It's Out Of The Park

ID: 12541

Time required
45 minutes

Activity Overview

This activity gives students an opportunity to select and create the most appropriate graph to represent a given data set.

Topic: Statistics and Data Analysis

- *Select and use appropriate statistical methods to analyze data*

- *Discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots.*

Teacher Preparation and Notes

- *The lists provided with this activity need to be loaded on all calculators.*

- *TI-Navigator is not required for this activity, but an extension is given for those teachers that would like to use it. TI-Navigator can also be used to transfer the lists and then this activity can be used as-is.*

- ***To download the student worksheet, calculator lists, and TI-Navigator file, go to education.ti.com/exchange and enter "12541" in the quick search box.***

Associated Materials

- *MGAct26_Graphs_worksheet_TI73.doc*

- *MGAct26_LrnChk_TI73.edc*

- *HomerunL1.73l – HomerunL5.73l*

- *LNMBR.73l and LTYPE.73l*

Suggested Related Activities

To download the activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

- *Going... Going… Gone (TI-73 Explorer and TI-Navigator) — 6694*

- *How Many States Have You Visited? (TI-84 Plus) — 8023*

- *Car Sales (TI-84 Plus) — 6027*

Problem 1 – Creating a Scatter Plot

Before you begin the activity, send the seven lists to students. If you send the list to one student, that student can then send it to another student.

A description of each list is as follows:

> **L1** (years from 1980 – 2004)
>
> **L2** (most home runs hit by a single player for the years given in L1)
>
> **L3** (total number of career home runs hit by the top 100 home run hitters)
>
> **L4** (number of home runs hit in 2004 by top 25 home run hitters for the American League)
>
> **L5** (number of home runs hit in 2004 by top 25 home run hitters for the National League)
>
> **TYPE** (each hit type: 1 = single,2 = double, 3 = triple, 4 = home run)
>
> **NMBR** (the total number of each type of hit during the 2004 MLB season)

Questions 1-3

Students are asked to set up a scatter plot in Problem 1. If students have prior experience with setting up stat plots, little supervision may be needed.

To access the stat plot, press 0   )   and press e   at **Plot1**. If you need to change the list names, move to **Xlist** and press 0   6   and select the correct name from the list. Repeat for Ylist.

Once the stat plot is set up, students can press +   and select **ZoomStat** to have the calculator select a viewing window. It is also good practice to have students look at the data and select appropriate minimums and maximums.
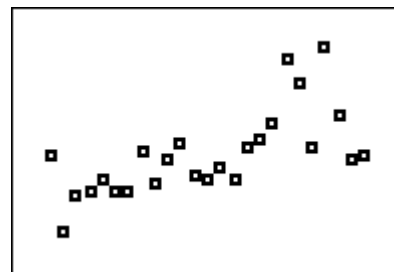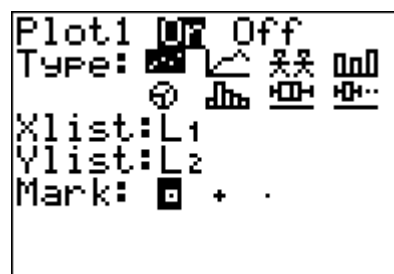
Discuss with students how they can use the scatter plot to describe the data (to see the general trend of the data). It may help to discuss the specifics of the data. They should see that the number of homeruns generally increases over the years.

Also, if students have not used the Plot set up screen much, you may want to give them time to explore the different types of graphs and the data needed for each. They will likely be excited about the pictograph plot and the different symbols that appear along the bottom of the screen.

Problem 2 – Creating a Histogram

<u>Question 4</u>

After discussing the scatter plot, have students move to the histogram. Again, access the Stat Plot menu and change the set up of **Plot1** to a histogram using L3.

In this case, have students set up the window (*   ) with an Xmin of 300, Xmax of 800 and Xscl of 50.

<u>Questions 5-8</u>

Students should press the `,`   key and explore the graph. Ask questions about the different bars, including the bar that is empty.

