Paths to Problem Solving
Student Journal

Name_____________________________________

hand2mind 76354 (1)

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Let’s Take a Walk Through the Student Journal

This is your book, and this is how you can use it.

Read the problem. Think about what it’s telling you.

The word LAUNCH means “to get going.” That’s what the Discovery Questions help you to do. Answer the questions after you read the problem and you will be on your way to solving it!

The word EXPLORE means “to search for answers.” That’s what you do once you understand the problem.

The word STRATEGY means “action plan.” Your first job is to think of a strategy—or action plan—you can use. You can choose any one of them. Or you can use more than one. Or you can use a strategy of your own! It’s up to you!

The word WORKBENCH means “a sturdy table where work is done.” The Student Journal is your workbench where you work on the answer to the problem. This is where you test your strategy and show your work. You may choose another strategy if your first choice doesn’t work. When you find the answer, you write it in a complete sentence at the bottom of your workbench work space.

The word SUMMARIZE means “to explain what you did in a brief way.” Think about how you solved the problem and answer the Looking Back questions. Your answers will be a summary of what you did. You can talk about your thinking to someone else and see how others have thought through the problem.
Know Your Problem-Solving Strategies!
Understanding the Problem

If I understand the problem, I can find a strategy to solve it.

Look for a Pattern
I can find things that happen over and over again. I can look for things that are the same.

Make a Model
I can understand how something works. I can make connections.

Make a Table
I can organize my findings. I can look for a pattern. I can find missing information.

Act It Out
I can see how things happen in the problem. I can see relationships.

Make or Use a Graph
I can organize my work. I can see relationships.

Solve a Simpler Problem
I can find a “rule” that I can apply to solve the problem.

Work Backwards
If I know the result, I can undo it to find out what happened first.

If I don’t understand the problem, I can ask myself these questions.

Discovery Questions
✓ What do I know?
✓ What do I want to find out?
✓ Do I need more information?
✓ Is there information I don’t need?
✓ Can I make an estimate or a prediction?

Make a Drawing or Diagram
I can see what the problem looks like. I can find patterns.

Guess and Check
I can experiment with possible solutions. I can look for reasonable answers.

Make an Organized List
I can see what I know and what I need to find out.

Account for All Possibilities
I can see which answers fit the problem.
Building a New Deck

Justin is helping his dad build steps for their new deck. They are stacking blocks to make the steps. This is how to stack the blocks for 1 step, for 2 steps, and for 3 steps. How many blocks will it take to build 10 steps?

Discovery Questions

1. What do I know? 

2. What do I want to find out? 

3. Do I need more information? 

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction? 

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? 
2. Did your estimate or prediction help you?
   Why or why not? 
3. What have you learned? 
4. Could you use any other strategies to solve the problem? If yes, what are they? 
5. Explain your thinking to someone else.
Problem: Growing a Nose

Pinocchio had a habit of telling lies. Each time he told a lie, his nose grew. One morning, Pinocchio decided to see just how long he could make his nose grow. He measured his nose and found that it was 2 inches long. Then he yelled out, “Dogs make the best brain surgeons!” His nose grew 3 inches! He shouted, “Chocolate is the best toothpaste!” Again, his nose grew 3 inches longer. He stood on the table and hollered, “Going to school makes you dumb!” Out went his nose another 3 inches! How long was Pinocchio’s nose after he told 15 lies?

Discovery Questions

1. What do I know? ______________________
2. What do I want to find out? ______________
3. Do I need more information? _____________
4. Is there information I don’t need? If so, I will cross it out of the problem.
5. Can I make an estimate or a prediction?

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ____________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? __________
2. Did your estimate or prediction help you?
   Why or why not? ____________________________
   ____________________________
3. What have you learned? ____________________
   ____________________________
   ____________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ____________________________
   ____________________________
5. Explain your thinking to someone else.
   ____________________________
   ____________________________
Activity 3

Problem
Dashing Around
Juan, Marcus, Luisa, Bobby, and Cathy ran in the 400 meter dash at the school track meet. Juan came in first. Marcus came in last. Luisa was ahead of Cathy. Bobby was just behind Luisa. Who finished second?

