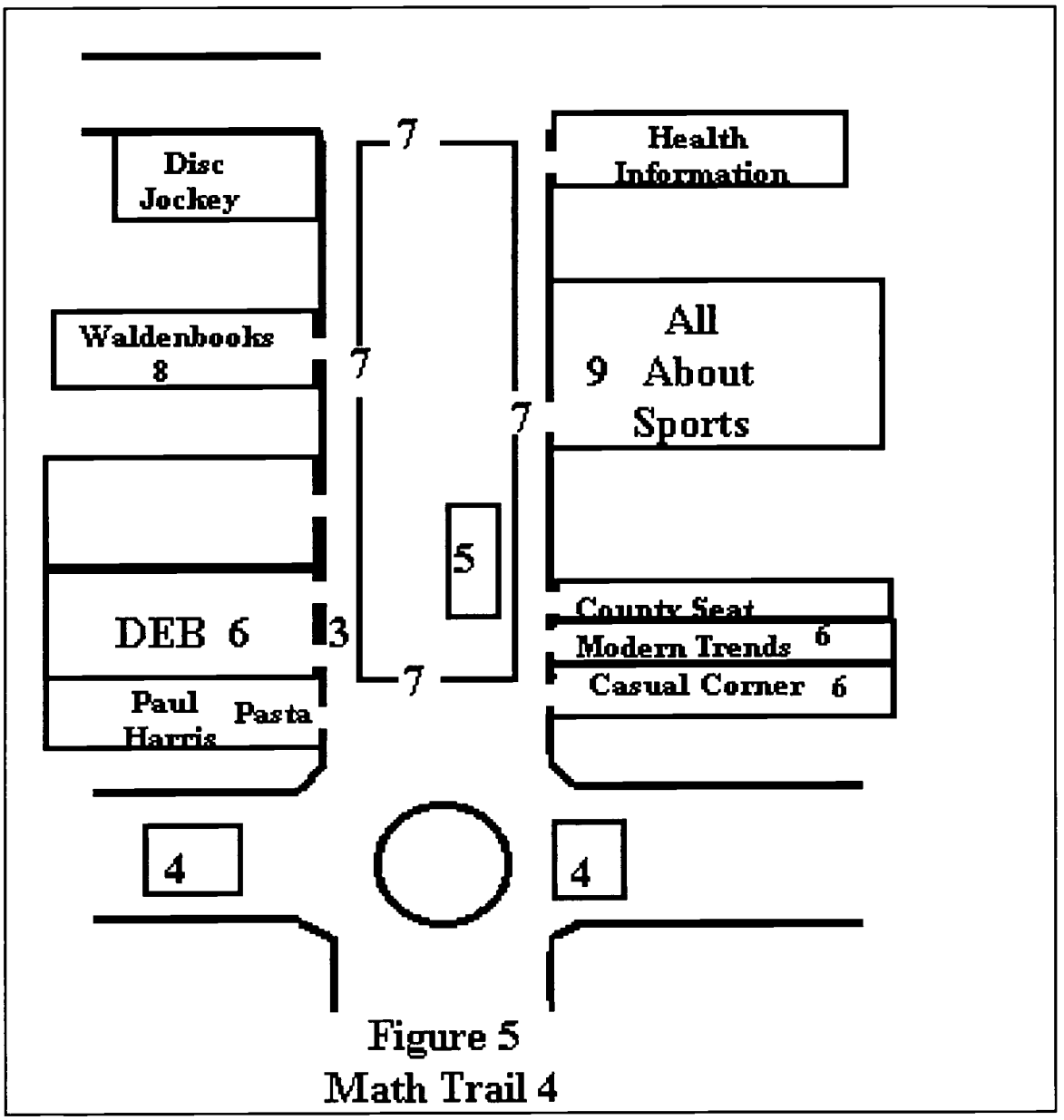


Figure 5
Math Trail 4

**Activity #1**
**Bench Sit**

**Areas:** Problem Solving
**Goal:** For students to use problem solving skills to solve a given problem.
**Materials:** Recording sheet, pencil or pen

**Procedure:** Find one of the benches in your trail section of the mall. By sitting on the bench determine how many people can sit comfortably on the bench. How much seating capacity is in your math trail section of the mall?

