Math Cards (Level 1)

Description	Learners will make cards to play multiple games gaining a deeper sense of numbers, greater – lesser, addition – subtraction, sequences and patterns.
Leading Question	Can you make your own card games?
Total Time Required	~ 6 hours over 6 days
Resources Required	Paper, pens, scissors and colors
Subjects	Numeracy, Art & Design, Literacy
Supervision	Medium
Learning Outcomes	By the end of this project, learners will be able to: 1. Apply the four basic arithmetic operations (addition, subtraction, multiplication, and division). 2. Apply game behavior principles, including taking turns, following rules, etc. 3. Identify number patterns (for example, odd and even numbers) to strengthen algebraic thinking skills and recognize the underlying rules governing the patterns. 4. Generate and interpret number patterns to strengthen algebraic thinking skills. 5. Utilize abstract and quantitative reasoning to solve mathematical problems and make informed decisions. 6. Identify whether the number of objects in one group is greater than or less than the number of objects in another group.
Previous Learning	1. Writing numbers and doing addition / subtraction functions 2. Be familiar with division and multiplication

Day 1- Today you will begin designing your own games and play a few card games.

Time	Activity and Description
30 minutes	**<u>Make your own cards:</u>** ● Draw rectangular cards that are approximately the size of your palm. If you do not have a ruler, you can use any box cover or book to draw the lines and measure it based on the length of your index finger. The shorter side can be the length of your thumb. ● Cut out 40 cards. Color each of the papers in one of 4 colors – choose any colors of your choice or do them in red, yellow, green and blue.

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	● Challenge yourselves by calculating: if we have 40 cards and 4 colors and want an equal number of cards in each color – how many cards will be in each color? *(Hint: 40 / 4 = 10)* ● You can also calculate: if we have 10 cards in yellow and an equal number of cards in each color – how many cards will we have in blue? ● Write the numbers 1-20 on each of the cards in bold letters in the middle of each of the cards. Make 2 cards with each of the numbers and make sure that no two numbers are on the same color card e.g. if there is a 3 in the yellow card, the other 3 should be on a blue card etc. ● Design the other side of the card with a logo, name or initial.
15 minutes	**<u>Game 1: Snap</u>** **Goal:** win all the cards by quickly identifying matching cards **Rules:** ● Step 1: Shuffle the cards and divide the cards equally between all the players ● Step 2: Each player opens a card from their deck each turn and this is laid open on the table ● Step 3: If the two cards have matching numbers, the players will say snap and the first person to say snap will take all the open cards underneath ● If two cards of the same color are opened, the players can say snap and take the two matching color cards ● If there are no matching cards through the entire play, the game will be discarded and restarted ● The player with the most cards at the end will win the game
15 minutes	**<u>Game 2: Memory Match</u>** ● First, play a memory game – in this game, you will mix up all the cards and face the number side down. ● Challenge yourselves by calculating how many rows you want to arrange the cards in: ● If you have a total of 40 cards and there are 20 cards in each row, how many rows will you have? Answer: 40 / 20 = 2. ● If you have a total of 40 cards and there are 10 cards in each row, how many rows will you have? Answer: 40 / 10 = 4. ● If you have a total of 40 cards and there are 8 cards in each row, how many rows will you have? Answer: 40 / 8 = 5 ● If you have a total of 40 cards and there are 5 cards in each row, how many rows will you have? Answer: 40 / 5 = 8 ● If you have a total of 40 cards and there are 2 cards in each row, how many rows will you have? Answer: 40 / 2 = 20 ● Another easy activity: try two different setups; the first time arrange the shuffled cards in 5 rows of 8 cards each and the second time arrange the shuffled cards in 8 rows of 5 cards each.

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Make a points' sheet, with two columns. In the first column, write your initials or full name and in the second column, write the initials or full name of whoever you are playing against.