Discovery Questions
1. What do I know? ______________________
2. What do I want to find out? ______________
3. Do I need more information? ____________
4. Is there information I don’t need? If so, I will cross it out of the problem.
5. Can I make an estimate or a prediction?

Strategies I Can Use
☐ Look for a Pattern
☐ Make a Table
☐ Make a Drawing or Diagram
☐ Make a Model
☐ Guess and Check
☐ Act It Out
☐ Make or Use a Graph
☐ Make an Organized List
☐ Solve a Simpler Problem
☐ Account for All Possibilities
☐ Work Backwards
☐ Other ________________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? _____
2. Did your estimate or prediction help you?
   Why or why not? _____________________________
   __________________________________________
3. What have you learned? _________________
   __________________________________________
   __________________________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   __________________________________________
   __________________________________________
5. Explain your thinking to someone else.
Problem Box It
Helen works for the Sweetheart Jewelry Company. She needs a rectangular box that can hold exactly 36 silver charms. Each charm is a 1-inch x 1-inch square with an animal on it. The box will hold just 1 layer of charms. What are the possible lengths and widths of the box?

Discovery Questions

1. What do I know? _______________________________________________________________________
2. What do I want to find out? _______________________________________________________________________
3. Do I need more information? _______________________________________________________________________
4. Is there information I don’t need? If so, I will cross it out of the problem.
5. Can I make an estimate or a prediction?

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ____________________________
Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? _____
2. Did your estimate or prediction help you?
   Why or why not? ____________________________
   ____________________________
3. What have you learned? _________________
   ____________________________
   ____________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ____________________________
   ____________________________
5. Explain your thinking to someone else.
Problem: Missing Digits
Miss Filibuster is our math teacher. Today she gave us this division problem, but she forgot to write all of the digits. What are the missing digits?

5□□1
8□□5□8

Discovery Questions

1. What do I know?

2. What do I want to find out?

3. Do I need more information?

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back
1. Does your answer seem reasonable? ______
2. Did your estimate or prediction help you?
   Why or why not? ________________________
   __________________________
3. What have you learned? __________________
   __________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   __________________________
5. Explain your thinking to someone else.
Problem: The Circle Game

Ten students in Marcy’s class are playing a counting game. They sit in a circle and count around the circle. The first person says “1,” the second person says “2,” and so on. They count to 5 and whoever says “5” is out of the game. Then they continue to count around the circle, starting from 1 again. They keep playing until 1 person remains. That person is the winner. Which position wins the game?

Discovery Questions

1. What do I know? ____________________________________________

2. What do I want to find out? ________________________________

3. Do I need more information? ________________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other______________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

1. Does your answer seem reasonable? __________
2. Did your estimate or prediction help you? 
   Why or why not? __________________________________________
3. What have you learned? ____________________________
   __________________________________________
4. Could you use any other strategies to solve the problem? If yes, what are they? 
   __________________________________________
5. Explain your thinking to someone else.
   __________________________________________

Looking Back
Activity 7

Problem: Getting Bigger
In 1980, 2,000 people lived in Carlson City. By 1990, the population had doubled. By 2000, the population had doubled again. If this growth pattern continues, how many people will live in Carlson City in the year 2020? Make a graph to show your results.

Discovery Questions

1. What do I know? ____________________________

2. What do I want to find out? ________________

3. Do I need more information? ________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ____________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

1. Does your answer seem reasonable? ______
2. Did your estimate or prediction help you?
   Why or why not? ____________________________
   ____________________________
3. What have you learned? _________________
   ____________________________
   ____________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ____________________________
   ____________________________
5. Explain your thinking to someone else.
   ____________________________
   ____________________________
   ____________________________
Activity 8

Problem Looking Good

Polly loves clothes. She has a red blouse, a blue sweater, and a gray sweatshirt. She also has black slacks, a black skirt, black sweats, and white shorts. She has sneakers and sandals. How many different outfits can Polly wear?