**Recording Sheet:**

Number of people that can sit on one bench _____
Number of benches in your math trail _____
Total seating capacity in your section of the mall _____

**Questions**:

1. What factors do you think affect the mall manager's decision in placing benches in different sections of the mall?

**Activity #2**
**Shape Hunt**

**Area:** Geometry
**Goal:** For the students to identify geometrical shapes.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Using the entire area of your trail find and identify the location of each of the following shapes (area includes hallway between Disc Jockey To Center Stage). If you find additional shapes not listed, add them to the bottom of the list. If you do not know the name of the shape, either count the number of sides and add it to the list or make a sketch in the space provided. Don't forget to record the location where you found each shape.

**Recording Sheet:**

| Name of Shape | Location of Shape |
|---|---|
| Square | |
| Circle | |
| Heart shaped curve | |
| Cylinder | |
| Hexagon | |
| Hexagonal prism | |
| Hexagonal pyramid | |
| Octagonal prism | |
| Scalene triangle | |
| Semi-circle | |
| Sphere | |
| Pentagon | |
| Square prism | |
| Rectangular prism | |
| Arc | |
| Trapezoid | |

| Other Shapes | Location |
|---|---|
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Use this space to sketch any unknown shapes.

## Activity #3
## Finding Your Way

**Area:** Coordinate Geometry
**Goal:** For the students to locate a destination by following coordinate directions.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Start by the set of four brown tiles closest to the first entrance to DEB as you walk towards Wal-Mart. Stand on the first brown tile and face County Seat. Walk forward 15 tiles. Make a 90 degree left turn. Walk forward 52 tiles. Now make a 90 degree right turn. Walk forward 20 more tiles. Make a 90 degree left turn. Walk forward 22 tiles. Make a 90 degree right turn. Walk forward 25 tiles. Where are you located now? Now design a set of directions (minimum of five) for a member of your group. Have the member of your group start at a location of your choice. Give suitable directions for the member of your group to end at a location of your choice.

**Recording Sheet:**

| Direction | Specific Instruction |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | |
| 14 | |

## Activity #4
## Up, Up, and Away

**Area:** Measurement/Problem Solving
**Goal:** For students to use measuring and problem solving skills to solve a real life problem.
**Materials:** Recording Sheet, pen or pencil, centimeter ruler, stopwatch

**Procedure:** In front of Bacon's near Kirlin's Hallmark store there is a set of stairs leading to the second level of the mall. Measure the height of one step to the nearest centimeter. Determine the total number of steps to the top of the stairway. Calculate the height of the second floor from the first floor to the nearest centimeter. Walk to the elevator. Use your stopwatch to time how long it takes to ride the elevator from the second floor to the first floor (to the nearest second). Repeat the timing procedure four more times. Calculate the average time (to the nearest second). Use the vertical height of the second floor from the first floor and your average time for the elevator to calculate the vertical speed of the elevator to the nearest centimeter per second.

**Recording Sheet:**

| | |
|---|---|
| Height of One Step | centimeters |
| Number of Steps | |
| Vertical Height | centimeters |
| Time Trial 1 | seconds |
| Time Trial 2 | seconds |
| Time Trial 3 | seconds |
| Time Trial 4 | seconds |
| Time Trial 5 | seconds |
| Average Time | seconds |
| Vertical Speed of Elevator | centimeters per second |

**Activity #5**
**Tiles, Tiles, Tiles, and More Tiles**

**Area:** Measurement and Problem Solving
**Goal:** (1)For students to understand the concept of area
(2)For students to apply the problem solving process to find the solution to a problem.
**Materials:** Recording paper, pen or pencil

**Procedure:** By the **Foto Fantasy Photobooth** (Modern Trends to your right and Paul Harris to your left) there is a section of floor that is tiled white and brown. Figure out how many tiles altogether are on this section of the floor. Explain how you figured out your answer. What is the total area (in tiles) of this section of the floor? How many white tiles are there on this section of the floor? How many brown tiles are on this section of the floor? What is the largest square you can make using just the white tiles?

