4-4 Problem-Solving Investigation: Make an Organized List
- Analyze the Strategy

1. Analyze the 24 possible arrangements. Do you agree or disagree with the possibilities? Explain your reasoning.

   Students should confirm the solution, which
   accounts for all possibilities.

2. **WRITING IN MATH** Explain how making an organized list helps you to solve a problem.

   An organized list allows you to make sure that
   you have all the possibilities.

4-4 Problem-Solving Investigation: Make an Organized List
- Mixed Problem Solving

Use the *make an organized list* strategy to solve Exercises 3-6.

3. **JEANS** A store has the following options for jeans.

Length	Style	Color
short	straight leg	dark
medium	bootcut	light
long	flair	

   How many combinations of length, style, and color are possible?

   Explore: We know there are three lengths, three styles and two different colors. We need to know how many combinations are possible.
   Plan: Make a list of all the different possible
   combinations. Use S for short, M for medium and L for long length. Use s for straight leg, B for bootcut, and F for flair style. Use D for dark and l for light color.
   Solve: SsD   MsD   LsD
   Ssl   Msl   Lsl
   SBD   MBD   LBD
   SBl   MBl   LBl
   SFD   MFD   LFD
   SFl   MFl   LFl
   There are 18 different combinations of length, style and color.
   Check: Check the answer by seeing if each
   length is accounted for three times with the three different styles and two different colors.

5. **PATTERNS** Where will the triangle with the circle be in the twentieth figure of this pattern?

   Explore: We know there are four different positions where the triangle can be.
   Plan: Make a list of the position the triangle is in currently as shown. There are 4 patterns shown. Use T for top, B for bottom. Use L for left and R for right. Write the pattern for the four shown and continue the pattern until you reach the 20th one.
   Solve: TR   BL   TL   BR
           TR   BL   TL   BR
           TR   BL   TL   BR
           TR   BL   TL   BR
           TR   BL   TL   BR
   Check: Starting with the first pattern, count each one starting from left to right and when you reach 20 that will be the answer. The answer is on the bottom right of the rectangle.

   Use any strategy to solve.
   Some strategies are shown below.
   PROBLEM-SOLVING STRATEGIES
   - Make a table.
   - Guess and check

7. **NUMBER SENSE** A whole number less than 10 is multiplied by 0.8. The product is then added to 14.4 and the result is 20. What is the number?

   Explore: You know the number is a whole number and is less than 10. You know the answer can be 1-9.
   Plan: Make a table. Start with 1 and multiply by 0.8 then add 14.4.
   Solve:
   $1 \times 0.8 = 0.8 + 14.4 = 15.2$
   $2 \times 0.8 = 1.6 + 14.4 = 16$
   $3 \times 0.8 = 2.4 + 14.4 = 16.8$
   $4 \times 0.8 = 3.2 + 14.4 = 17.6$
   $5 \times 0.8 = 4.0 + 14.4 = 18.4$
   $6 \times 0.8 = 4.8 + 14.4 = 19.2$
   $7 \times 0.8 = 5.6 + 14.4 = 20$
   $8 \times 0.8 = 6.4 + 14.4 = 20.8$
   $9 \times 0.8 = 7.2 + 14.4 = 21.6$
   Check: Multiply 7 by 14.4 and then add 20.

9. **CODES** The letters A, B, C, and D are used to identify different types of dogs at a dog show. How many different identification codes for dogs are there if A is always the first letter?

   Explore: We know there are four types of identifications for dogs.
   Plan: Make a list of all the different possible
   Combinations when A is always the first letter..
   Solve: ABCD   ABDC   ACBD
         ACDB   ADBC   ADCB
   There are 6 different identification codes.
   Check: Check the answer by Check the answer by seeing if A is accounted for six times in the first positions.

11. **MONEY** You would like to buy four gifts that cost $15 each and one gift for $10.99. How much money will you have left if you have $85.75?

    Explore: We know the cost of the gifts, and we know how much money we have. We need to find how much money will have left over.
    Plan: Write and solve a numerical expression.
    Solve: $ to begin with – $ spent = $ left over
    $85.75 – [(4 × $15) + $10.99]
        = $85.75 – ($60 + $10.99)
        = $85.75 – $70.99
        = $14.76
    So, the amount left over is $14.76
    Check: If you add the amount left over and the amount spent on the items, it should total $85.75

13. **HIKING** The number of miles Greg hiked in the first four days of a hiking trip are shown. At this rate, how many miles should he expect to hike at the end of the fifth day?

Day	Miles
1	2
2	3
3	5
4	8
5	∎

    Explore: We need to find how many miles Greg will hike on the fifth day.
    Plan: Examine the pattern in the table to find how many miles he will hike.
    Solve:

Day	Miles
1	2
2	3
3	5
4	8
5	∎

    + 1
    + 2
    + 3
    + 4

    So, at this rate, Greg will hike 12 miles on the fifth day.
    Check: Between the first and second day; he hiked 1 more mile, the second day 2 more miles; the third day 3 more miles, the fourth day 4 more miles. 8 + 4 = 12.