



Permutations And Combinations

Lesson Plan: Class 06 / LCR / 01



Determine the number of possible orderings of an arbitrary number of objects and to describe procedures for listing and counting all such orderings

(Rough sketch – design phase)

Overall goal of the lesson: Children will learn about permutations and combinations and difference in between both.

Prior knowledge required: Knowledge of the concept of arrangements and grouping of numbers and alphabets, word building activities (done in Std. 1, 2, 3).

MODULE 1:

Module time: 35 minutes

Goal: To give a brief introduction permutations and combinations and explain difference between the two.

Description: Children will learn about permutations and combinations and the difference between them with the help of activities.

Material required:

Physical:

1. One copy of the worksheet (Introduction to permutations and combinations) per child.
2. Writing material to solve the worksheet: pencil and eraser.

Electronic:

PPT Presentation for Introduction to permutations and combinations

Procedure Summary:

1. Distribute the worksheets (Introduction to permutations and combinations) to the children.
2. Read through the worksheet and discuss with the class the importance of permutations and combinations.

Procedure Details:

1. Slide 2: Ask a few children to pick the fruits. Write on the board their choices. Let a couple of children pick the same combination – write that also. Now explain how mango, kiwi, apple is the same as apple, kiwi, mango.
2. Slide 3: Repeat like Slide 2, try to involve other children. They should be able to answer the question.
3. Slide 4: Introduction of term combination. Make sure children understand what we mean by 'order of selection'
4. Slide 5: Definition of combination. Get the children to repeat after you. Let children come up with some more examples.
5. Slide 6: Make sure the children understand what is asked. If they are not able to proceed show them the first row. Then let them complete the rest of it on their own. See how many children can answer the additional questions at the bottom.
6. Slide 7: Answer
7. Slide 8: Go back to the chief guest example, but with a modification. See if the children can point out the difference in this example.
8. Slide 9: Make sure the children understand the inner and outer circle.
9. Slide 10 & 11: Make sure the children understand that red in the inner and red in the outer are different designs.
10. Slide 12: Introduction to permutation.
11. Slide 13: This is an activity – let the children suggest the first way the 3 children can sit on the bench.
12. Slide 14: Multiple ways they can sit. Let children participate actively. It's ok if they jump ahead and list all the ways.
13. Slide 15: Make sure children understand encoding. Let them all try to get the 6 permutations.
14. Slide 16: You can repeat the activity with 4 children from the class. Make sure their names start with different letters. Let them sit in different arrangements and write down on the board each arrangement's encoding.
15. Slide 17: The need for a rule or formula.
16. Slide 18 & 19: We are now deriving the formula for permutation so it is very important the children understand this. Go step by step.

Draw on the board like so: options for place 1

A

B

C

D

Then for A, write options for place 2 like so

A B

A C

A D

Do this for B, C and D in place 1 also.

Then, write options for place 3 like so

A B C

A B D

A C B

A C D

A D B

A D C

Do it for the other rows also.

Now the options for place 4 like so:

A B C D

A B D C

A C B D

A C D B

A D B C

A D C B

Do it for other rows also.

Basically, the children must understand how the options get multiplied.

17. Slide 19: examples and factorial concept – make sure children understand it.

18. Slide 20 & 21: Work out the formula for a subset of the group.

19. Slide 22: Verification

20. Slide 23: Notation and formula for permutation, special case of nP_n

21. Slide 24 - 26: examples and answers

Assessment:

Answer questions on the activity sheet

Information Broadcast: In Computer Science, the children learnt about the basics of permutations and combinations.