**Recording Sheet:**

Total Number of Tiles on the Floor: _____
Number of White Tiles: _____
Number of Brown Tiles: _____
Area of Section of Floor (in Tiles) _____

Diagram of largest Square:

## Activity #6
## Salary Size-Up

**Area:** Problem Solving
**Goal:** For students to use problem solving skills to compare employment compensation at different stores.
**Materials:** Recording sheet, pen or pencil, calculator

**Procedure:** Proceed to the Pasta store and ask the manager how much money a beginning sales clerk would make per hour. Also ask the manager if they would receive any salary increases during the first year. Record the starting hourly wage, each increase in hourly wage, the length of time that you needed to work at Pasta to receive the increase, and the resulting new hourly wage on your recording sheet. Get the same information from Deb and Casual Corner. Record your findings on your recording sheet. Multiply each hourly wage by 40 hours to determine your gross salary for one week at each store for each different hourly wage.

**Recording Sheet:**

| Store | Length of Employment (Months) | Hourly Wage Increase | Hourly Wage | Weekly Hours Worked | Gross Salary |
|---|---|---|---|---|---|
| Pasta | 0 | $0.00 | | 40 | |
| Pasta | | | | 40 | |
| Pasta | | | | 40 | |
| Pasta | | | | 40 | |
| Deb | 0 | $0.00 | | 40 | |
| Deb | | | | 40 | |
| Deb | | | | 40 | |
| Deb | | | | 40 | |
| Casual Corner | 0 | $0.00 | | 40 | |
| Casual Corner | | | | 40 | |
| Casual Corner | | | | 40 | |
| Casual Corner | | | | 40 | |

**Questions:**

1. When you first start working at the stores, in which store would you make the most money per week (gross salary)? What is the difference in gross salary between the store that has the highest weekly gross salary and the lowest weekly gross salary?

2. In which store would you receive the largest increase in salary during your first year of employment? How much was this increase?

3. Do any of the three stores have other work incentives like commission sales, medical plans, etc? Would these extra work incentives affect your choice of store for employment?

## Activity #7
## Health Walk

**Areas:** Measurement and Problem Solving
**Goal:** For students to use measuring and problem solving skills to solve a real life problem.
**Materials:** Measuring tape, recording sheet, pencil or pen

**Procedure:** Many people use the mall for health walks. Assume that mall patrons wanted to walk a total of 2 kilometers. Assume that the walking path is rectangular. The walking path begins at the set of four brown tiles in front of Modern Trends that is the start of a set of white tiles that proceed the length of the mall hall. Follow the inner white tile strip through the mall hall passing Casual Corner, Good News Inspirations, Inc., Radio Shack, and Health Information Center on your right. When you reach the end of Health Information Center you will notice three sets of four brown tiles. Turn left at the third set of four brown tiles and walk across the hall towards Disc Jockey music store. When you reach the inner white tile strip, turn left and walk back towards the mall center. On your right you will pass Disc Jockey. Proceed to the end of the white tile strip (in front of Paul Harris). Turn left at the set four brown tiles and go back to the starting point. Find the total distance that you walk in one trip (to the nearest meter). How many complete trips around this path would the mall patrons have to walk to reach their target of 2 kilometers (2000 meters)?

**Recording Sheet:**
Distance around the path once (nearest meter) _____
Number of complete trips for 2 kilometer (2000 meters) _____

**Question:**
1. Design a flyer that would attract the community to walk at the mall. Include information that would motivate the community to use the mall not only for shopping.