Discovery Questions

1. What do I know? ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

2. What do I want to find out? _________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

3. Do I need more information? ________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

Strategies I Can Use

☐ Look for a Pattern
☐ Make a Table
☐ Make a Drawing or Diagram
☐ Make a Model
☐ Guess and Check
☐ Act It Out

☐ Make or Use a Graph
☐ Make an Organized List
☐ Solve a Simpler Problem
☐ Account for All Possibilities
☐ Work Backwards
☐ Other ____________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

1. Does your answer seem reasonable? 
2. Did your estimate or prediction help you? Why or why not? 
3. What have you learned? 
4. Could you use any other strategies to solve the problem? If yes, what are they? 
5. Explain your thinking to someone else.

Looking Back

1. Does your answer seem reasonable? 
2. Did your estimate or prediction help you? Why or why not? 
3. What have you learned? 
4. Could you use any other strategies to solve the problem? If yes, what are they? 
5. Explain your thinking to someone else.
The Sandbox

Jane and Jack have a rectangular sandbox in their backyard. Its length is twice as long as its width. If the area of the sandbox is 98 square feet, what is its perimeter?

Discovery Questions

1. What do I know? _______________________________ 3. Do I need more information? ________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________

2. What do I want to find out? ________________
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?
   ____________________________________________
   ____________________________________________
   ____________________________________________
   ____________________________________________

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other__________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? _____
2. Did your estimate or prediction help you?
   Why or why not? ______________________
   ________________________________________________________________________
3. What have you learned? ________________
   ________________________________________________________________________
   ________________________________________________________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ________________________________________________________________________
   ________________________________________________________________________
5. Explain your thinking to someone else.
**Problem**

**Adam Ant-ics**

Adam Ant has a strange habit. He likes to crawl around on the edges of a cube. How many different paths can Adam crawl to get from corner A to corner G along the edges of this cube? He crawls only on the edges of the cube, and he wants to make the shortest possible trip.

### Discovery Questions

1. What do I know? ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

2. What do I want to find out? ________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

3. Do I need more information? _____________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?
   ____________________________
   ____________________________
   ____________________________
   ____________________________

### Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ____________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? ____________

2. Did your estimate or prediction help you?
   Why or why not? ____________________________
   _______________________________________________________________________________

3. What have you learned? ______________________
   _______________________________________________________________________________

4. Could you use any other strategies to solve the problem? If yes, what are they?
   _______________________________________________________________________________

5. Explain your thinking to someone else.
   _______________________________________________________________________________
Problem: Shopping Spree

Last week Carlos bought birthday presents for his family. He bought a sweater for his mom for $15.75. He bought a CD for his brother for $9.99. When Carlos got home, he had $2.28 left. How much money did Carlos have before he went shopping?

Discovery Questions

1. What do I know? ________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

2. What do I want to find out? __________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

3. Do I need more information? ________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other______________________
Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

1. Does your answer seem reasonable? 
2. Did your estimate or prediction help you? Why or why not?
3. What have you learned?
4. Could you use any other strategies to solve the problem? If yes, what are they?
5. Explain your thinking to someone else.

Looking Back

1. Does your answer seem reasonable? _____
2. Did your estimate or prediction help you? Why or why not? 
3. What have you learned? 
4. Could you use any other strategies to solve the problem? If yes, what are they? 
5. Explain your thinking to someone else.
**Problem**

**It Pays to Be Kind**

In the kingdom of Mathland lived a poor farmer. One day he found a horse that had been hurt. The farmer saved the horse’s life. Later, he learned that it was the king’s favorite horse. The king came to thank the farmer and offered him anything in the kingdom. The farmer said he had divided his land into 16 sections. He asked the king to put 1 gold coin in the first section, 2 coins in the second section, 4 coins in the third section, and to continue the sequence until all of the sections were filled. The king thought this was a strange request, but followed the farmer’s wishes. How many coins did the farmer receive?

