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November 21, 2000
12th Grade

Subject: Matrices

25 students

1. OBJECTIVES / Intended Observable Outcomes
   - Students will learn to organize data and put it into a matrix
   - Students will also see and understand how matrices are used in everyday activities (ex. A shoe store manager)

2. MATERIALS / Visual Aids
   - Overhead/Overheads dealing with text
   - Textbook

3. READINESS / Prior knowledge and Skills Required

The students will have to know how to read a paragraph and retrieve the needed information. The students will also have to remember ways they have organized information they have gathered. This may help them understand the idea of matrices.

4. MOTIVATION / Anticipatory Set / Advanced Organizers / Introduction

Anticipated Time: 5-7 minutes

1. The teacher will use the Master 2 overhead when asking the students the following questions found on the overhead. (One student will come to the board and right down the list the class comes up with for question *a.*)
   a. What information might the manager of the store want to know about the kinds of shoes the customers prefer?
   b. It's not enough just to have information. The manager needs to organize and manage the information in order to make good decisions. What are some ways the manager might organize the information?

5. PROCEDURE / Instructional Strategies / Activities / Key Questions

Anticipated Time: 35 minutes

The teacher will help the class work through Investigation 1, in their textbook.

1. The class will make a list of all the different brands of athletic shoes the students in the class prefer.
2. Then they will divide these brands by how many girls and how many boys prefer each brand.
3. Once all the data is collected we will organize a table consisting of the data. The table will look similar to the example on page 3 of their textbook.
4. At this point the teacher needs to explain the **matrix**, how many **rows** and **columns** it has.
5. To see how they understand the idea of matrices the teacher will have them think of more information a shoe store manager might want to know.
   a. From that information the students need to construct a matrix to organize some of the information from the list they just developed.

b. They should also label the rows and columns and give the matrix a title.
c. When they show the other students their matrices they will say how many columns and rows it has. The class can also discuss any differences between any of the matrices constructed.

Now the teacher will divide the class into groups of 2-3 students to work on problem #4 in their book. After about 10 minutes the class will come together and discuss their answers with each other.

6. ASSESSMENT / Methods of Evaluating Student Learning

The teacher will go around the room and observe the students to see how things are going and try to make sure everyone is doing their part. When the class goes through their answers to question four the teacher will pick one from each group to answer a question to see that each group was doing their work. They will also have an assignment from the book on building a matrix from given data. These extra problems will help the teacher see how well the students are understanding the basic concept of matrices, like building them and the number of rows and columns.

7. MODIFICATIONS / Considerations of Objectives, Methods and/or Standards of "Success" for Special Needs Students

When working through the problem together at the beginning the teacher should walk around the room and this will give him/her a chance to see if the student is taking notes and trying to understand the material. The teacher could also ask the student with special needs a question about the matrix constructed. When the class gets into groups the teacher could pair up the special needs student with someone that works well with others and knows the material very well.

8. IF TIME / Extensions of Enrichment Activities

The students will work in their groups on question 5 on page 5 of their text. This problem will be handed in so the teacher can see how they are doing with the idea of matrices since it is a very new topic.

9. EVALUATION

Subsets may include:

Pre-Lesson Check List-

How much practice if any have they had with matrices?

How much time is going to be needed to go through the whole-class activity?

How much time will each group need to be able to complete the other activity successfully?

Will all the students understand this material well enough to complete their homework on matrices after today's activities?

Post-Lesson Evaluation of Teaching / Instructional-

What areas did the students have problems with?

Did all the students participate and have a good time doing the activity as a whole class and the group activity?

Did the students do well with the building of a matrix and the homework assigned out of the book?

10. SOURCES / References of Ideas

I got the idea from a lesson in the Core-Plus Mathematics Project Course 2, Part A. The lesson was from pages 1-5. I also looked at the *Principles and Standards for School Mathematics* on the web to see what topics need to be covered for the standards.

many columns would it have? Which display would you prefer? Why?

3. **a.** Knowing the brands of shoes that customers prefer certainly will help a store manager decide which shoes to stock. What other information might the manager of the store want to know about the kinds of shoes the customers prefer? Look back at the list you generated for the "Think About This Situation" on page 3. Add to your list if necessary.

   b. Construct a matrix to organize some of the information from your list in part a. Don't worry about actually collecting the information; just set up the matrix, label the rows and columns, and give the matrix a title according to the information that it will show.

   c. Compare your matrix with those made by other groups.

   - Do all the *matrices* (plural of matrix) make sense?
   - Are the row and column labels and titles appropriate?
   - How many different variables can be represented in one matrix?

Suppose you were a manager of a local FleetFeet shoe store. Data on monthly sales of Converse, Nike, and Reebok shoes are shown in the matrix below. Each entry represents the number of pairs of shoes sold.

Monthly Sales

	J	F	M	A	M	J	J	A	S	O	N	D
Converse	40	35	50	55	70	60	40	40	70	35	30	80
Nike	55	55	75	70	70	65	60	60	75	55	50	75
Reebok	50	30	60	80	70	50	10	40	75	35	40	70

4. **a.** For each shoebrand, which month has the highest sales? What could be a reason for the high sales?

   b. How many pairs of Nikes were sold over the year?

   c. How many pairs of all three brands together were sold in February?

   d. What was the mean number of pairs of Reeboks sold per month?

   e. Which brand has more variability in its monthly sales? Explain how you determined variability.

   f. What is another way that you could determine variability?

Reaction to my lesson

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I think I did a good job overall. Some things I noticed that I did was I held my hands together at my chest all the time and I said "OK" quite a bit. I think when the students were working in their groups I did a good job of walking around. I noticed that when Kelly was talking to you at the beginning of one of our activities I probably should have called on her to answer a question to get her to stop talking and get her back on track. I liked how I let everyone answer when they wanted but in a bigger class I do not know exactly how well that would work. It was interesting to watch myself; I think it went well I have just a few things I should watch for.