## Activity #8
## Reader's Paradise

**Area:** Estimation
**Goal:** For students to use holistic estimation skills to guess a specified quantity.
**Materials:** Recording sheet, pencil or pen, calculator

**Procedure:** Proceed to Waldenbooks bookstore. Stand back approximately three feet and as a group agree on an estimate for the number of books that are in the new fiction section (first bookshelf on your left as you enter Waldenbooks). Record your estimation on the recording sheet. Now count the actual number of books on the shelf and record this on your recording sheet. Now go to the back of Waldenbooks and locate the bookshelf containing Test Prep/Language. Stand back approximately three feet and as a group agree on an estimate for the number of books that are in the Test Prep/Language. Record your estimation on the recording sheet. Now count the actual number of books on the shelf and record this on your recording sheet. Calculate the actual and percentage difference between your estimates and the actual numbers.

**Recording Sheet:**

**Estimate 1**

Group agreed estimate new fiction section _____
Actual number new fiction section _____
Difference between estimate and actual _____
Percentage difference between estimate and actual _____

**Estimate 2**

Group agreed estimate Test Prep/Language section _____
Actual number Test Prep/Language section _____
Difference between estimate and actual _____
Percentage difference between estimate and actual _____

**Question**

1. Was the group agreed estimate for Test Prep/Language closer to the actual number for Test Prep/Language than the group agreed estimate for new fiction to the actual number for new fiction? If so, why do you think your second estimate was closer to the actual number?

**Activity #9**
**Sneaker Heaven**

**Area:** Graphs
**Goal:** For the students to collect data and create a bar graph.
**Materials:** Pencil or pen, recording sheet, crayons or leads, graph paper

**Procedure:**
Go in All About Sports and observe both the men's athletic shoes and the women's athletic shoes. (Examples: basketball, running, cross trainers). List the different types of men's athletic shoes and women's athletic shoes on the recording sheet. Count the number of different styles of each type. Record this information on the recording sheet. Use a bar graph to graph the number of each style of the different types of men's athletic shoes and women's athletic shoes.