**Discovery Questions**

1. **What do I know?**

2. **What do I want to find out?**

3. **Do I need more information?**

4. **Is there information I don’t need? If so, I will cross it out of the problem.**

5. **Can I make an estimate or a prediction?**

**Strategies I Can Use**

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ____________________________
Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? ______
2. Did your estimate or prediction help you?
   Why or why not? __________________________
   __________________________
   __________________________
3. What have you learned? __________________________
   __________________________
   __________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   __________________________
   __________________________
   __________________________
5. Explain your thinking to someone else.
Discovery Questions

1. What do I know? ____________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

2. What do I want to find out? ________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

3. Do I need more information? ______________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction? 
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other____________________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable?_____
2. Did your estimate or prediction help you?
   Why or why not?_____________________
   _________________________________
3. What have you learned?_____________________
   _________________________________
   _________________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   _________________________________
   _________________________________
5. Explain your thinking to someone else.
Activity 14

Problem: What Number Am I?

I am a 2-digit number.
I am even.
The sum of my digits is divisible by 7.
I am divisible by 7.
Who am I?

1. What do I know?
2. What do I want to find out?
3. Do I need more information?
4. Is there information I don’t need? If so, I will cross it out of the problem.
5. Can I make an estimate or a prediction?

Discovery Questions

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other__________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

1. Does your answer seem reasonable?_____
2. Did your estimate or prediction help you?
   Why or why not?__________________________
   ________________________________
3. What have you learned? ______________________
   ________________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ________________________________
   ________________________________
5. Explain your thinking to someone else.
Problem: Dinnertime Delight

The Glove family always eats dinner together. They have a round table in their kitchen, and they like to make a game out of who sits where. How many different ways can Mr. and Mrs. Glove and their 2 children sit around the dinner table?

Discovery Questions

1. What do I know? 

2. What do I want to find out?

3. Do I need more information?

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? ______
2. Did your estimate or prediction help you?
   Why or why not? __________________________
   __________________________
3. What have you learned? __________________________
   __________________________

4. Could you use any other strategies to solve the problem? If yes, what are they?
   __________________________
   __________________________

5. Explain your thinking to someone else.
Problem: **Mystery Shapes**

The fourth grade class is making up geometry puzzles. This is the puzzle that Anthony wrote.
I am a polygon.
I have 2 acute angles and 2 obtuse angles.
All of my sides are congruent.
I have 2 lines of symmetry.
What am I?

**Discovery Questions**

1. **What do I know?**
   
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

2. **What do I want to find out?**
   
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

3. **Do I need more information?**
   
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

4. **Is there information I don’t need?** If so, I will cross it out of the problem.

5. **Can I make an estimate or a prediction?**
   
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

**Strategies I Can Use**

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other________________________
Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? 

2. Did your estimate or prediction help you?
   Why or why not?

3. What have you learned?

4. Could you use any other strategies to solve the problem? If yes, what are they?

5. Explain your thinking to someone else.
Activity 17

**Problem: Popcorn**

Linda has $\frac{2}{3}$ of a box of popcorn. Louise has $\frac{9}{12}$ of a box of popcorn. Linda says she has more popcorn. Louise says she has more. Lucy says they both have the same amount. Who is correct? Explain your reasoning.

**Discovery Questions**

1. **What do I know?**
   
   __________________________
   __________________________
   __________________________
   __________________________
   __________________________

2. **What do I want to find out?**
   
   __________________________
   __________________________
   __________________________
   __________________________
   __________________________

3. **Do I need more information?**
   
   __________________________
   __________________________
   __________________________
   __________________________
   __________________________

4. **Is there information I don’t need? If so, I will cross it out of the problem.**

5. **Can I make an estimate or a prediction?**
   
   __________________________
   __________________________
   __________________________
   __________________________
   __________________________

**Strategies I Can Use**

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other __________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? ______
2. Did your estimate or prediction help you?
   Why or why not?__________________________
   ________________________________
3. What have you learned? ________________
   ________________________________
   ________________________________

4. Could you use any other strategies to solve the problem? If yes, what are they?
   ________________________________
   ________________________________

5. Explain your thinking to someone else.
Problem: Rectangle Roundup
How many different rectangles can you find in this drawing?

