Teacher Notes.

Lesson 16: Even and Odd Numbers

Classwork

Opening Exercise

a. What is an even number?

*. An integer that can be evenly divided by 2.
*. A number whose unit digits is 0, 2, 4, 6, 8
*. All multiples of 2.

b. List some examples of even numbers. (Vary)

examples: 2, 20, 400,

c. What is an odd number?

*. An integer that CANNOT be evenly divided by 2.
*. A number whose unit digit is 1, 3, 5, 7, 9
*. All the numbers that are not multiples of 2.

d. List some examples of odd numbers. (Vary)

examples: 1, 3, 7, 97, 109

What happens when we add two even numbers? Do we always get an even number?

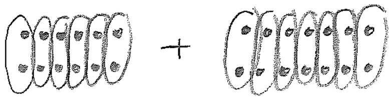
examples. $2 + 4 = 6$

$8 + 6 = 14$

Exercises 1–3

1. Why is the sum of two even numbers even?

   a. Think of the problem $12 + 14$. Draw dots to represent each number.



   b. Circle pairs of dots to determine if any of the dots are left over.

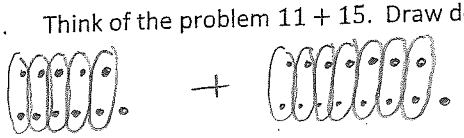
   There are no dots left over; the answer is even.

   c. Is this true every time two even numbers are added together? Why or why not?

   * Even numbers never have dots left over when we are circling pairs. Therefore the answer is always even.

2. Why is the sum of two odd numbers even?

   a. Think of the problem $11 + 15$. Draw dots to represent each number.



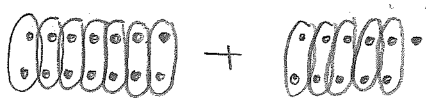
   b. Circle pairs of dots to determine if any of the dots are left over.

   c. Is this true every time two odd numbers are added together? Why or why not?

   This is true every time two odd numbers are added together because every odd number has one dot remaining when we circle pairs of dots. Since each number has one dot remaining, these dots can be combined to make another pair. Therefore, no dots remain, resulting in an even sum.

3. Why is the sum of an even number and an odd number odd?

   a. Think of the problem $14 + 11$. Draw dots to represent each number.



   b. Circle pairs of dots to determine if any of the dots are left over.

   c. Is this true every time an even number and an odd number are added together? Why or why not?

   This is always true when an even number and an odd number are added togerner because only an odd # will have a dot remaining after we circle the pairs of dots. Since this dot does not have a pair, the sum is odd.

   d. What if the first addend is odd and the second is even? Is the sum still odd? Why or why not? For example, if we had $11 + 14$, would the sum be odd?

   The sum is still odd for two reasons. Changing the order of addition does not change the answer. Because an even number plus an odd number is odd, than an odd number plus an even number is also odd. Second, it does not matter which addend is odd; there is still one dot remaining, making the sum odd.

Let's sum it up:

- "Even" + "even" = "even" 2 + 4 = 6
- "odd" + "odd" = "even" 1 + 3 = 4
- "odd" + "even" = "odd" 1 + 4 = 5

Exploratory Challenge/Exercises 4–6

4. The product of two even numbers is even.

$6 \times 4 = 24$ (6 groups of 4) or $4+4+4+4+4+4$

5. The product of two odd numbers is odd. (yes)

$5 \times 3 = 15$ $7 \times 3 = 21$

6. The product of an even number and an odd number is even. (yes)

$2 \times 3 = 6$