MAKING FUNCTIONS RELEVANT WITH THE CBL
Workshop 01--Thursday 8:00 - 10:00 AM

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Conference Booklet Description: ***Are you searching for ways to provide your students with a solid understanding of what constitutes a function? This workshop is intended for participants who have had little or no experience with the CBL (Calculator Based Laboratory) and will demonstrate how the CBL and the TI-82 Graphics Calculator can be used to help students better understand functions and related concepts.***

Rationale: Students, quite often, have difficulty grasping the concept of function. Most textbook examples simply do not help students understand the concept itself. The CBL has proved a valuable tool to help students better understand the ins and outs of functions. Domain and range are put into a real context that makes more sense to students, and the relationship of input and output variables fall easily into place.

If enough CBLs can be acquired, letting the students do their own experiments is even more helpful. However, in many cases, limited numbers of CBLs are available. This workshop was designed to acquaint the participants with the benefits of using the CBL in connection with the TI/82 both when supplies are limited, and when they are not.

Workshop Summary:

During the first hour of the workshop, participants were introduced to TI-82 Graph Link**,** a program which can be used to transfer programs between the TI-82 Graphing Calculator and a PC, print graphs created on the TI-82, and numerous other tasks. Participants transferred programs from the PC to the TI-82, and between TI-82's using the linking cord provided with the TI-82.

Attendees also participated in a large group demonstration of two simple experiments in which volunteers walked first, *away from* and then *toward* the motion detector**,** which was connected to the CBL-TI-82 Graphing Calculator-View Screen unit. The graph which represented the function was shown on the view screen as well as the data points collected. The slope of the line shown on the graph was calculated. By using the units of input-time, and output-distance when figuring the slope, the meaning of slope as a rate of change was clearly shown. In addition, changes in motion which occurred during the experiment were discussed as a means of demonstrating piece-wise defined functions and the concepts of domain and range.

Participants then suggested other movements that could be experimented with using the motion detector and those experiments were conducted. Student suggestions of additional experiments to be performed is a common occurrence in the classroom and the excitement in discovery that can be generated by using real-life experiments with the CBL was clearly demonstrated.

After the initial introduction to the CBL and other peripherals was completed, participants were given a handout which included several experiments that could be done with individual CBLs, and, in small groups, they conducted their own experiments.

HAND OUT GIVEN TO WORKSHOP PARTICIPANTS

Workshop Activities

I. Large Group Activities
   1. Introduction to CBL unit, various probes and TI/82/85 Graph Link.
   2. Introduction to TI/82 and viewscreen in connection with CBL.
      Demonstrations of experiments with audience participation.
      a. Linear Functions
      b. Piecewise Defined Functions.
   3. Keystrokes on TI/82.

II. Small Group Activities
   1. Exercises using CBL.

WALK ACTIVITY (Conducted with the large group)

Part I

1. Run the "Walk" program on the TI-82 calculator using the CBL and the motion detector.
2. Have a volunteer walk away from the motion detector for 5 seconds at a steady rate of speed.
3. Discuss what the activity represented in terms of the relationship between distance travelled and time elapsed. Have group make predictions as to what a graphical representation of the activity will look like.
4. Run the "Graphs" program on the TI-82.
5. Discuss the look of the graph. Does it match the predictions made earlier.
6. Go to L_1 and L_2 . Retrieve values for time (L_1) and distance (L_2) when graph took on a linear shape. Choose other values of (L_1 and L_2) at the end of linear shape. Record the values as ordered pairs.
7. Find a function which represents the linear part of the graph.
8. When determining slope, make sure to include axes definitions while calculating.
9. Discuss the meaning of the slope of the line.
10. Discuss the domain of the function.

Part II.

1. Repeat steps 1-10 above but this time have the volunteer walk toward the motion detector rather than away from it.

III.

1. Repeat steps 1-8 above but this time have the volunteer stand still for approximately 2 seconds before starting to walk.
2. Discuss the situation as a piecewise defined function.
3. Discuss the domain of the function as a whole and in pieces.

The following experiments given in the handout for use in the small group activities were taken from Real-World Math With the CBL System, 25 Activities Using the CBL and TI-82.

1. That's The Way the Ball Bounces. Activity 9, p. 49.
2. Chill Out. Activity 10, p. 55.
3. Stepping to the Greatest Integer. Activity 18, p. 95.
4. Match It, Graph It. Activity 19, p. 101.

Real-World Math with the CBL System, 25 Activities Using the CBL and TI-82
by Chris Bruenigsen, Bill Bower, Linda Antinone, Elisa Brueningsen