Discovery Questions

1. What do I know? _________________
   _________________________________
   _________________________________
   _________________________________
   _________________________________
   _________________________________

2. What do I want to find out? ___________
   _________________________________
   _________________________________
   _________________________________
   _________________________________
   _________________________________

3. Do I need more information? ___________
   _________________________________
   _________________________________
   _________________________________
   _________________________________
   _________________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction? 
   _________________________________
   _________________________________
   _________________________________
   _________________________________
   _________________________________

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out

- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ___________________________
Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? ______
2. Did your estimate or prediction help you?
   Why or why not? ______________________
   ______________________
3. What have you learned? ________________
   ______________________
   ______________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ______________________
   ______________________
5. Explain your thinking to someone else.
   ______________________
Problem: Collecting Coins
Jane has pennies, nickels, and dimes in her purse. She has 8 coins altogether. She has fewer nickels than dimes. She has fewer pennies than nickels. How much money could she have?

Discovery Questions

1. What do I know?
   - ________________
   - ________________
   - ________________
   - ________________
   - ________________

2. What do I want to find out?
   - ________________
   - ________________
   - ________________
   - ________________

3. Do I need more information?
   - ________________
   - ________________
   - ________________
   - ________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?
   - ________________
   - ________________

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other______________________
Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable?_____

2. Did your estimate or prediction help you?
   Why or why not?__________________________
   ____________________________

3. What have you learned?____________________
   ____________________________
   ____________________________

4. Could you use any other strategies to solve the problem? If yes, what are they?
   ____________________________
   ____________________________
   ____________________________

5. Explain your thinking to someone else.
**Activity 20**

**Problem**

**Nice Nines**
Tommy is working to memorize his multiplication facts. He knows all of them pretty well, except the nines. They drive him crazy! Martina said she learned the nines when she noticed some patterns. Look at this list of facts for nine and describe all of the patterns you see.

\[
\begin{align*}
9 \times 1 &= 9 \\
9 \times 2 &= 18 \\
9 \times 3 &= 27 \\
9 \times 4 &= 36 \\
9 \times 5 &= 45 \\
9 \times 6 &= 54 \\
9 \times 7 &= 63 \\
9 \times 8 &= 72 \\
9 \times 9 &= 81 \\
9 \times 10 &= 90
\end{align*}
\]

What hints can you give Tommy to help him learn these facts?

1. **What do I know?**

2. **What do I want to find out?**

3. **Do I need more information?**

4. **Is there information I don’t need? If so, I will cross it out of the problem.**

5. **Can I make an estimate or a prediction?**

6. **Strategies I Can Use**

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out

- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other
Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? _____
2. Did your estimate or prediction help you?
   Why or why not? ____________________________
   __________________________________________
3. What have you learned? _________________
   __________________________________________
   __________________________________________

4. Could you use any other strategies to solve the problem? If yes, what are they?
   __________________________________________
   __________________________________________
   __________________________________________

5. Explain your thinking to someone else.
Problem  
**Pizza Pizzazz**

Tony’s Pizza offers pizza lovers many choices. You can get a small pizza or a large pizza. You can get 2 toppings at no extra cost. Your choices are pepperoni, sausage, mushrooms, and extra cheese. You can get your pizza with thin crust or thick crust. How many different pizzas with 2 toppings can you order?

**Discovery Questions**

1. **What do I know?**

2. **What do I want to find out?**

3. **Do I need more information?**

4. **Is there information I don’t need? If so, I will cross it out of the problem.**

5. **Can I make an estimate or a prediction?**

**Strategies I Can Use**

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? _____
2. Did your estimate or prediction help you?
   Why or why not? _______________________
   ________________________________
3. What have you learned? _______________________
   ________________________________
   ________________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ________________________________
   ________________________________
   ________________________________
5. Explain your thinking to someone else.
Cindy’s mean stepsisters love to give her extra work to do! Today she has piles and piles of dishes to wash (and no dishwasher!). Cindy takes 3 minutes to wash 5 dishes. She takes 1 1/2 minutes to dry them. The meanies stacked up 100 dishes for Cindy to wash and dry. How long will it take her to finish the task?

