Grade Level: Grade 2
Lesson Plan Name: Conceptual Understanding of Even and Odd
Rationale/Lesson Abstract: In this lesson, students will explore even and odd numbers by pairing counters or linkers. The hands-on experience will provide students with a concrete way of thinking about even and odd numbers. Students can continue to apply this concept to other numbers that they explore in 2nd grade. Additional connections are included at the end of the lesson to provide more details about how to approach other concepts students may want to explore about even and odd numbers.
Timeframe: 1 hour
Common Core Standard(s): 2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends

Instructional Resources/Materials:
- Counters
- Linker Cubes
- Chart Paper

Objectives:
Students will determine whether a number is even or odd.
Students will be able to explain why a number is even or odd.

Lesson:
Part 1: Introduction & Modeling as a Class
1. Begin by telling students that today we will explore numbers and determine whether a number is even or odd.
2. Display 1 counter. Talk about the number 1. It is one object; we cannot make a pair. It is alone.
3. Next, display 2 counters (or linker cubes). With 2 counters we can make 2 equal groups with one counter in each group; we have 1 pair of counters.
4. Continue and talk about 3 and 4.
5. Begin making a chart that shows the number, the counters/linker cubes, a bar model and one last column to determine if it is even or odd. To reinforce the writing of number sentences/equations, each number will include an equation that shows the adding of the same number equals an even number. For example, 2 + 2 = 4. If the number is odd, the equation could be 2 + 2+ 1 = 5
6. Once you have talked about the numbers 1 – 4, ask students if they notice any patterns. Specifically, have students explore the idea of making pairs with the counters or linker cubes. What patterns do you notice? Which numbers had an exact amount of pairs? Which numbers had a counter that did not have a pair?
7. Explain to students that an even number is a number you can make an exact amount of pairs. An odd number will have one part left that does not have a pair. Even numbers can be divided into two equal groups; odd numbers cannot be divided into 2 equal groups – there will always be one that will not have a pair. Go through the numbers 1-4 and discuss whether each one is even or odd. Model using the sentence frame: *"My number is _____. The number _____ is _____ (even/odd) because …."*

Part 2: Individual or Partner Work

8. Have students work individually or in pairs with the numbers 5 – 20. Students should explore with counters or linker cubes and pair up the counters/cubes. Students determine if the number is even or odd. The numbers 1 – 20 have been provided in order to quick assign students a number. The cards can be printed on cardstock, and then laminated so that they can be reused. Or multiple copies of the cards can be made so that the number can be glued into students' notebooks or on to the Exit Ticket

9. Students will present their number. In order to prepare for the short presentation of their number, students can use a sentence frame:

    "My number is _____. The number _____ is _____ (even/odd) because …."

    My number is 4. The number 4 is even because you can make 2 pairs and no counters are left without a pair.

10. Have students practice using the sentence frame before the class debrief. This should allow some support with students being ready to explain about their number and to allow the presentations to be quick.
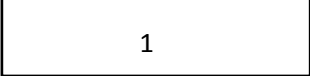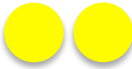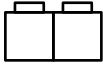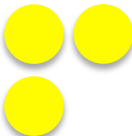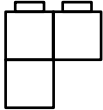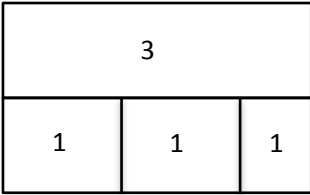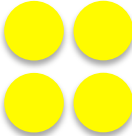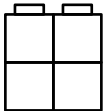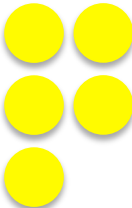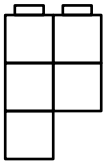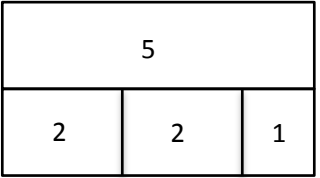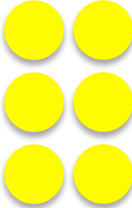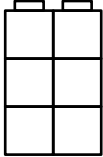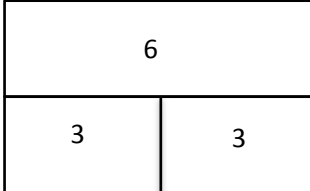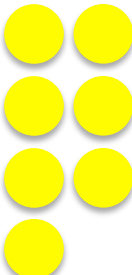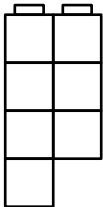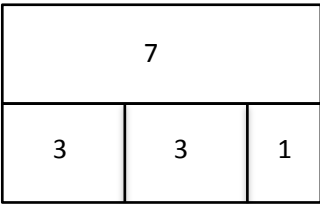
Part 3: Class Debrief
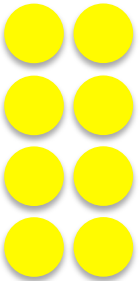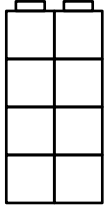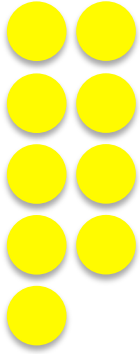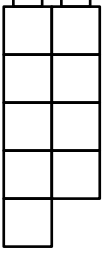
11. Have each person or pair show their number with the counters/linker cubes and say whether their number is even or odd. Students can present their work by using the sentence frame. Using counters/linker cubes during the presentation may help students visualize what is happening when the cubes/counters are paired. This builds students conceptual development of odd and even numbers

