

## Find Out

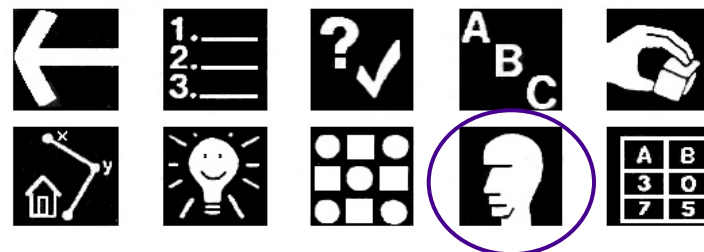
Question: What is the 3-digit number?

Clues:

- Each digit is even (but not zero).
- Between 700 and 830
- Each digit is different
- Sum of digits is greater than 15

$$\underline{\quad} + \underline{\quad} + \underline{\quad} > 15$$

## Choose a Strategy



Logical Reasoning

## Solve It

<del>2</del>	(2)	<del>2</del>
<del>4</del>	<del>4</del>	<del>4</del>
<del>6</del>	<del>6</del>	(6)
(8)	<del>8</del>	<del>8</del>

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$$8 + 2 + 6 > 15$$

## Look Back

826

- ✓ 8, 2, and 6 are even numbers
- ✓ more than 700, less than 830
- ✓ 8, 2, and 6 are different numbers
- ✓  $8 + 2 + 6 = 16$  (greater than 15)

## Cooperative Group Activity that uses Logical Reasoning for Problem Solving

### Background knowledge of students:

- Using 4-Square for solving computational word problems (PIPS: Problem → Info → Picture → Solution). Also using 4-Square for organizing paragraphs.
- The *Problem Solver* 4-step process for Problem Solving, and experience with working on *Problem Solver* problems that require the strategy of Logical Reasoning.
- Mystery Number problems where the mystery number is referred to as “X.”
- Greater than and Less than symbols ( $>$ ,  $<$ )
- Vocabulary: digit (0, 1, 2, 3, 4, 5, 6, 7, 8, 9), sum (total of an addition problem), odd and even

### Cooperative Group Management:

- There are 4 students per group.
- There are 4 colored folders per group (green, red, purple, yellow) – so that each group member has a different colored folder.
- Groups are labeled A, B, C, & D. The folders of a group are labeled 1, 2, 3, & 4, and they also have the group letter on them.
- Each folder contains a clue, a job description, and a 4-Square graphic organizer.
  - All the purple folders contain the same clue (#1) and job (Referee).
  - All the red folders contain the same clue (#2) and job (Timekeeper).
  - All the yellow folders contain the same clue (#3) and job (Reporter).
  - All the green folders contain the same clue (#4) and job (Director).
- Expert Jigsaw: All of the yellows get together to discuss their clue and what it means. Each of the other colors also get together. After that, all the A's get together; all the B's get together; all the C's get together; and all the D's get together. Each group has a yellow who is an expert for that clue, a purple who is an expert for that clue, a green who is an expert for that clue, etc.
- Group Jobs:
  - Director: Responsible for passing the Koosh. Responsible for guiding the group through the task by following the directions provided in their folder.
  - Timekeeper: Responsible for letting the group know when specified time periods are up.
  - Referee: Responsible for letting people know when their conversation veers from the task at hand. This person may speak without the Koosh when necessary to do their job.
  - Reporter: Responsible for sharing their group's solution with the rest of the class.
- Koosh: Only the person holding the Koosh is allowed to talk. (Exceptions are allowed when necessary for a person to perform their group job.)
- The task will be broken down into small steps. The students will try to finish each step by a certain given time so that the teacher can keep the whole class at the same pace, and have a chance to get groups back on track if necessary.

<b>Folder Color</b>	<b>Clue #</b>	<b>Group Job</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Purple	1	Referee	Student 1	Student 5	Student 9	Student 13
Red	2	Timekeeper	Student 2	Student 6	Student 10	Student 14
Yellow	3	Reporter	Student 3	Student 7	Student 11	Student 15
Green	4	Director	Student 4	Student 8	Student 12	Student 16

Substitute = Stephen (or a 5<sup>th</sup> member of group D, sharing the yellow folder).

<b>The Problem</b>		<b>Step 3: "Solve it."</b>		
		Hundreds Place	Tens Place	Ones Place
<b>Clue 1</b> (purple)	Each digit is an even number	2 4 6 8	2 4 6 8	2 4 6 8
<b>Clue 2</b> (red)	The number is between 700 and 830.	Eliminate 2, 4, 6 Answer: 8	Since hundreds place is 8, eliminate 4, 6, 8 Answer: 2	2 4 6 8
<b>Clue 3</b> (yellow)	3 different digits	8	2	Eliminate 2, 8 Possible: 4 6
<b>Clue 4</b> (green)	The sum of the digits is greater than 15	8	2	Eliminate 4 (sum would be less than 15) Answer: 6
Solution: 826				

<b>The 4-Step Problem Solver Process</b>		
Step 1	<b>Find Out</b>	<ul style="list-style-type: none"> <li>Identify the question that needs to be answered.</li> <li>Think about the clues. Gain a better understanding of the clues by asking questions about them. (Come up with a question for which the provided clue would be the answer.)</li> </ul>
Step 2	<b>Choose a Strategy</b>	<ul style="list-style-type: none"> <li>Know that when clues are provided, and need to be used together in order to solve the problem, a good strategy is "Logical Reasoning."</li> </ul>
Step 3	<b>Solve it</b>	<ul style="list-style-type: none"> <li>Taking one clue at a time, determine what the possibilities are for that clue, or what can be eliminated.</li> <li>Reach a final answer.</li> </ul>
Step 4	<b>Look Back</b>	<ul style="list-style-type: none"> <li>Check the final answer against each of the clues, one at a time.</li> </ul>

Clue #1 (purple)

**Each digit is an even number.**

Hint: “Do you think each digit is \_\_\_\_\_ or \_\_\_\_\_?”

