Teaching Problem │ **What Number Makes Sense?**

Turn Up the Heat

Teaching Goal

After participating in this lesson, students will be able to solve the problems in this section by identifying and accurately placing ;- missing information. Students will also be able to explain their reasoning and justify their answers..

Problem

> An oil delivery truck has just arrived at the Murphys' new house. The house's oil tank has a capacity of _____ gallons. But the deliveryman finds that there are still _____ gallons of oil left in the bottom of the tank, and so he delivers only _____ gallons.
>
> The delivery truck has a capacity of _____ gallons. It can pump oil into the house's tank at a rate of _____ gallons per minute. This means that it will take _____ minutes to fill the tank.
>
> **10   20   50   200   250   2,000**

Teaching Plan

1. Have students read the problem individually, or read it together as a class.
2. Have the students read the problem.
3. Ask students to think about the problem. Ask what they think they need to do to solve it.

4. Lead a whole-group discussion. Consider using the following questions as part of the discussion:

What problem-solving strategy would you use to decide where to place the numbers? They may suggest strategies such as Using Logical Reasoning, Guess and Check, and Using Number Sense.

What number makes the most sense for the capacity of the oil delivery truck? They will probably choose 2,000, since that would represent the greatest quantity of oil.

What numbers would you consider as a possible capacity for the house's oil tank? They will probably say 200 or 250.

Which math operation would you use to find the number of gallons that can be pumped into the tank now? They will probably say that they would subtract the amount of oil left in the tank, 50 gallons, from the total capacity of tank, 250 gallons, to find the amount that can be pumped into the tank to fill it to capacity, 200 gallons.

5. Have students place the numbers in the blanks where they think they fit best.

How did you determine how much time it would take the truck to fill the house's oil tank? They will probably say that they divided the number of gallons needed, 200, by the number of gallons that the truck can pump in 1 minute, 20. At this rate, it will take 10 minutes to fill the tank: $200 \div 20 = 10$.

Explain how you know your answers are all correct.

This think-and-check problem-solving process, along with class discussion, allows students to use, extend, and communicate their reasoning and logic skills..

Problem 2   **The Panthers' Stats**

The chart at right shows the statistics for the five starting players on the Panthers basketball team.

George, who is 24 years old, has just joined the team. He is 78 inches tall and weighs 212 pounds. His weight increases the average weight of the team by _____ pounds to _____ pounds. His height increases the average height of the team by _____ inches to inches. His age increases the average age of the team by _____ years to _____ years.

Average Weight (in pounds)	189
Average Height (in inches)	73
Average Age (in years)	21

| 0.5 | 0.8 | 3.8 | 21.5 | 73.8 | 192.8 |

1. First, read the problem.

2. Look at the numbers in the box.

3. Put the numbers in the blanks where you think they fit best.

4. Read the problem again. Do the numbers make sense?

5. Explain how you know you have the numbers in the correct blanks.

_____

_____

_____

_____

Teaching Problem | **What's the Question?**

Just One Clip

Teaching Goal

After participating in this lesson, students should be able to generate a variety of questions based on the given data in each to construct a question for a specific answer.

Problem

> My math teacher held up a small paper bag. He said that there are 12 colored paper clips in the bag- 5 are red, 4 are green, and the rest are yellow. Then he called on me to close my eyes, reach into the bag, and take out just 1 paper clip.

Teaching Plan

1. Write the above information on the overhead projector, chalkboard, or white board.
2. Ask students to read the information.
3. Lead a discussion with the whole class using the following questions as part of the discussion:

   What's the question if the answer is 1/3, or 1 chance out of 3?
   What is the probability that the paper clip I took out was green? (Be sure that students understand that of the 12 paper clips, the 4 green ones represent 4/12 which in lowest terms is 1/3 of the total.)

What's the question if the answer is ¼, or 1 chance out of 4? What is the
probability that the paper clip I took out was yellow? (Be sure that students understand that of the
12 paper clips, 9 are red or green, so the 3 that remain must be yellow. The 3 yellow ones
represent 4/12 which reduces to i of the total.)

What's the question if the answer is 1? What is the probability that the paper clip I took
out was red, green, or yellow? (Be sure students understand that the paper clips in these three
colors represent all the clips in the bag – 12/12, which in lowest terms is 1 – and that 1 stands for
the probability of any "event" that is certain to occur.) OR What is the probability that the paper
clip I took out was not purple (or any color other than red, green, or yellow)?

What's the question if the answer is 0? What is the probability that the paper clip I took
out was blue *(or any color other than red, green, or yellow)*? (Be sure students understand that 0
represents the probability of any "event" that is impossible, or cannot occur.)

What's the question if the answer is 3/4,or 3 chances out of 4? What is the
probability that the paper clip I took out was , red or green? (Be sure students understand that the
probability of picking red, 5/12 added to the probability of picking green, 4/12, equals 9/12 which
reduces to 3/4.)

………………………………………………………………………………………..

This is an excellent reasoning exercise. Initially, some students may have difficulty constructing
questions that can be answered !t by a given number. If your students are having difficulty with this
lesson, you might want to try an additional lesson or two with the whole class before asking students
to continue working the next problems with a small group or in pairs.

Problem 1 **Electric Cars**

The bar graph shows the number of electric-powered cars sold by the Electro-Moto Car Company during one week in May

Electro-Moto Car Sales
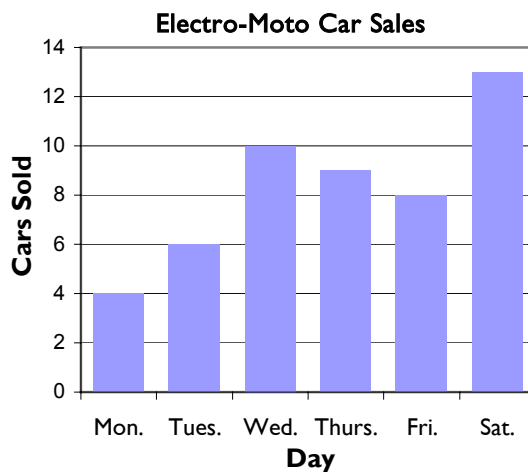
1. What's the question if the answer is 4?

2. What's the question if the answer is 50?

3. What's the question if the answer is 26%

4. What's the question if the answer is 40%

5. What's the question if the answer is 60%