**Recording Sheet:**

| Type of Athletic Shoe | Number of different styles - Men's | Number of different styles - Women's |
|---|---|---|
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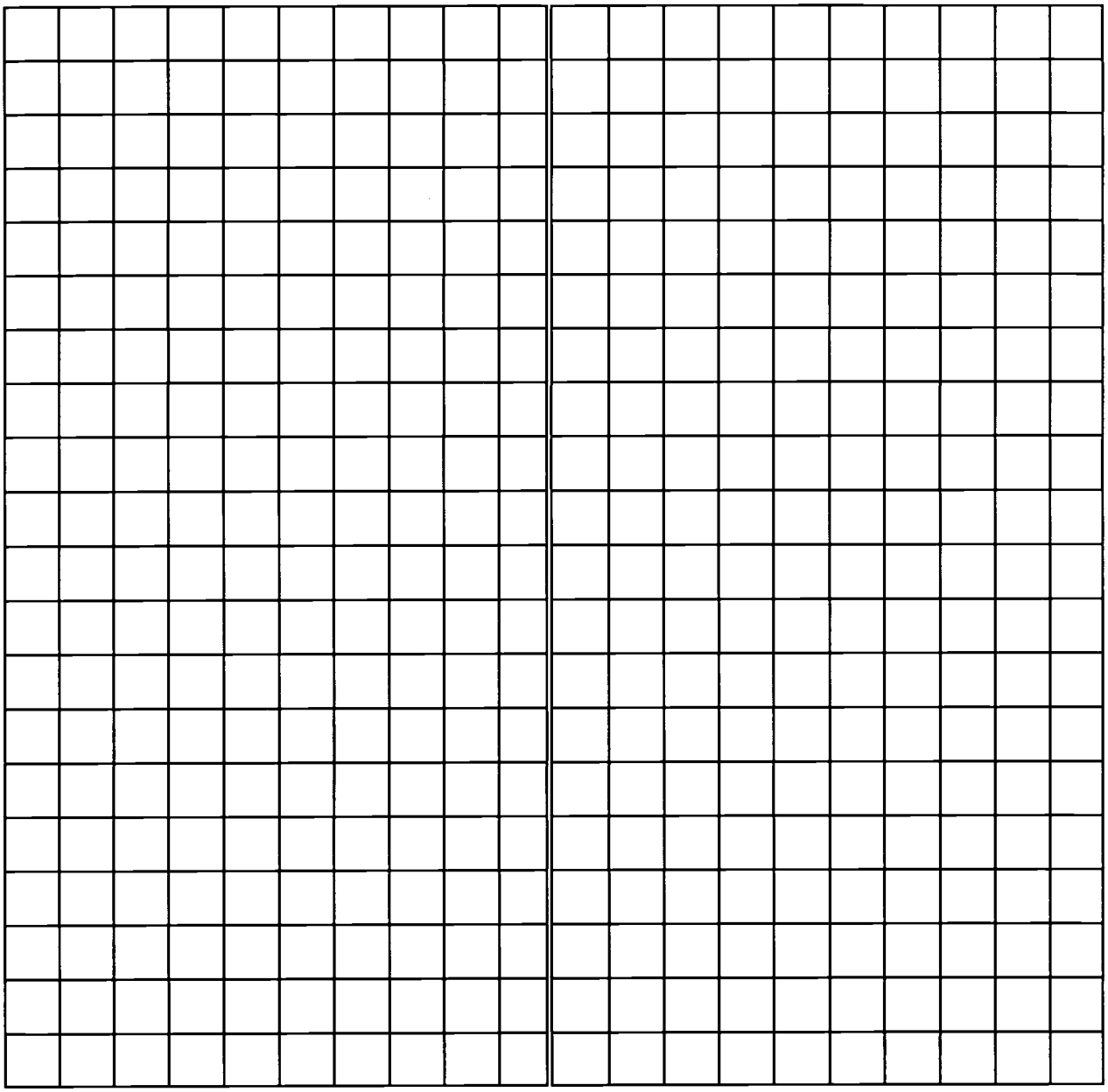
**Number of each style of the different types of athletic shoes**

**Men's** **Women's**



**Questions:**

#1. Which type of men's athletic shoe has the most different types? How many? Women's? How many?

#2. Which type of women's athletic shoe had the least different types? How many? Men's? How many?

#3. What is the difference between the men's athletic shoe with the most different types and the mens athletic shoe with the least different types? Women's?

#4. How many different types of women's athletic shoes are there in total? Men's?

## Activity #10
## Shop 'Til You Drop

**Area:** Problem Solving
**Goal:** For students to learn the benefits of value shopping
**Materials:** Ledger sheet, pencil or pen, calculator

**Procedure:** Your ledger will have a beginning balance of $200. Using all of the stores in the mall, try to buy as many practical items as possible without going over your $200. All group members must agree to purchase the item. List each item and its price on your ledger. Be sure to subtract each total price from your existing balance. Your "shopping spree" should end with the purchase of a lunch in the upstairs food court. Be sure to save enough of your $200 to include a well balanced lunch.

**Recording Sheet:**

| Purchase | Price | 5% Sales Tax | Total Cost | Balance ($200) |
|---|---|---|---|---|
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# Math Trail 5

Activities 1 and 2 are in the entire hall area of your math trail.
Activity 10 takes in the entire River Falls Mall and this activity is to be completed last.
The locations of the other activities are indicated by the numbers in the diagram below.