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Clue #2 (red)

**The number is between 700 and 830.**

Hint: “What two numbers do you think the mystery number is in between?”

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Clue #3 (yellow)

**Each digit is different.**

Hint: “Do you think all the digits are different or can some be the same?”

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Clue #4 (green)

**The sum of the digits is greater than 15.**

Hint: “Do you think the \_\_\_\_\_ is greater than or less than \_\_\_\_\_?”

<b>Folder Color</b>	<b>Clue #</b>	<b>Group Job</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>Purple</b>	<b>1</b>	<b>Referee</b>	Student 1	Student 5	Student 9	Student 13
<b>Red</b>	<b>2</b>	<b>Timekeeper</b>	Student 2	Student 6	Student 10	Student 14
<b>Yellow</b>	<b>3</b>	<b>Reporter</b>	Student 3	Student 7	Student 11	Student 15
<b>Green</b>	<b>4</b>	<b>Director</b>	Student 4	Student 8	Student 12	Student 16

<b>Job</b>	<b>Description</b>
Director	<ul style="list-style-type: none"> <li>• Responsible for passing the Koosh</li> <li>• Responsible for guiding the group through the task by following directions provided in the green folder.</li> </ul>
Timekeeper:	<ul style="list-style-type: none"> <li>• Responsible for letting the group know when time is up.</li> <li>• Tries to give the group a “two minute warning.”</li> </ul>
Referee:	<ul style="list-style-type: none"> <li>• Responsible for letting team members know if their conversation needs to wait until another time. (“We aren’t supposed to talk about that now because it doesn’t have to do with figuring out this problem.”)</li> </ul>
Reporter:	<ul style="list-style-type: none"> <li>• Responsible for sharing their group’s solution with the rest of the class.</li> </ul>

Director	<ul style="list-style-type: none"> <li>• Responsible for passing the Koosh</li> <li>• Responsible for guiding the group through the task by following directions provided in the green folder.</li> </ul> <p>Note: Each person may speak without the Koosh ONLY if it is for doing their job.</p>
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## The Problem:

The mystery number has 3 digits. Each person in your group will have a different clue. You can't look at anyone else's clue, but you will need to use all four clues in order to figure out what the mystery number is. What is the number?

Your group will use the 4-Square to do the 4 steps for solving this problem. Part of the Director's job is to tell the group when to write, so don't write on the 4-Square until that person says.

<b>1. Find Out:</b> → Write down the question. → Make 4 bullets for the clues.  • • • •	<b>2. Choose a Strategy</b>  Circle one symbol. Then write down what it is.
<b>3. Solve it:</b>  Begin with the first clue and determine what digits will work for each place in the number. Then look at clues 2, 3, and 4 and figure out which digits can be eliminated.  ____    ____    ____	<b>4. Look Back:</b>  Write down your answer. Then make a check mark for each clue that works.  ✓ ✓ ✓ ✓

You may only talk when you are holding the Koosh, unless you need to say something for doing your group job.

Before we begin, you will meet with the people from other groups who have the same color folder as you. If you have any questions about what your clue means, you can ask them. You will be the only person in your group who knows what your clue is, so you will need to understand it and be an expert on it!

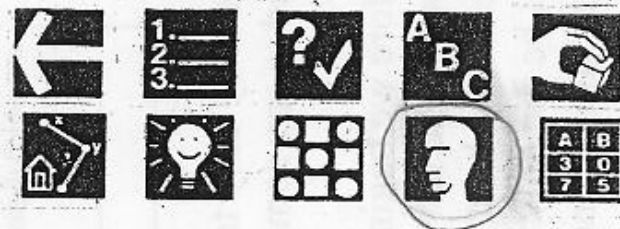
## Find Out

What is the number.

1. x is even  
 2. each digit is different  
 3. x is between 700 and 800  
 4.  $- + - + - > 15$

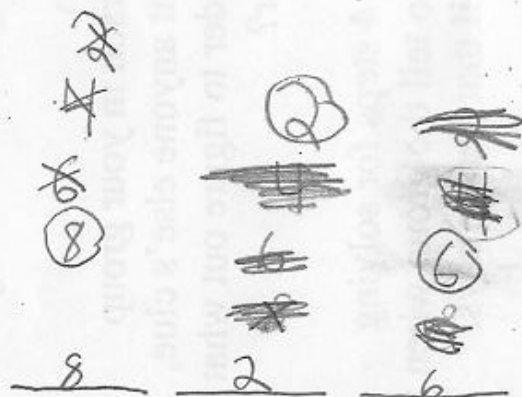
Name: \_\_\_\_\_

## Choose a Strategy



logical reasoning

## Solve It



$$8 + 2 + 6 = 16$$

826



826

Look Back