12. The teacher can continue to fill in the chart as the class presents. Discuss the patterns that are noticed among numbers that are even and among numbers that are odd. Here are a few observations students might make:

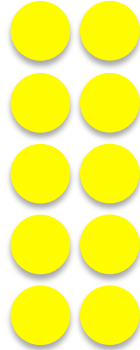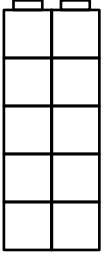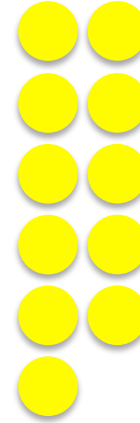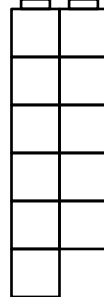   - Every other number is even. Every other number is odd.
    - When skip counting by 2's, those numbers are even 2, 4, 6, 8, 10 …
    - All the even numbers have two towers of linker cubes.
    - All the odd numbers have one linker cube not paired.

13. For closure to the lesson, have students define an even number and an odd number. Then assign the exit ticket (see worksheet below).
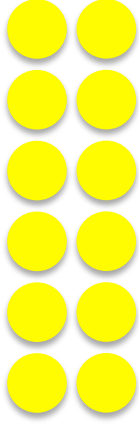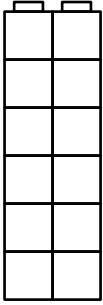   Ways to use the **Exit Ticket:**
    - Assign the class a number between 1 and 20. Have them write the number in the square. Then students can either build it or draw a picture to determine whether the number is even or odd. Students should complete the sentence frame to include how they know the number is even or odd.
    - Assign each student a new number or each table group a new number.
    - Have students pick any number they want (except for the number they had earlier in the lesson). Some students may wish to go beyond 20. For students who are ready for the challenge, allow them to pick a number bigger than 20 and determine whether it is even or odd.
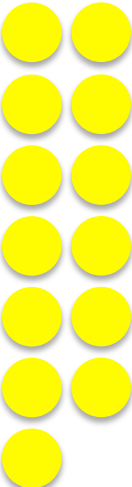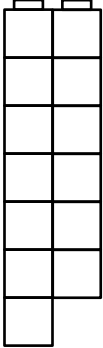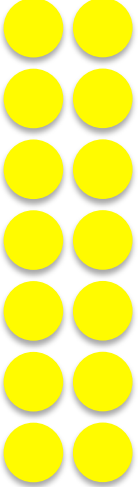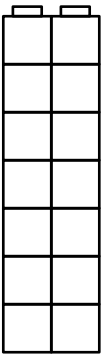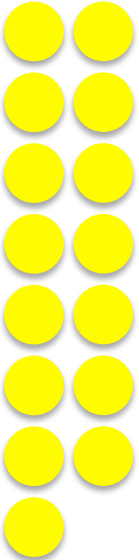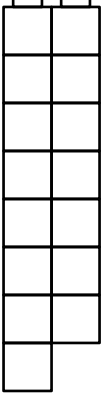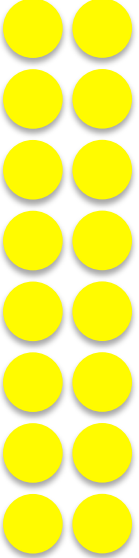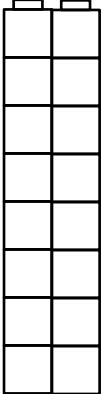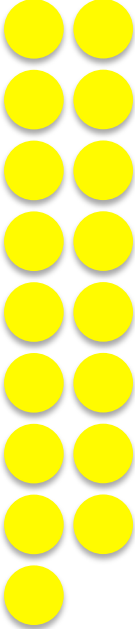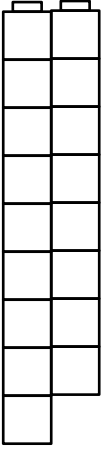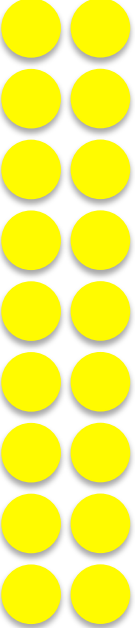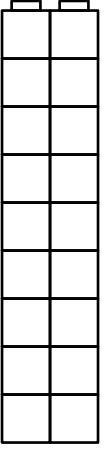
