

## “CATCH THE WAVE”

**Note:** This is an adaptation of an activity from the  $T^3$  Summer Institute called  $AC^2E$  which was originally written for the TI-83.

**Materials and equipment:** people, stopwatch

**Overview:** Collect class generated data. Analyze it to find the relationship between the number of people and the time required to complete “the wave.”

**Collecting the data:** In groups of 4, 8, 12, 16, 20, ... have the participants do some form of “the wave.” (Note: you can use other size groups which are not multiples of 4)

Round 1: Begin timing – the first person stands, waves his/her arms in the air, and states his/her name and favorite college (or football team or baseball team or maybe his/her favorite mathematician ...), then sits down; the next person does the same thing, followed by the third, and then the fourth. Stop timing and record the time for this group. **THIS IS NOT A RACE!**

Round 2: Do the same as in Round 1 except include 4 MORE people (the first four and the next four which is a total of eight)

Round 3: Do the same as in Round 2 except include 4 MORE people (the first eight and the next four which is a total of twelve.)

Rounds 4, 5, 6, ... Continue rounds until all participants are in the final round. It may be that the final round could not be a multiple of 4.

# people	time (sec)

### Analyzing the data:

1. Once the data has been recorded on paper, enter the values into lists. Use L1 for the number of people in that round, and L2 contains the time required to complete the round (in seconds).
2. Create a Scatter Plot of the data using L1 and L2.
3. Discuss what you notice about the pattern the points make (if there is one). Do you think we could come up with an algebraic model that would come close to “fitting” the data?
4. Somehow generate an equation that best models this data.
5. Using the graph and/or table features to answer “what if” questions:
  - a) How long do you think it would take to do the wave if we had 10 people? (This is called **interpolation**.)
  - b) How long do you think it would take to do the wave if we had 40 people? (This is called **extrapolation**.)
  - c) What if the wave took 40 seconds, how many people would you expect that to be? (Is this interpolation or extrapolation?)

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