Discuss with students how they can use the histogram to describe the data. It describes the frequency of a category. (A circle graph also does this.) They should see that many players have a few home runs and that fewer players have many home runs.

Have students adjust the **Xscl** of the window (i.e. the width of the bars of the histogram) to see what happens. In pairs or small groups, they can discuss how you can change the look of the graph even though the data hasn't changed. They should see that the height of the bars and the number of bars change.
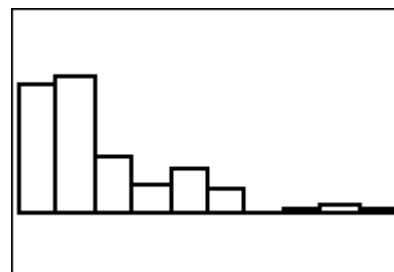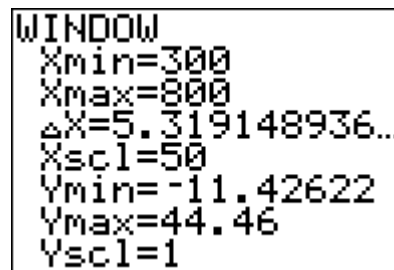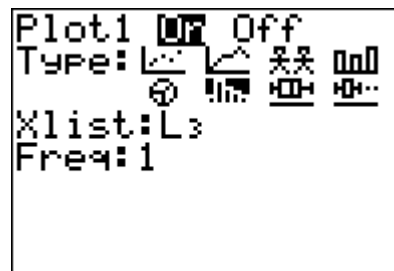
Problem 3 – Creating Box Plots
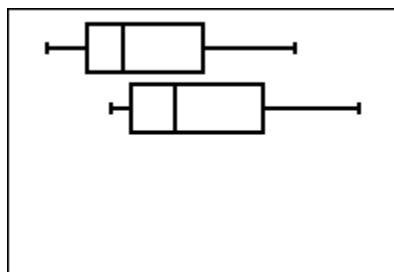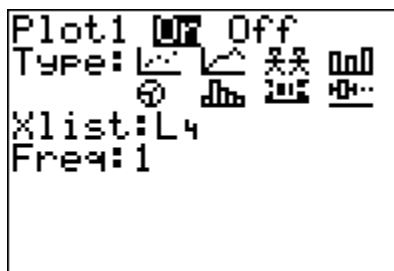
<u>Questions 9-11</u>

Students explore a box-and-whisker plot. In this example, they will use both **Plot1** (L4) and **Plot2** (L5).

Again, to select the list name, press `0`   `6`   and move down to the needed list and press `e`   . This will enter the list name in the Xlist field.

Press `+`   and select **ZoomStat** to display the graph. The `,`   key will allow students to explore the various parts of the graph. To move from Plot 1 (L4) to Plot 2 (L5), students need to use the up and down (`&` `'`) arrows. The graph they are tracing will be displayed in the upper left corner.

Ask students questions to compare the two sets of data. Are the minimums of both sets of data close together?

The maximums? Help students see that box plots are a great way to compare the statistics of two different sets of data.

**Problem 4 – Creating a Circle Graph**

<u>Questions 12-14</u>

Students should again explore the graph and the data shown. They may also want to change the setting from Number to Percent and see what additional information they see in the circle graph.

Ask questions to help students see that a circle graph makes it easy to see how one category compares to the whole.

<u>Question 15</u>

Through this exercise, students should have a better understanding of the benefits of the different types of data graphs.
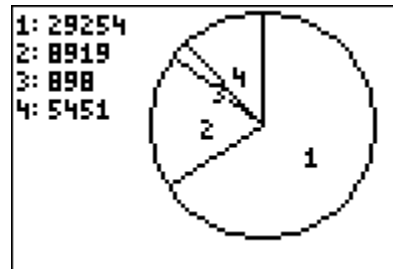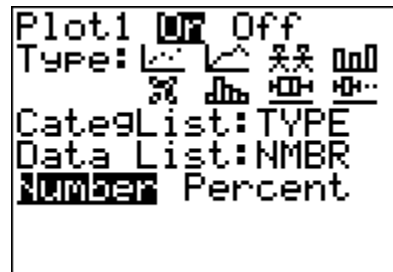

Extension – TI-Navigator™

1. To begin the lesson, open the file *MGAct26_LrnChk_TI73.edc* on the computer. Drag the window divider so the questions in the right column cannot be seen by the students.