Discovery Questions

1. What do I know? ____________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

2. What do I want to find out? ________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

3. Do I need more information? ______________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ____________________________
**Workbench**

Find the answer. Show your work. Write your answer in a complete sentence.

1. Does your answer seem reasonable? ______
2. Did your estimate or prediction help you? ______
   
   Why or why not? ____________________________________________
   ____________________________________________________________

3. What have you learned? ________________________
   ____________________________________________________________
   ____________________________________________________________

4. Could you use any other strategies to solve the problem? If yes, what are they? ______
   ____________________________________________________________
   ____________________________________________________________

5. Explain your thinking to someone else.
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
How High?

The Sears Tower in Chicago is about 442 meters tall. This includes the antenna on top. How many 2-cm cubes would you need to make a stack as tall as the Sears Tower?

Discovery Questions

1. What do I know?
   -
   -
   -
   -
   -

2. What do I want to find out?
   -
   -
   -
   -
   -

3. Do I need more information?
   -
   -
   -
   -
   -

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?
   -
   -
   -
   -
   -

Strategies I Can Use

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other__________________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable?_____
2. Did your estimate or prediction help you?
   Why or why not?_____________________
   ________________________________
3. What have you learned?______________
   ________________________________
   ________________________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   ________________________________
   ________________________________
   ________________________________
5. Explain your thinking to someone else.
Activity 24

Problem  It’s All in Your Head

Harry’s class is studying multiplication. He says he can do this multiplication problem in his head. Can you find a way to multiply these numbers without writing all the steps? (No calculators allowed!) Explain your thinking.

Problem  $28 \times 7 = ?$

Discovery Questions

1. What do I know? __________________________

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________

2. What do I want to find out? ________________

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________________________________________________________________________

________________________________________________________________________

3. Do I need more information? ______________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Strategies I Can Use

☐ Look for a Pattern
☐ Make a Table
☐ Make a Drawing or Diagram
☐ Make a Model
☐ Guess and Check
☐ Act It Out
☐ Make or Use a Graph
☐ Make an Organized List
☐ Solve a Simpler Problem
☐ Account for All Possibilities
☐ Work Backwards
☐ Other___________________
Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

Looking Back

1. Does your answer seem reasonable? _____
2. Did your estimate or prediction help you?
   Why or why not? _______________________
   _______________________
3. What have you learned? _______________________
   _______________________
4. Could you use any other strategies to solve the problem? If yes, what are they?
   _______________________
   _______________________
5. Explain your thinking to someone else.
Crazy for Berries

Lisa's mom just filled a bowl with big, fat, juicy blueberries. The first time Lisa walked by the bowl, she took 1 blueberry. The second time she walked by the bowl, she took 4 blueberries. The third time she walked by the bowl, she took 7 blueberries. This behavior continued until Lisa had walked by the bowl 10 times. Then the bowl was empty. How many blueberries were in the bowl at the start?

**Discovery Questions**

1. What do I know? ____________________________

2. What do I want to find out? _________________

3. Do I need more information? _______________

4. Is there information I don’t need? If so, I will cross it out of the problem.

5. Can I make an estimate or a prediction?

**Strategies I Can Use**

- Look for a Pattern
- Make a Table
- Make a Drawing or Diagram
- Make a Model
- Guess and Check
- Act It Out
- Make or Use a Graph
- Make an Organized List
- Solve a Simpler Problem
- Account for All Possibilities
- Work Backwards
- Other ________________________________
**Workbench**
Find the answer. Show your work. Write your answer in a complete sentence.

---

**Looking Back**

1. Does your answer seem reasonable?
2. Did your estimate or prediction help you?
   Why or why not?
3. What have you learned?
4. Could you use any other strategies to solve the problem? If yes, what are they?
5. Explain your thinking to someone else.
Making Change

Jane has $1.15 made up of 6 coins. She cannot make change for a dollar, half dollar, quarter, dime, or nickel. What 6 coins does she have?