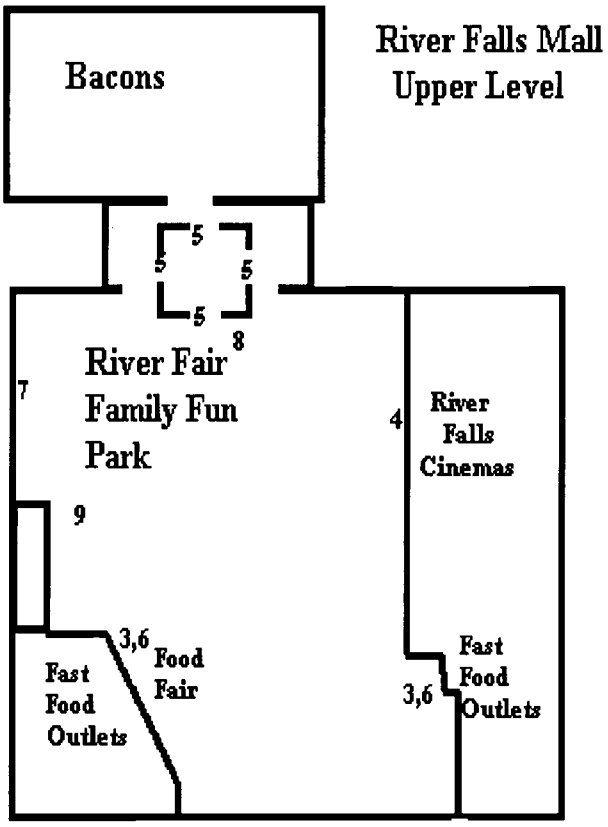


**Figure 6**
**Math Trail 5**

**Activity #1**
**Bench Sit**

**Areas:** Problem Solving
**Goal:** For students to use problem solving skills to solve a given problem.
**Materials:** Recording sheet, pen or pencil

**Procedure:** Find one of the mall benches in your trail section of the mall (not the benches at the fast food restaurants). By sitting on the bench determine how many people can sit comfortably on the bench. How much seating capacity (mall benches only) is in your math trail section of the mall?

**Recording Sheet:**

Number of people that can sit on one bench _____
Number of mall benches in your math trail _____
Total seating capacity in your section of the mall _____

**Questions**:

1. What factors do you think affect the mall manager's decision in placing benches in different sections of the mall?

## Activity #2
## Shape Hunt

**Area:** Geometry
**Objective:** Students will identify geometrical shapes.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Using the entire area of your trial find and identify the location of each of the following shapes (2nd level- fun park, food court, and cinemas). If you find additional shapes not listed, add them to the bottom of the list. If you do not know the name of the shape count the number of sides and add it to the list or you may sketch it in the space provided. Don't forget to record the location where you found each shape.

**Recording Sheet:**

| Name of Shape | Location of Shape |
|---|---|
| Equilateral triangle | |
| Isosceles triangle | |
| Scalene triangle | |
| Rectangular prism | |
| Square prism | |
| Square pyramid | |
| Parallelogram | |
| Pentagon | |
| Triangular prism | |
| Hexagonal prism | |
| Rhombus | |
| Heart shaped curve | |
| Cylinder | |
| Sphere | |
| Cone | |
| Semi-circle | |
| Oval | |
| Arc | |

| Other Shapes | Location |
|---|---|
| | |
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Use this space to sketch any unknown shapes.

## Activity #3
## Who Eats Lunch

**Area:** Graph
**Goal:** For the students to collect data and create a bar graph.
**Materials:** Paper, recording sheet, stop watch, pencil or pen, crayons or leads

**Procedure:** Have a seat in the food court, making sure you are able to see each of the fast food restaurants. Observe where the people choose to buy their food. Keep a running tally of how many people purchase food at each place. Observe the fast food restaurants for 10 minutes. At the end of 10 minutes add up the total for each food business. At the end of the morning get the results from the other groups. Total your results together for a grand total. Now create a bar graph using the grand total for the morning.