The following pages include a table that might be similar to the chart that is developed as a class.
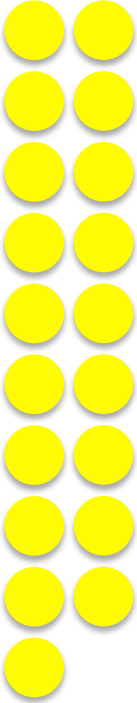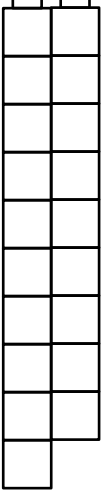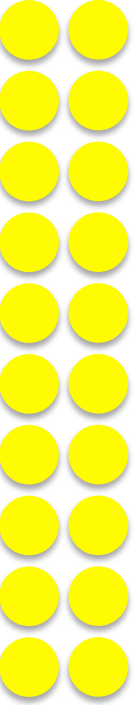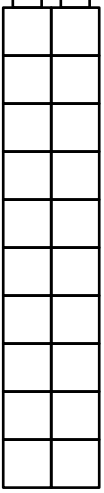
Number	Picture	Linker Cubes	Bar Model & Equation	Even or Odd
1			1	Odd
2			2 / 1 1 $1+1=2$	Even
3			3 / 1 1 1 $1+1+1=3$	Odd
4			4 / 2 2 $2+2=4$	Even
5			5 / 2 2 1 $2+2+1=5$	Odd
6			6 / 3 3 $3+3=6$	Even
7			7 / 3 3 1 $3+3+1=7$	Odd

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8	(8 yellow counters)	(cubes)	8 4 | 4 $4+4=8$	Even
9	(9 yellow counters)	(cubes)	9 4 | 4 | 1 $4+4+1=9$	Odd
10	(10 yellow counters)	(cubes)	10 5 | 5 $5+5=10$	Even
11	(11 yellow counters)	(cubes)	11 5 | 5 | 1 $5+5+1=11$	Odd

12	(12 yellow counters)	(cube tower)	12 6 | 6 $6 + 6 = 12$	Even
13	(13 yellow counters)	(cube tower)	13 6 | 6 | 1 $6 + 6 + 1 = 13$	Odd
14	(14 yellow counters)	(cube tower)	14 7 | 7 $7 + 7 = 14$	Even

15			15 7 | 7 | 1 $7+7+1=15$	Odd
16			16 8 | 8 $8+8=16$	Even

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17	(17 yellow counters)	(cube tower)		Odd

17

$8 + 8 + 1 = 17$

| | 8 | 8 | 1 |

18

$9 + 9 = 18$

| **18** | (18 yellow counters) | (cube tower) | | Even |

18

| | 9 | 9 |

19	(yellow counters)	(connecting cubes)	19 / 9, 9, 1 $$9 + 9 + 1 = 19$$	Odd
20	(yellow counters)	(connecting cubes)	20 / 10, 10 $$10 + 10 = 20$$	Even

1	6	11
2	7	12
3	8	13
4	9	14
5	10	15

16

17

18

19

20

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Assessment

Give students a number: 13. Have students build the number, determine if the number is even or odd, and explain how they know the number is even or odd. A sample Exit Ticket or worksheet is given below.

