JUMPING MATH (LEVEL 1)

Description	Learners will design their own number line game to get a better grasp of number sense and conduct simple addition and subtraction functions.
Leading Question	Can you make your own number line?
Total Time Required	~ 4 hours over 5 days
Resources Required	Paint, paper, scissors, cardboard
Subjects	Numeracy , Physical Education
Self-guided/ Supervised activity	Medium
Learning Outcomes	By the end of this project, learners will be able to: 1. Discuss the concept of even and odd numbers 2. Recognize and identify even and odd numbers from 1 to 20 3. Create a number line from 0 to 20 and distinguish even and odd numbers through color coding 4. Construct a dice or spinning wheel for games 5. Explore the properties of cubes and other shapes 6. Apply addition and subtraction concepts using a number line and dice/spinning wheel 7. Compare numbers using mathematical symbols (<, >, =) 8. Create and solve numerical equations using addition and subtraction
Previous Learning	Awareness of numbers from 0-20 and being able to write the numbers.

DAY 1- Today you will learn what a number line is and how to create one.

Suggested Duration	Activity and Description

<table>
<tr>
<td>10 minutes</td>
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Revise counting the numbers from 0-20, you can count different objects in your house to revise this – trying to count both forward and backwards from 20.
Perform the following experiment to help you learn about even numbers and odd numbers.
Obtain some items at home e.g., pens, pencils, spoons, folks, boxes etc. or anything else available at home. Take note of the number of items available for each of the items. You can use a table like the one below:

<table>
<tr><td>Item</td><td>Number available</td></tr>
<tr><td>Pens</td><td>3</td></tr>
<tr><td>Boxes</td><td>2</td></tr>
<tr><td>Spoons</td><td>5</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>

Find two people within your home/community
Distribute the items equally among the two people. What do you observe?

Hint: some items can be divided equally among the two people, and some may not.

The number of items that can be split into two parts equally as a whole is an even number and the number that cannot be split in two parts equally as a whole number is an odd number

Tip: Younger learners that may not understand the concept of a whole number should be told that no halving is allowed.

Example:

2 pencils can be distributed to two people as 1 goes to X and 1 goes to Y with none leftover – so it is an even number
3 boxes get distributed as 1 goes to X and 1 goes to Y, but then there is 1 leftover, and it can only be divided if we split it into half (which is not allowed) – so 3 is an odd number

</td>
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<tr>
<td>20 minutes</td>
<td>

Identify which numbers between 1-20 are odd or even by doing the same experiment above but using two sticks this time and placing an equal number of balls on each of the sticks:.

For example, for the numbers, 3 and 4.
</td>
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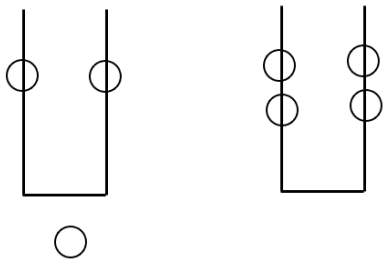
</table>



Because 3 cannot be equally distributed into the two sticks, it is an odd number and because 4 can be distributed between the two sticks equally then it is an even number.

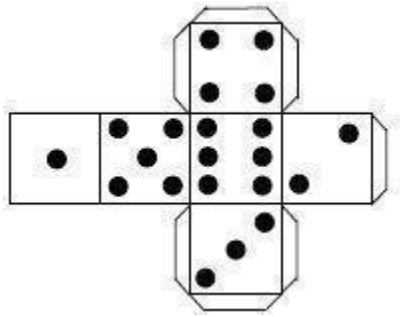
You should now do this for all the numbers from 1-20.

- You should reach the result that 2 – 4 – 6 – 8 – 10 – 12 – 14 – 16 – 18 – 20 are even numbers and the odd numbers are 1 – 3 – 5 – 7- 9 – 11 – 13 – 15 – 17 – 19
- Now design your own number line: paint, write and cut out each of the numbers from 0 – 20 and stick them in order on the ground. The even numbers will be in one color and the odd numbers will be in another color. See example below:

1
2
3
4
5
6
7
8
9
10

- *TIP: If you have tiles at home – please place a number in each tile or measure equal distances between the numbers being stuck.*

DAY 2- Today you will learn how to create your own dice or spinning wheel.

Suggested Duration	Activity and Description
30 minutes	● You will make your own dice based on your understanding of a cube. *Input: A cube is a three-dimensional solid object bounded by six square faces, with three meeting at each vertex/corner*. - Identify other cubes in your home (e.g. ice cubes, sugar cubes, square tissue boxes etc.) Think about what is unique about the cube? What shapes do you see in the cube? How many sides does it have? Write the description of a cube and draw the same. - Identify the different squares in the cube and count and draw these with equal length of 4 sides - Also identify rectangles at home and draw these to see the difference between the square and the rectangle - Design and draw the below to make your own dice, the lines will be folded and stuck together in the shape of a cube.  ● Alternatively, design the spinning wheel for the game. *Input: A spinning wheel is a circle or round and looks a little like a clock. Like the hands of a clock, we have to design a hand or arrow that we can spin and will land on one choice.* To design the spinning wheel, think about a clock. What do you observe about the clock? What is the shape of the clock? What about the moving sticks? So a spinning wheel is like a clock. ● You can use any round object to trace out a large circle. Then, make 6 sections to the circle