Goal: get as many points as possible by remembering and opening the correct matching card numbers.
Rules:

Step 1: arrange the shuffled cards in 5 rows of 8 cards each or arrange the shuffled cards in 8 rows of 5 cards each.
Step 2: Player 1 opens one card.
Step 3: Player 1 opens another card.
If the 2 cards are the same matching number, you can take the cards out of the rows and you get 2 points in your column.
If the 2 cards have a matching color but not a matching number, you get 1 point in your column and you can close the cards putting them back in the same place in the arrangement
If the 2 cards are not the matching number or color, you get no points and just close the cards in the arrangement
Step 4: Player 2 opens one card.
Step 5: Player 2 opens another card.
Add the number of points in both columns and whoever has more points is the winner of the game.
Use a score sheet like the one below:

<table>
<tr><th>Player's name/Initials</th><th>Number of points</th><th>Opponent's name/initials</th><th>Number of points</th></tr>
<tr><td>Ali</td><td>2</td><td>Dad</td><td>3</td></tr>
<tr><td>Faith</td><td>5</td><td>Mum</td><td>3</td></tr>
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<td>15 minutes</td>
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<u>Challenge yourself! (Numeracy activities)</u>

Can you create 5 mathematical functions with different numbers that all add up to 30? E.g. 15 + 15 = 30 or 10 + 5 + 15 = 30 etc.
If Samir went to school for 4 days of the week, how many days did he stay home? (Hint: 7 – 4 =?)
Leena finished lunch at 2 pm and then read a book until she went out to play at 5 pm – how many hours did Leena read a book?
What is the total number of days from September to the end of November? (Hint: September (30 days) + October (31 days) + November (30 days) =?)
How many more days in January than February? (Hint: 31 – 28=?)

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DAY 2- Today you will design two new games to understand the concept of greater and smaller than numbers.

Time	Activity and Description
20 minutes	**Game 3: Greater Alligator** **Goal:** Get the most points after 5 rounds by having the highest card (a card with the highest number) - (a variation of the same game can be played for the winner being the one with the smallest card) **Rules:** ● Step 1: Shuffle the cards and deal 2 cards per player ● Step 2: Each player will play their highest card and the person with the highest card will win e.g. Player 1 has 3, 12 and Player 2 has 4, 8, and Player 3 has 9, 20 then player 3 is the winner for having the card 20 ● If two players have the same high card, they both get to play their next highest card and whoever's second card is the highest will win ● The winner of each round gets 2 points and the final winner is the one that has the most points at the end of 5 rounds ● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the numbers using the greater than sign for each of the rounds for the 3 cards played e.g. 20 greater than 12 greater than 8.
20 minutes	**Game 4: Larger Numbers** **Goal:** getting the most points after 5 rounds by having the largest sum in their cards. **Rules:** ● Step 1: Shuffle the cards and deal 3 cards per player ● Step 2: Each player will add the numbers dealt with their cards ● Step 3: Players will each say the total number and the highest number will win ● If two players have the same high number, they will each pick up one more card from the deck and add that to the sum and whoever has the highest total will win ● Example: Player 1 has 4, 11, 16 and Player 2 has 16, 9, 2 – so Player 1's total is 31 and Player 2's total is 27 so Player 1 wins the game ● The winner of each round gets 2 points and the final winner is the one that has the most points at the end of 5 rounds ● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the 3 sums for each of the rounds for the 3 cards played e.g. - Player 1: 4 + 11 + 16 = 31 - Player 2: 16 + 9 + 2 = 27 - Final: 31 is greater than 27
20 minutes	**Game 5: Closest Number**

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	Goal: Get the most points after 3 to 5 rounds by having the total number closest to the open card (a variation of the same game can be played for the winner being the one with the further number) **Rules:** ● Step 1: Shuffle the cards and deal 3 cards per player ● Step 2: Each player will add the numbers on the cards that were dealt to them e.g. if Player 1 gets 4, 11, 16 (4+11+16=31) with their cards ● Step 3: Pick a random card from the deck lay this card open on the table, whichever player has a number that is closest to the opened number wins the game ● If two players have the same high number, they will each pick up one more card from the deck and add that to the sum and whoever has the highest total will win ● Example: Player 1's total is 31 and Player 2's total is 27 – if the card opened if 17 then Player 2 wins ● The winner of each round gets 2 points and the final winner is the one that has the most points at the end of 5 rounds ● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the 4 sums for each of the rounds for the 3 cards played e.g. - Player 1: 4 + 11 + 16 = 31 - Player 2: 16 + 9 + 2 = 27 - Comparison: 27 – 17 = 10 and 31 – 17 = 14 - Final: 14 is greater than 10 so 10 is the winner since it is closer

DAY 3- Today, you will continue to play games on subtraction and sequences.

