Drawing Conclusions

Activity Overview

This activity introduces students to the concept of collecting and analyzing data and using conjectures to formulate new questions.
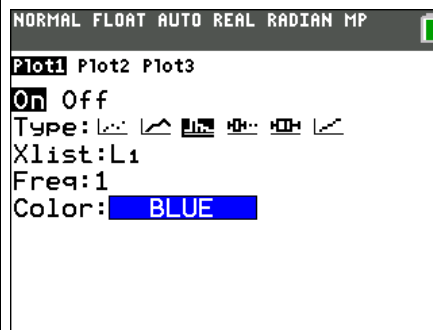
Topic: Data Analysis

- Develop and evaluate inferences and predictions that are based on data
- Use conjectures to formulate new questions and plan new studies to answer them

Materials:

Enough pieces of string, all the same length, for each student to have one.

Teacher Preparation and Notes

- **To download the student worksheet, go to education.ti.com/exchange/dc**

NORMAL FLOAT AUTO REAL RADIAN MP

Plot1 Plot2 Plot3

On Off

Type: ⌐ ⌐ ⌐ ⌐ ⌐ ⌐

Xlist:L₁

Freq:1

Color: BLUE

This activity utilizes MathPrint™ functionality and includes screen captures taken from the TI-84 Plus C Silver Edition. It is also appropriate for use with the TI-83 Plus, TI-84 Plus, and TI-84 Plus Silver Edition but slight variances may be found within the directions.

Compatible Devices:
- TI-84 Plus Family
- TI-84 Plus C Silver Edition

Associated Materials:
- Drawing_Conclusions_Student.pdf
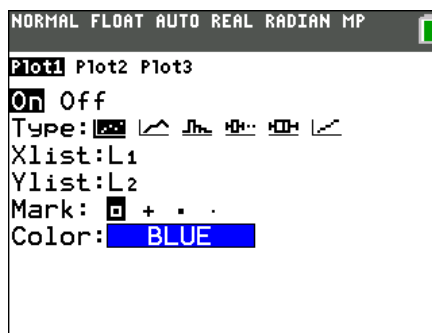- Drawing_Conclusions_Student.doc

Tech Tips:
- Access free tutorials at http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials
- Any required calculator files can be distributed to students via handheld-to-handheld transfer.

Part 1 – Estimating Length

Provide each student with a piece of string of the same length (between 20 and 40 feet) and instruct him or her to use it to mark off a distance at home. It is important that each student marks off the same length. Tell students to ask 5 people to view the distance and estimate its length to the nearest foot. A time limit should be set for estimating the distance and people should not be allowed to walk the distance or attempt to measure it in any way.

Questions 1–3

When students bring their lists back to class, all data points need to be entered into one large list. You may want to have students read off their numbers and you enter the values into **L1** or you could tell them to come one at a time to your calculator and enter the values.

Press STAT and select **1:Edit…** to access L1. If there are data values in L1, you can move to the top of the list (▲) and press CLEAR ENTER.

Once all the numbers have been entered, you can send the large list back to all calculators.

Questions 4–9

After students have received the whole list, have them set up a histogram using the data in L1. Press 2nd [STAT PLOT] to access the stat plot. After the plot is set up as shown, students can press ZOOM 9 (**ZoomStat**) to display the data.

Part 2 – Remembering Numbers

Questions 10–12

Send each student home with a list of random numbers between 0 and 9. A sample list is given on the last page of this document. Ask them to find four people to participate in a memory test. For each person, students are to read the first 2 digits on the list and ask them to repeat them. Record the number correct repeated in the table. Then, they need to read the next 3 digits on the list, ask the person to repeat them, and record the number correct. They are to repeat this process until the person has read 12 digits in a row to them. Ask students to average each row of responses for the four people tested and enter the first and last columns of the table in **L1** and **L2**, respectively.

Again, when students return to class, enter all data into two large lists. (either you entering the data they call out or having them enter the data into one calculator) After the data is compiled into L1 and L2, send the data back out to students' calculators.

Questions 13–15

After students have received the data, have them set up a new scatter plot using L1 and L2. (see right) After the data is entered and the scatter plot is set up, press ZOOM 9 to display the graph.

The data should show that most people were able to remember a small number of digits, but eventually there was a limit to how many digits they could remember.

Discussion Questions:

- Describe the shape of the graph.

- Explain what happens as the number of digits increases.

- Is the graph predictable?

- Are there any conclusions you can draw from this experiment?

- Do you think there is a limit to how many numbers a typical person can remember?

- Why do you think some people were able to remember digits better than others?

- How might you modify or extend this experiment?

Solutions – student worksheet

Part 1 – Estimating Length

1.   Distance to measure off (given by teacher): **List is based on value given to students.**

2–3. **Data will vary.**

4–6. **Histograms will vary based on data collected. Make sure the sketch shows scale and labels.**

7.   How do people's guesses compare with the actual distance? **Answers will depend on data collected.**

8–9. **Answers will depend on data collected. Students should conclude that the more data collected, the more "centralized" the majority of the data is.**

Part 2 – Remembering Numbers

10–11. **See students' work. Tables will vary but should be complete and reflect the general trend of the class.**

12. **Scatter Plots will vary based on data collected. Make sure the sketch shows scale and labels.**

13. How is the overall shape of this graph different from the one in Problem 1?

   Answer: Scatter plots will depend on data collected. Students should see that the histogram was symmetrical or peaks in the middle, where as the scatterplot peaks on the left side and is not symmetrical.

14. Is the graph predictable? Are there any conclusions you can draw from this experiment?

   Answer: Students should see that most people remember about the same amount of correct numbers and they could likely predict how many numbers another given person will remember.

15. Do you think there's a limit to how many numbers a typical person can remember? Explain.

   Answers will vary but should be supported by the data collected.

Sample List

{2 7}

{9 2 3}

{0 9 1 0}

{7 3 6 5 0}

{9 5 3 8 2 4}

{8 6 9 6 1 9 4}

{5 8 9 2 2 1 0 7}

{0 4 3 9 0 8 6 2 9}

{2 6 8 1 4 4 2 8 5 4}

{6 0 5 2 0 9 8 2 7 2 1}

{7 2 5 8 9 4 0 4 6 3 8 7}

Or have students use the **randInt** command. Press MATH and select **randInt(** from the **PROB** menu. The randInt wizard will open. Then enter 0, 9, and 2 as shown. Highlight Paste and press ENTER to be taken back to the Home Screen. Press ENTER to display the first two random integers.

 Use the up arrow to highlight the **randInt** command and press ENTER to copy and paste the command. Use the left arrow to highlight the 2 and type in 3 ENTER.

Continue this process until you generate a list of 12 random integers. If necessary, use the left and right arrow keys to view all of the numbers in a list.