Assessment Options:

- ➢ Give each student a different number 1-20. Students should work with a different number than the one they worked with during the exploration.
- ➢ Give students a number greater than 20. The standard says that students only need to work with numbers within 20, however, if students understand the concept of even and odd, they should be able to extend the concept to greater numbers.

Name _____   Date _____

Determine whether the given number is even or odd.
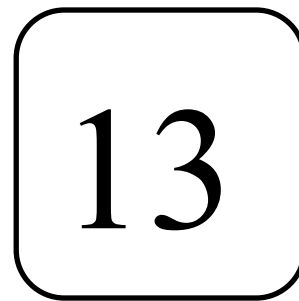
I think the number 13 is odd.

13

Using words, numbers and/or pictures, explain how you know the number is even or odd.

I think the number 13 is odd because I can pair 12 of the counters, but there is one counter leftover.
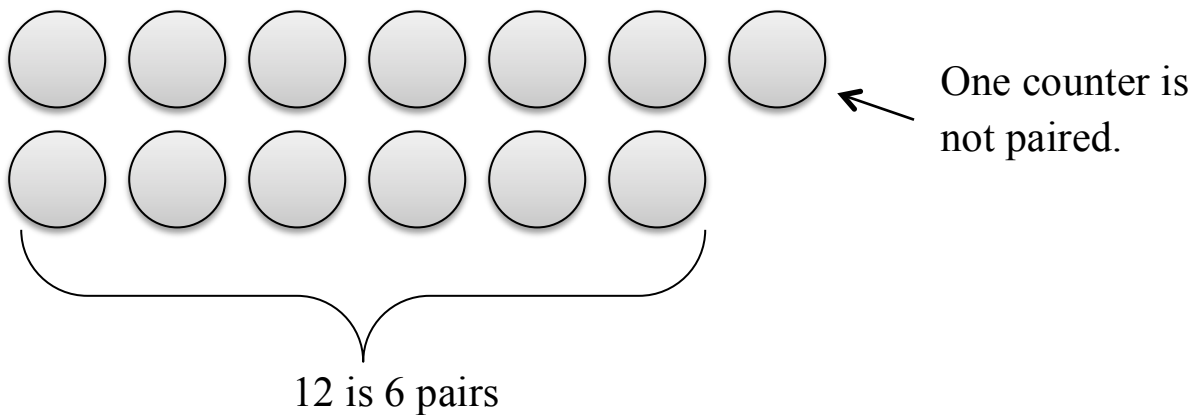
One counter is not paired.

12 is 6 pairs

Name _____   Date _____

Determine whether the given number is even or odd.
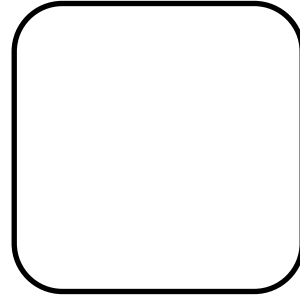
Using words, numbers and/or pictures, explain how you know the number is even or odd.

Name _____   Date _____

Determine whether the given number is even or odd.
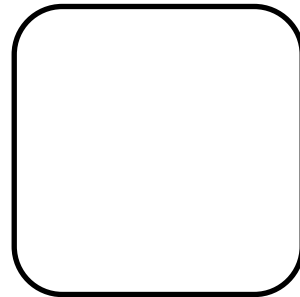
Using words, numbers and/or pictures, explain how you know the number is even or odd.

Warm-Up

Addition 2.NBT.5

Add using at least 2 methods.

$$12 + 13$$

Equal Groups 2.OA.3

Jenny bought some apples at the store. At home she placed the apples on the counter like this:

How many apples does Jenny have?