2. Highlight the first question and click **File > Send > Item as Quick Poll**. This will reveal the LearningCheck™ question in the Poll Prompt window of **Quick Poll**. Instruct students to choose the description with the best graph type (histogram, circle graph, double box plot, scatter plot).

3. Repeat Step 2 for the remaining three questions. Tell students that they will use their answers to make graphs representing home run data. The first description (year versus maximum number of homeruns hit by a player) must be graphed as a scatter plot because this data set represents two-variable data. The other descriptions are interchangeable; however, the following choices are recommended:

   2 → A (Histogram: a large data set can be grouped in intervals);

   3 → C (Box-plot: two plots can be displayed, one for the AL and one for the NL);

   4 → B (Circle Graph: categories combine to represent a whole)

4. Use TI-Navigator to send the lists to students for the activity.

5. Use **Screen Capture** to monitor student progress throughout the lesson.

Solutions – student worksheet

<u>Problem 1</u>

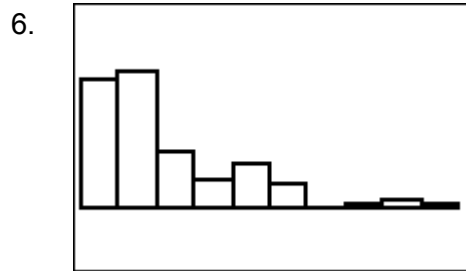1. Check students' work.

2.
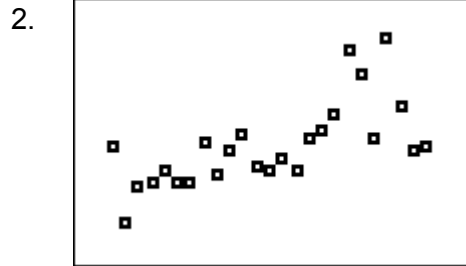
3. Students should see that you can determine trends over time. In this case, there appears to be more homeruns hit as time passes.

<u>Problem 2</u>

4. Check students' work.

5. This graph only uses one list. I had to select a scale for the width of each bar in the graph.
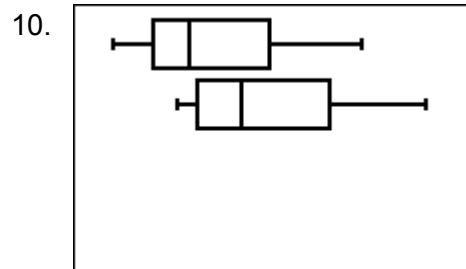
6.

7. It is easier to compare the different sections to each other. The height of the bar makes it easier to see which group has the most and which has the least.

8. If I make the Xscl 100, there are fewer bars because it has combined that data into the same bar.

<u>Problem 3</u>
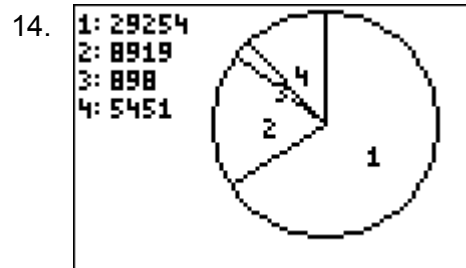
9. Check students' work.

10.

11. This graph allows me to compare two sets of data.

12. The American League has less homeruns overall than the National League.

<u>Problem 4</u>

13. Check students' work.

14.

15. It is easier to compare one group to the whole and to the relative size of other categories.

16. Answers will vary. Students' explanations should align with the material learned in the lesson. Explanations should match the example graphs used in the exercises.