**Recording Sheet for your 10 minute observation:**

| Restaurant | Number of People buying Food at Restaurant |
|---|---|
| Gold Star Chili | |
| Lallo's Pizza | |
| Steak Escape | |
| Tumbleweed | |
| Manchu Wok | |
| Arby's | |
| Subway | |
| Woody's Famous Burgers | |

**Recording Sheet for entire morning:**

| Restaurant | Number of People buying Food at Restaurant |
|---|---|
| Gold Star Chile | |
| Lallo's Pizza | |
| Tumbleweed | |
| Manchu Wok | |
| Arby's | |
| Subway | |
| Woody's Famous Burgers | |

**Number of people purchasing meals at the different fast food outlets**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
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**Questions:**

1. Which fast food restaurant was the favorite this morning?

2. How many people purchased food at the River Fair Food Court during your ten minute survey? During the whole morning?

3. What factors do you think affect a person's decision to purchase food at a particular fast food restaurant?

4. If you were manager at one of the fast food restaurants what types of promotions would you use to attract customers?

**Activity #4**
**Lights, Camera, Action!**

**Area:** Problem Solving
**Goal:** For students to use problem solving skills to solve a given problem..
**Materials:** Recording sheet, pen or pencil, calculator

**Procedure:** Go to the River Falls Cinemas. Note the prices that the cinemas charge for the movies for people of different ages and the specific time of day. Use the recording sheet to calculate the total cost for the family listed to attend the movies (1) during the day and (2) during the evening.

**Recording Sheet:**

| Family Member | Daytime Price | Evening Price(after 6:00) |
|---|---|---|
| Father | | |
| Mother | | |
| Brother (under two years old) | | |
| Sister (five years old) | | |
| Grandmother (senior citizen) | | |
| Yourself | | |
| Total Price | | |

**Questions:**
1. What is the price difference for the family between attending the movies during the day and during the evening?

2. Why do you think the movie theater charges more for movies after 6:00 p.m.?

## Activity #5
## Health Walk

**Areas:** Measurement and Problem Solving
**Goal:** For students to use measuring and problem solving skills to solve a real life problem.
**Materials:** Measuring tape, recording sheet, pencil or pen

**Procedure:** Many people use the mall for health walks. Assume that mall patrons wanted to walk a total of 2 kilometers. Assume that the walking path is rectangular. The walking path is to walk around the rectangular opening on the second floor by the escalator in front of Bacons. Find the total distance you walk in one trip (to the nearest meter). How many complete trips around this path would the mall patrons have to walk to reach their target of 2 kilometers (2000 meters)?

**Recording Sheet:**
Distance around the path once (nearest meter) _____
Number of complete trips for 2 kilometer (2000 meters) _____

**Question:**
1. Design a flyer that would attract the community to walk at the mall. Include information that would motivate the community to use the mall not only for shopping.

**Activity #6**
**Burger Round-up**

**Area:** Problem Solving
**Goal:** For students to calculate savings when buying combos at fast food restaurants.
**Materials:** Ledger sheet, pencil or pen, calculator

**Procedure:** Go to each of the fast food restaurants listed in the recording sheet. Record the price of the combo listed for each fast food restaurant and then find the individual prices of each of the items that are in the combo. Calculate the savings you get by buying the food as a combo.

**Recording Sheet:**

| Restaurant Combo | Combo Price | Combo Item#1 Price | Combo Item#2 Price | Combo Item#3 Price | Combo Item#4 Price | Total Cost Individual Items | Savings |
|---|---|---|---|---|---|---|---|
| Arbys - Regular Roast Beef | | | | | | | |
| Steak Escape - Original Combo | | | | | | | |
| Lallo's Pizza - Pizza Combo | | | | | | | |
| Gold Star Chili - Combo #2 | | | | | | | |
| Subway - 6 inch Turkey Combo | | | | | | | |
| Woody's - Woody's Combo | | | | | | | |

**Questions**:
#1. In which fast food restaurant did you save the most money by buying the combo? The least?

#2. Why do you think that fast food restaurants offer combos?

## Activity #7
## Tiles, Tiles, Tiles, and More Tiles

**Area:** Measurement and Problem Solving

**Goal:** (1)For students to understand that the concept of area
(2)For students to apply the problem solving process to find the solution to a problem.