Workbench
Find the answer. Show your work. Write your answer in a complete sentence.
Problem

**Counting Legs**

In the art room, there are 4-legged tables and 3-legged stools. There are 43 legs altogether in the art room. How many tables and how many stools can there be?

---

**Workbench**

Find the answer. Show your work. Write your answer in a complete sentence.

__________________________

__________________________

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__________________________

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__________________________
Activity 28

Problem

Whisper Down the Lane

The fourth graders at Wilson School are playing whisper down the lane. They are seated in a circle. Student 5 sits directly across from student 16. How many students are playing the game?

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Marta’s father wants to put a fence around the doghouse in the back yard. He gives Marta this riddle to solve: The fence makes the shape of a rectangle. The length is twice as long as the width. The area of the rectangle is 72 square meters. How much fence must I buy?

Find the answer. Show your work. Write your answer in a complete sentence.
Problem: Towering Toothpicks
The Empire State Building in New York City is 1,453 feet 9 inches tall. How many toothpicks, 3 inches long, would it take to reach from the ground to the top of the Empire State Building?

Workbench
Find the answer. Show your work. Write your answer in a complete sentence.
Problem  Dividing Strawberries
Jaime brought some strawberries to share with the class. If you divide the number of strawberries by 2, 3, 4, 5, or 6, you will have no remainder. If you divide by 7 or 8, you will have a remainder of 4. How many strawberries did Jaime bring?

Workbench
Find the answer. Show your work. Write your answer in a complete sentence.
The Walker family has planned a summer vacation. On the first day, they will go swimming. On the second day, they will go to the park. On the third day, they will play baseball. On the fourth day, they will go to the library. On the fifth day, they will go swimming. On the sixth day, they will go to the park. On the seventh day, they will play baseball, and on the eighth day, they will go to the library.

If they continue this pattern, what will they do on the 21st day of vacation? On the 31st day?

EXPLORE

Find the answer. Show your work. Write your answer in a complete sentence.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
The gardens in Gardenia City are beautiful. At the main city park, the gardens are built in the patterns shown below. The Fendall family wants to build a very large garden in their back yard. They have enough room for the 8th garden design in the series. Find the area and the perimeter of their garden.

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Problem  What’s Your Angle?
How many different acute angles can you find in this diagram?

Workbench
Find the answer. Show your work. Write your answer in a complete sentence.
Problem  Strange Sums
Use each of the digits 1 through 9 to make three 3-digit numbers. The largest 3-digit number is the sum of the other two.

Workbench
Find the answer. Show your work. Write your answer in a complete sentence.
Problem: Coin Toss

Thomas and Olivia each toss 1 penny in the air. If both pennies land showing heads, Thomas gets 2 points. If the pennies land showing 1 heads and 1 tails, Olivia gets 1 point. If both pennies land showing tails, no one gets a point. Flip 2 coins 40 times. Record the results in a graph. Explain if the game is fair or not.

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Linda and Consuela are painting fences. Linda charges $7.50 an hour. Consuela charges $5 an hour for the first 3 hours and then $9 an hour for each hour after that. How many hours do the girls need to work for Consuela to earn more money than Linda?

**Workbench**
Find the answer. Show your work. Write your answer in a complete sentence.
Problem | The Dragon Slayer

Prince Charming is off slaying dragons. He must slay 50 dragons in 1 day to rescue the maiden. He slays 4 dragons the first day, 9 dragons the second day, and 14 dragons the third day. He continues this pattern. How long will it take him to rescue the maiden?

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Activity 39

**Problem**

**Triangle Patterns**

Find all the different shapes that can be made by joining 6 equilateral triangles side to side.

**Workbench**

Find the answer. Show your work. Write your answer in a complete sentence.
Activity 40

Problem: Football Frenzy

During a football game, your team scored 15 points. How many different ways could your team have made that score?

