

Lesson Plans

Day 1 To learn the fundamental counting principle and how to apply it to multiple groups of objects.

Introduction: Students will be given a packet of Chernoff faces and use it to create their own “face.”

Group Work: Students will be given a worksheet and access to a variety of graham crackers, frostings, and candies. They will be instructed to create a “candy pizza” using one graham cracker, one frosting, and their choice of candies. In groups they are then to use the “pizza” to help answer questions on the worksheet.

Modeling: Teacher will help the students break down the information garnered from the worksheet into an understanding of the fundamental counting principle without repeated groups, the fundamental counting principle with repeated groups and repeated objects, and the fundamental counting principle with repeated groups but without repeated objects. Note that the end of the worksheet doesn’t really demonstrate the number of different possible pizzas.

Guided Practice: Whatever homework assignments are appropriate.

Conclusion: Review the different aspects of the fundamental counting principle.

Day 2 To learn to calculate permutations of n objects taken r at a time.

Introduction: Review the fundamental counting principle from the previous day. Put emphasis on the last part of the worksheet, repeated groups without repeated objects.

Group Work: Students will be given a worksheet to help explore factorials and permutations.

Modeling: Teacher will help students break down the explorations from the worksheet to understand factorials, permutations without repeated elements, and permutations with repeated elements. Again note that the worksheet still doesn’t demonstrate the number of different possible pizzas.

Guided Practice: Whatever homework assignments are appropriate.

Conclusion: Review different aspects of the fundamental counting principle and permutation.

Day 3 To learn to calculate combinations of a group of n objects taken r at a time.

Introduction: Review the fundamental counting principle and permutations. Focus on the problems with the order of the toppings not giving an accurate count.

Group Work: Students will be given a worksheet to help explore combinations of n objects taken r at a time.

Modeling: Teacher will help students break down the worksheet exploration into an understanding of combinations.

Guided Practice Whatever homework assignments are appropriate.

Conclusion: Review the fundamental counting principle, permutations, and combinations.

Day 4 To create student guided examples of: the fundamental counting principle, permutations, and combinations.

Introduction: Review the fundamental counting principle, permutations, and combinations of groups.

Group Work In groups the students will develop a miniature test and answer key for each of the key concepts: fundamental counting principle, permutations, and combinations. They should come out with at least 2 for each, without repeating what the teacher did.

Day 5 To review the key concepts of the unit

Group Work: In groups, students will work on the problems generated by other groups on the mini-test from the day before.

PERFORMANCE PACKAGE TASK 1

Combinatorics and Candy Pizzas

Content Standard: Algebra II

Level: Partial

Specific Statement(s) from the Standard:

8.2 THE STUDENT WILL CALCULATE THE NUMBER OF WAYS A COMPOUND EVENT MAY OCCUR USING THE FUNDAMENTAL COUNTING PRINCIPALS.

(1,2,3,11) (TL 5)

8.3 THE STUDENT WILL CALCULATE THE PERMUTATION OF A SET OF N OBJECTS TAKEN R AT A TIME.

(1,2,3,11) (TL 5)

8.3.1 Suggestion: Demonstrate experiments with and without replacement, with repeated objects, and circular arrangements.

8.4 THE STUDENT WILL CALCULATE THE COMBINATIONS OF A SET OF N OBJECTS TAKEN R AT A TIME.

(1,2,3,11) (TL 5)

Product(s):

Students will create a candy pizza and a packet of combinatoric examples and work.

Task Description:

Students will take an assortment of graham crackers, frostings, and candy toppings and make a candy pizza. The candy pizzas will then be used in conjunction with worksheets to help facilitate an understanding of the fundamental counting principle, permutations, and combinations. Students will be given a project packet or series of in class and homework explorations to emphasize each of the key concepts. This packet will be turned in at the end of the unit.

Special Notes:

Supplementary resources are needed for homework. I would attempt to use an exploration packet of work to be turned in at the end of the unit to include tree diagrams and problems for each of the key aspects of the unit.

PERFORMANCE PACKAGE TASK 1
Combinatorics and Candy Pizza

FEEDBACK CHECKLIST FOR TASK 1

The purpose of the checklist is to provide feedback to the student about his/her work relative to the content standard. Have the standard available for reference.

Y=Yes

N=Needs Improvement

<u>Student</u>		<u>Teacher</u>
_____	Appropriate and accurate counting principle tree diagram	_____
_____	Appropriate and accurate use of the fundamental counting principle	_____
_____	Appropriate and accurate permutation tree diagram	_____
_____	Appropriate and accurate permutation formula use	_____
_____	Appropriate and accurate combination tree diagram	_____
_____	Appropriate and accurate combination formula use	_____

Overall Comments (information about student progress, quality of the work, next steps for teacher and student, needed adjustments in the teaching and learning processes, and problems to be addressed):