**Materials:** Recording sheet, pen or pencil

**Procedure:** Go to the bumper cars in the fun park. Figure out how many mirror tiles altogether are on the slanted section of the wall behind the bumper cars. Explain how you figured out your answer. What is the total area (in tiles) of this section of the wall? How many diamond shapes are on this section of the wall? What is the largest square that you could make with these many diamond shapes?

**Recording Sheet:**

Total Number of Tiles on the wall: _____

Number of diamond shapes: _____

Diagram of largest square:

## Activity #8
## Finding Your Way

**Area:** Coordinate Geometry
**Goal:** For the students to locate a destination by following coordinate directions.
**Materials:** Pencil or pen, recording sheet

**Procedure:** Start at the brown tile on the left at the top of the stairs by the escalator. Face the elevator. Walk forward 10 tiles. Make a 90 degree left turn. Walk forward 30 tiles. Now make a 90 degree right turn. Walk forward 20 more tiles. Make a 90 degree left turn. Walk forward 19 tiles. Where are you located now? Now design a set of directions (minimum of five) for a member of your group. Have the member of your group start at the location of your choice. Give suitable directions for the member of your group to end at a location of your choice.

**Recording Sheet:**

| Direction | Specific Instruction |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
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**Activity #9**
**Play Golf**

**Area:** Problem Solving
**Goal:** For the students to calculate potential profit in a business venture.
**Materials:** Golf club, golf ball, pencil or pen, recording sheet, calculator

**Procedure:** Go to the booth located in front of the golf area. Each person needs to get a golf ball and a golf club. Proceed to the golf course. One half of the group play holes 1 to 9 and the other half of the group play holes 10 to 18. Record the time (in seconds) that it takes each person to play each hole (each person completes the hole in turn). Repeat this recording through the nine holes that you play. Record each person's time at each hole in the recording sheet below. Calculate the average time per hole. Calculate how long it would take one person to complete 18 holes.

**Recording Sheet**

| Time | Player 1 | Player 2 | Player 3 | Average Time |
|---|---|---|---|---|
| Hole 1 | | | | |
| Hole 2 | | | | |
| Hole 3 | | | | |
| Hole 4 | | | | |
| Hole 5 | | | | |
| Hole 6 | | | | |
| Hole 7 | | | | |
| Hole 8 | | | | |
| Hole 9 | | | | |
| Hole 10 | | | | |
| Hole 11 | | | | |
| Hole 12 | | | | |
| Hole 13 | | | | |
| Hole 14 | | | | |
| Hole 15 | | | | |
| Hole 16 | | | | |
| Hole 17 | | | | |
| Hole 18 | | | | |

**Questions:**

1. What is the average time required for one person to complete all 18 holes?

2. Based on your answer to #1, how many people can play 18 holes of golf in one hour?

3. How much does it cost to play a round of golf on Monday? If the maximum number of people in one hour are playing on Monday then how much money can the mall take in on the golf course in one hour?

4. How much does it cost to play on Saturday? If a family of 6 goes to the mall to play golf on Saturday then how much will it cost the family to play golf? How long will it take the family to play one game?

## Activity #10
## Shop 'Til You Drop

**Area:** Problem Solving
**Goal:** For students to learn the benefits of value shopping
**Materials:** Ledger sheet, pencil or pen, calculator

**Procedure:** Your ledger will have a beginning balance of $200. Using all of the stores in the mall, try to buy as many practical items as possible without going over your $200. All group members must agree to purchase the item. List each item and its price on your ledger. Be sure to subtract each total price from your existing balance. Your "shopping spree" should end with the purchase of a lunch in the upstairs food court. Be sure to save enough of your $200 to include a well balanced lunch.

**Recording Sheet:**

| Purchase | Price | 5% Sales Tax | Total Cost | Balance ($200) |
|---|---|---|---|---|
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