Time	Activity and Description
20 minutes	**Game 6: Smaller Numbers** **Goal:** Get the most points after 5 rounds by having the largest sum in their cards **Rules:** ● Step 1: Shuffle the cards and deal 3 cards per player ● Step 2: Each player will subtract the numbers written on the cards they were dealt. ● Step 3: Players will each say the total number and the highest number will win ● If two players have the same high number, they will each pick up one more card from the deck and subtract that to the sum and whoever has the highest total will win ● Example: Player 1 has 4, 11, 16 and Player 2 has 16, 9, 2 – so Player 1's total is 16 – 11 – 4 = 1 and Player 2's total is 16 – 9 – 2 = 5 so Player 2 wins the game ● The winner of each round gets 2 points and the final winner is the one that has the most points at the end of 5 rounds

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	● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the 3 mathematical functions for each of the rounds for the 3 cards played e.g. - Player 1: 16 – 11 – 4 = 1 - Player 2: 16 – 9 – 2 = 5 - Final: 5 is greater than 1
20 minutes	**<u>Game 7: Getting Close</u>** **Goal:** Get the most points after 5 rounds by having the total number closest to the open card (a variation of the same game can be played for the winner being the one with the further number) **Rules:** ● Step 1: Shuffle the cards and deal 3 cards per player ● Step 2: Each player will subtract the numbers written on the cards they were dealt ● Step 3: Pick a random card from the deck and open this, whichever player has a number that is closest to the opened number wins the game ● If two players have the same answer, they will each pick up one more card from the deck and subtract and whoever has the closest number will win ● Example: Player 1 has 4, 11, 16 and Player 2 has 16, 9, 2 – so Player 1's total is 16 – 11 – 4 = 1 and Player 2's total is 16 – 9 – 2 = 5 so if the card 12 is opened - Player 2 wins the game ● The winner of each round gets 2 points and the final winner is the one that has the most points at the end of 5 rounds ● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the 4 mathematical function for each of the rounds for the 3 cards played e.g. - Player 1: 16 – 11 – 4 = 1 - Player 2: 16 – 9 – 2 = 5 - Comparison: 12 - 1 = 11 and 12 – 5 = 7 - Final: 11 is greater than 7 so 7 is the winner since it is closer
20 minutes	**<u>Game 8: Sequence</u>** **Goal:** Get the most points after 5 rounds by making sequences of numbers **Rules:** ● Step 1: Shuffle the cards and deal 3 cards to each player and keep the others as a closed deck. ● Step 2: Players will each have a turn where they get to either pick up a card either from the deck or the discarded pile and they also discard a card ● The player who is the first to get a sequence will win the game e.g. 1, 2, 3 or 11, 12, 13

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	● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the entire numerical sequence that you decided.

DAY 4- Today, you will continue to play games on multiplication, division operations and explore patterns of your own choice.

Time	Activity and Description
20 minutes	**<u>Game 9: Multiply Quick</u>** **Goal:** Get the most points after 5 rounds by having the largest total number after multiplying the number **Rules:** ● Step 1: Shuffle the cards from 1 - 10 and deal 2 or 3 cards per player (only deal 2 cards for younger learners) ● Step 2: Each player will multiply the numbers dealt with their cards ● Step 3: Player will call out the number they have quickly and the player with the highest number will win ● If two players have the same answer, they will each pick up one more card from the deck and multiply that too ● Example: Player 1 has 4 and 2 and Player 2 has 6 and 3 – so Player 1's total is 4x2 = 8 and Player 2's total is 6x3 = 18 so Player 2 wins the game since 18 is greater than 8 ● The winner of each round gets 2 points and the final winner is the one that has the most points at the end of 5 rounds ● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the 3 mathematical functions for each of the rounds for the 3 cards played, e.g. - Player 1: 4x2 = 8 - Player 2: 6x3 = 18 - Final: 18 is greater than 8
20 minutes	**<u>Extension: Game 10: Full Division</u>** **Goal:** Get the most points after 5 rounds by finding perfectly divisible numbers **Rules:** ● Step 1: Shuffle the cards of the numbers from 1 - 10 and deal 1 card per player ● Step 2: Keep the deck of cards of the numbers from 10 – 20 and open one card from this deck ● Step 3: Players will check if the number from the deck can be divided by the card the player has to give a whole number (i.e. not a decimal / fraction) then the player gets 2 points. If both players have the right card, they both get 2 points.