<table>
<thead>
<tr>
<th>Scoreboard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touchdown</td>
</tr>
<tr>
<td>Extra point after touchdown</td>
</tr>
<tr>
<td>Field goal</td>
</tr>
<tr>
<td>Safety</td>
</tr>
<tr>
<td>6 points</td>
</tr>
<tr>
<td>1 point</td>
</tr>
<tr>
<td>3 points</td>
</tr>
<tr>
<td>2 points</td>
</tr>
</tbody>
</table>

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Problem  
House Number Hunt

My house number is a 3-digit number. Each digit is different. The number is even. It is divisible by 3. It is less than 601. It is the closest number to 601 that fits these clues. What is my house number?

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Activity 42

Problem  County Fair
At the County Fair, you can win a prize by throwing balls into the hoops shown here. The number of points you score are shown inside each hoop. If you get a score of exactly 34, you win the biggest prize. What is the least number of balls needed to score exactly 34?

Workbench
Find the answer. Show your work. Write your answer in a complete sentence.
In Mathville, it costs 43¢ to mail a letter and 26¢ to mail a postcard. George went to the post office last week and spent $5.00 to mail some letters and postcards. How many of each did George mail?

**Workbench**

Find the answer. Show your work. Write your answer in a complete sentence.
Fred and Laura like to play golf. Fred goes golfing every Sunday. Laura goes golfing every 5 days. If they played together today, in how many days will they play together again?

**Workbench**

Find the answer. Show your work. Write your answer in a complete sentence.
Adam Ant is getting ready for the Ant Olympics. He is entering the cross country event. He will be running on a path made up of hexagons. To prepare for the event, Adam has run on the tracks shown below. The race path in each case is the perimeter of the composite shape. Each straight segment is 1 meter. How many meters will Adam Ant run in the Ant Olympics if the cross country course is on Track 10?

**Workbench**
Find the answer. Show your work. Write your answer in a complete sentence.
Mom baked oatmeal cookies. You could smell them all through the house. My brother, Pete, walked by the cookie jar and took \( \frac{1}{3} \) of the cookies. Then my sister, Pam, helped herself to \( \frac{1}{4} \) of what was left. My father walked by and took \( \frac{1}{2} \) of what was left. I finished my homework and went downstairs for a snack. I found only 6 cookies left. How many cookies did Mom bake?

**Workbench**

Find the answer. Show your work. Write your answer in a complete sentence.
Problem  
Class Field Trip
The fourth grade at Cranberry Elementary School is going on a field trip to the art museum. Students will ride in school vans. Each van holds 9 students and a driver. How many vans and how many drivers will be needed for 103 students?

EXPLORE

Workbench
Find the answer. Show your work. Write your answer in a complete sentence.

________________________________________________________________________
________________________________________________________________________
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### Problem: Number Detective

Find the missing numbers in this addition table.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>62</td>
<td></td>
</tr>
</tbody>
</table>

### Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Problem  
Tommy’s Locker

Tommy forgot his locker number. His math teacher gave him hints to help him figure it out. These are the hints. The locker number is divisible by 8. The sum of the 3 digits is 13. The product of the digits is 48. The first digit is greater than the second, but less than the third. What is Tommy’s locker number?

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.
Activity 50

Problem

Cupcake Choices

Helen’s grandma is making cupcakes for Helen’s birthday party. Grandma has chocolate and vanilla cake. She has chocolate, strawberry, white, and butterscotch frosting. How many different kinds of cupcakes can Helen’s grandma make?

Workbench

Find the answer. Show your work. Write your answer in a complete sentence.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Paths to Problem Solving
Student Self-Assessment Sheet

Name __________________________________________ Date _______________________

Complete each statement below to create a statement that best describes your own work. There are no wrong answers. Answer honestly and add any comments you want. Your answers will not be used for grading purposes.

1. When I worked on this Student Journal, I was pleased with the way I…

2. I think I can improve by…

3. What I need the most help with right now is…

4. In completing my Journal, I learned…
Certificate of Completion

GREAT JOB!

This certificate is presented to

upon successful completion of Paths to Problem Solving Student Journal

Teacher’s Signature