10 minutes	*TIP: Please see below as a reference and learners can understand it by imagining the circle is one big pizza or cake and you had to cut 6 pieces of the pizza)* • Create the spinning arrow – which could be a paper clip that is inserted in a paper pin that is inserted into the center of the circle as below  • Alternatively, you can cut out an arrow on cardboard or thick paper and then insert this into the center of the circle using an opened paperclip or paper pin. • Now write all the numbers down and cut them into small cards. See example below: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 • Also write the main mathematical functions on separate small cards (+ addition / - subtraction / > greater than / < less than). For example:

	<table><tr><td>+</td><td>-</td><td>x</td><td>÷</td></tr><tr><td>Less than (<)</td><td>Greater than (>)</td><td>Equal to (=)</td><td></td></tr></table>
10 minutes	**Critique and revision:** Reflect and identify the shapes you identified today in your homes such as an ice cube, or a pizza / flatbread / clock divided into the many sections. Based on these alternate objects, can you improve the design of what you have designed?

DAY 3- Today you will learn addition.

Suggested Duration	Activity and Description
45 minutes	● All the preparations are now ready to play the addition game! **Rules:** ● Throw the dice or spin the spinner and based on the number that comes, you have to jump that many places UP the number-line. Start from 0 (e.g. if the dice is 3, you will jump up 1..2..3 to number 3, then throw the dice and if it is 5 – you will jump up to 8 (3+5 or 4..5..6..7..8) ● You can also complete a numerical representation by writing down the sums that you are practicing e.g., 3+5=8
15 minutes	● Family members will pick up a number card. Compare the two numbers (the number you are standing on and the number the family member is holding). What can you say about the two numbers? Is one number less than (<), greater than (>) or equal to (=) the other? ● Come up with rules on how to play the game based on the number selected. Examples: If you land on a number is less than – you have to jump forward 2 steps If you land on a number is greater than – you have to jump forward 3 steps If you land on a number equal to, ….You can add the rule here

	• Example: Family member picks up a number 4, if you happen to be standing on 6, 6 is greater than 4 - So you give your family members an exercise to do • You will represent this in a numerical function as 6 > 4 using the number cards and the mathematical functions cards. • Extension: you can do the number of exercises as the number is greater than e.g. 13 – 8 = 5 so 5 jumping jack exercises.

DAY 4- Today you will learn subtraction.

Suggested Duration	Activity and Description
45 minutes	• All the preparations are now ready to play the subtraction game **Rules:** • Throw the dice or spin the spinner and based on the number that comes, they have to jump the same number of places DOWN the number line. Start from 20 (e.g. if the dice is 3, they will jump down to 17 (20–3), then throw the dice and if it is 5 they will jump down to 12 (17-5) • You will also complete a numerical representation by writing down the sums that you are practicing e.g. 20 – 3 = 17
15 minutes	• Family members will pick up a number card. Compare the two numbers (the number you are standing on and the number the family member is holding). What can you say about the two numbers? Is one number less than (<), greater than (>) or equal to (=) the other? • Come up with rules on how to play the game based on the number selected. Examples: If you land on a number is less than – you have to jump forward 2 steps If you land on a number is greater than – you have to jump forward 3 steps If you land on a number equal to, …. you can add a rule here • Example: Family member picks up a number 13, if you happen to be standing on 8, since 8 is less than 13 - you give the family members an exercise to do • Write and represent this numerically as 8 < 13 or can use the number cards and the mathematical functions cards.

	Extension: Learners can do the number of exercises as the number is greater than e.g. 13 – 8 = 5 so 5 jumping jack exercises

DAY 5- Today you will learn subtraction

Suggested Duration	Activity and Description
45 minutes	• Play the game with any or all four numerical operations with your own rules (addition, subtraction, multiplication and division – depending on your levels) • Family members can pick up a function card and a number card. Then perform the operation e.g. + 6, - 3, is the number greater than 2 etc. • Write down all the mathematical functions numerically • You can add in rules – examples include: - if you land on an even number – you have to jump that many times or if you land on an odd number – you have to hop that many times - Extra points for identifying the different ways to reach the same number, e.g. 7+3 = 10, 5+5 = 10, 14-4 = 10. Try all these out on the number line.
15 minutes	**Overall Project Reflection:** Now think about all the exercises you have done all week and take note of "TWO" of the following: • What is the most important lesson you have learnt through this project? • What have you found challenging, puzzling or difficult to understand? • What question would you most like to discuss? • What is something you found interesting? • Is there any new math trick or rule you learned?

Additional Enrichment activities	• Design the number line for going to – 10 • Design the number line for 30 - 50 • Introduce patterns and more rules to start understanding multiplication e.g. students asked to jump on every alternate number e.g. 2 – 4 – 6 – 8 – 10 etc. and write down 2+2=4, 4+2=6, 6+2=8 etc. A similar exercise can be done for patterns for the 5 and 10 times table • Learners can begin to write inverse operations.

Modifications for Simplification	• Provide templates or pre-made dice/spinning wheels for learners to use instead of creating their own from scratch. • Limit the number range for the spinning wheel game to 1-6 for easier understanding.

ASSESSMENT CRITERIA

By the end of the project, most of the learners were able to:

- ☐ Explain the difference between even and odd numbers
- ☐ Create accurately a number line, dice and spinning wheel according to the given instructions
- ☐ Apply addition and subtraction concepts by using the number line and dice/ spinning wheel accurately.
- ☐ Solve numerical equations