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	● If neither of the players has such a card, the players will discard the card and play again ● Example: Number opened is 14, Player 1 has the card 7 and Player 2 has the card 3 so 14 / 7 = 2 and 14 / 3 = 4.66, so player 1 gets 2 points ● The winner of each round gets 2 points and the final winner is the one that has the most points at the end of 5 rounds ● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the 2 mathematical functions for each of the rounds for the 3 cards played, e.g. - Player 1: 14 / 7 = 2 - Player 2: 14 / 3 = 4.66
20 minutes	**Game 11: Patterns:** **Goal:** Get the most points after 5 rounds by making patterns with the numbers **Rules:** ● Step 1: Shuffle the cards and deal 3 cards to each player and keep the others as a closed deck. ● Step 2: Players will each have a turn where they get to either pick up a card either from the deck or the discarded pile and they also discard a card to make a pattern. ● The player who is the first to get a pattern will win the game. ● The design pattern is the learners choice e.g. odd-even numbers (2, 8, 14 or 3, 11, 15); a pattern of the 2, 3, 4, 5 times multiplication table (2, 4, 6 or 4, 8, 12 or 10, 15, 20); a pattern that has a difference of 6 between the numbers (2, 8, 14) etc. ● Play the game and write the score on a points' sheet which has a column for each of the players with their initials/full name on it. ● Write the pattern that you decided.

DAY 5- Today, you will play a literacy game to expand your vocabulary and help with your spelling.

Time	Activity and Description
20 minutes	**Make your own cards to play a literacy game: (Literacy extention)** ● Make additional cards for each of the alphabets or for each digraphs (sh, wh, th, ph) or for some consonant-vowel-consonant endings (ad, an, am, at, in, en etc.)
20 minutes	**Game 12: Fastest Words** **Goal:** Getting the most points after 5 rounds for whichever player can make the most number of words with the chosen card in 30 seconds **Rules:**

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	• Step 1: Keep a closed deck of the alphabet, digraph and CVC word ending sounds suggested cards in the appendix • Step 2: Learners will pick a card and they will have 30 seconds to name the most number of words with that letter / digraph / CVC word ending. Example: If the letter J is picked up, player 1 can say words like: Juice, Just, Jump, Jelly etc. if the digraph "Ph" is picked up by player 1 they can say: Phone, Phonics, Photo etc. if the CVC word ending "an" is picked up by Player 1 they can say words like: Can, Man, Ran, Fan, Pan etc. • Step 3: Players get a point for each of the words said and add the points at the end of the game and the player with the most points would win • Play the game and write the score on a points' sheet which has a column for each of the players with their initials / full name on it. • Players will get 1 point for each word. After each turn the learners will write the number of points on the points sheet • Add the total points per player at the end of each of the turns of play and the one who has the maximum number is the winner

DAY 6- Today, you will present your work.

Time	Activity and Description
30 minutes	• Design your own card game using the number or letter cards – you get a chance to give your game a name, a goal and make up your own rules.
30 minutes	• Invite your family members to come play the games. • Present the games' rules to everyone and show everyone how it can be played. • The family members will be divided equally in groups to interact with everyone and play different games. • A big competition is held for all of the games and winners will be announced.

Extension Activities	• Learners can deal additional cards for all the games • Learners can create the deck up to the number 50 to make the numbers more challenging • Learners can develop more games with patterns
Modifications for Simplification	• Learners can develop a deck of cards only for the numbers from 1 – 10 to simplify the game • Learners not familiar with multiplication and division functions can omit the day 4 games. • Learners can choose only 2 cards for the addition and subtraction functions

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Assessment criteria

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

- ☐ Design math cards to use them to play games.
- ☐ Design cards to use them to play a literacy game.
- ☐ Apply the rules of the game correctly.
- ☐ Play the games and apply the functions of memory, greater / smaller than, proximity, addition-subtraction, and sequences.
- ☐ Play the games and apply the functions of division, multiplication and patterns

Appendix

Language game cards:

- Cards for the alphabet letters: A, B, R, D, H, M, N, P, S, T, V, C, E, F, L
- Cards for the CVCV words: At (e.g. Cat), Ag (e.g. Bag), Ap (e.g. Nap), En (e.g. Men), Et (e.g. Get), It (e.g. Fit), Op (e.g. Top), On (e.g. Con), Ug (e.g. Rug), Un (e.g. Fun)
- Cards for the diagraphs: Ph (e.g. Phone) Wh (e.g. What), Th (e.g. This), Sh (e.g. Show), Ch (e.g. Chat)

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