Write an equation for the sum of apples.

Addition 2.OA.2

Write a number sentence for the Bar model shown below:

7	?
14	
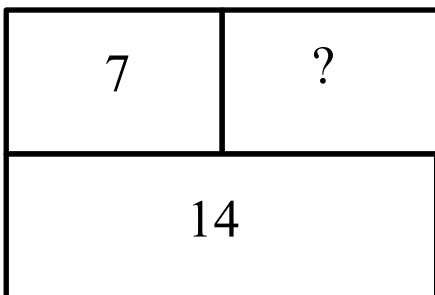
What is the missing addend?

Number Line 2.MD.6

What number can be represented by point A on the number line below? Explain your answer.

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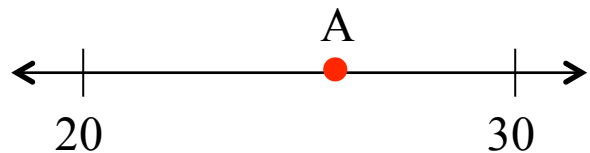
Warm-Up: Debrief

y

Addition 2.NBT.5

Add using at least 2 methods.

$$12 + 13$$

Decomposition
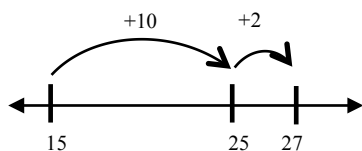
$$12 + 13$$
$$= 10 + 2 + 10 + 3$$
$$= 10 + 10 + 2 + 3$$
$$= 20 + 5$$
$$= 25$$

Decomposition

$$12 + 13$$
$$= 12 + 10 + 3$$
$$= 22 + 3$$
$$= 25$$

Number Line

$+10$ $+2$

15   25 27

*The focus of this question is to have students see an addition problem where a doubling strategy could be used Although not all students may be ready for doubles beyond a sum of 20; it allows students to practice multiple strategies for addition. Other methods could be: Base-10 Blocks, Bar Models, Partial Sums, Adding by Place Value Vertically, etc...

Equal Groups 2.OA.3

Jenny bought some apples at the store. At home she placed the apples on the counter like this:

How many apples does Jenny have?

Write an equation for the sum of apples.

Jenny has 8 apples.

$$4 + 4 = 8 \quad \text{or} \quad 2 + 2 + 2 + 2 = 8$$

*The focus of this question is to have students see an array and count the same number repeatedly to find the sum. In preparation for understanding even and odd numbers, seeing 2 groups of 4 or counting doubles can support the conceptual understanding of even numbers.

x

Addition 2.OA.2

Write a number sentence for the Bar model shown below:

7	?
14	
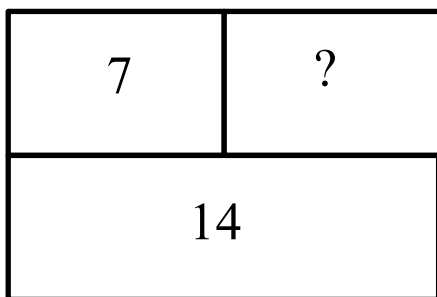
What is the missing addend?

The missing addend is 7, because 7+7=14, or 14-7 = 7.

*The focus of this question is to have students see an addition problem where a doubling strategy could be used This problem also has a sum within 20. Students can make connections between addition and subtraction. When thinking about even numbers, we can write an addition equation of equal addends.

Number Line 2.MD.6

What number can be represented by point A on the number line below? Explain your answer.

A

20   30
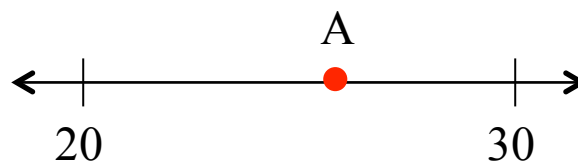
Point A could be the number 26 because it is a little more than half way (25).

*The focus of this question is to have students think about half way and just a little more – possible half way and one more. When writing an equation for an odd number, it equals the sum of equal addends and one more 11 = 5+5+1. Or can be written as the sum equals one addend plus one more than the first addends 11 = 5 + 6.

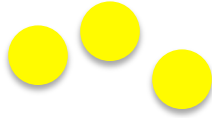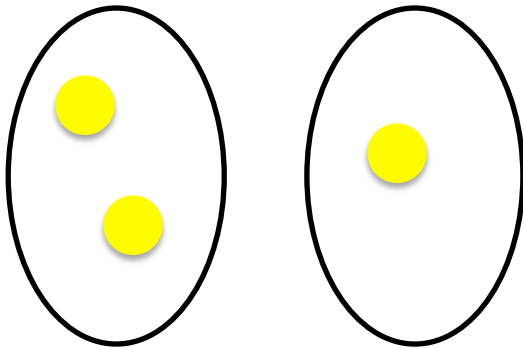**Considerations for Connections to Other 2nd Grade Topics**

Equal Groups

Consider the number 3. Can we make 2 equal groups if we have 3 objects?

T: "Here are 3 counters.

Let's see if we can share the counters between 2 groups equally. "

Show students how to share the counters between 2 groups. There will be one group with 2 counters and one group with 1 counter.

T: "Do both groups have the same amount of counters?" [No]

Consider the number 4. Can we make 2 equal groups if we have 4 objects?

T: "Here are 4 counters.

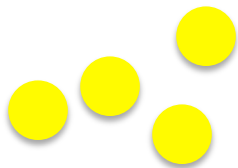**Let's see if we can share the counters between 2 groups equally. "**
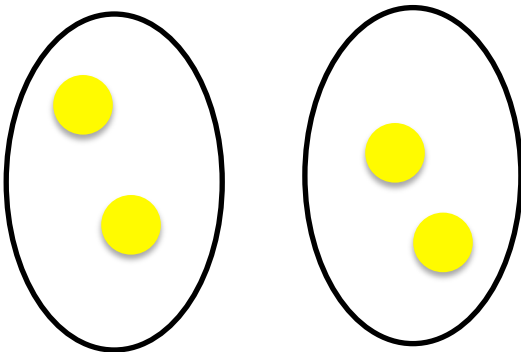
Show students how to share the counters between 2 groups. Both groups will have 2 counters.

T: "Do both groups have the same amount of counters?" [Yes]

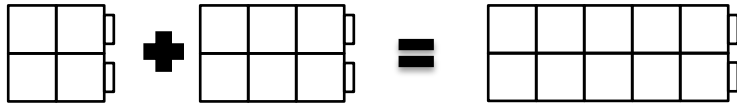Continue working with more numbers in a similar way.

Considerations for Connections to Other 2nd Grade Topics

Sums of Evens and Odds

Use words, pictures, and/or numbers to explain your thinking.

"If I add two even numbers, the sum will be _____, because…"

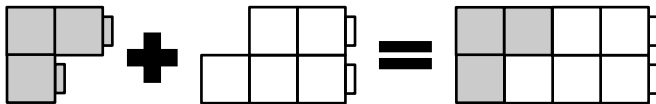**The sum of two even numbers will always be even.**

When the first number is even, all of its parts will have a pair. And when the second number is even, all of its parts will have a pair. That means that every part will have a pair. **Therefore, the sum of two even numbers will be even.**

Use words, pictures, and/or numbers to explain your thinking.

"If I add two odd numbers, the sum will be _____, because…"

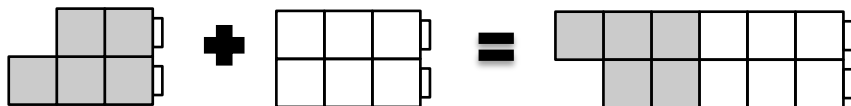**The sum of two odd numbers will always be even.**

When one number is odd, not all of its parts will have a pair. And when the other number is also odd, not all of its parts will have a pair. That means that there will be one part that is "left over" from each number and together they will make a pair. **Therefore, the sum of two odd numbers will be even.**

Use words, pictures, and/or numbers to explain your thinking.

"If I add an even numbers with an odd number, the sum will be _____."

The sum of an even number and odd number will be odd.

When the one number is odd, not all of its parts will have a pair. And when the other number is even, all of its parts will have a pair. That means that there will be one part that is "left over" and it will not have a pair. **Therefore, the sum of an even number and odd number will be odd.**