Order Pears
ID: 11638

Time Required
15 minutes

Activity Overview
In this activity, students will investigate ordered pairs. They will graphically explore the coordinates of a point on a Cartesian plane by identifying characteristics of a point corresponding to the coordinates. Students will plot ordered pairs of a function, list these in a table of values, and graph them in a scatter plot.

Topic: Functions & Relations
- *Cartesian coordinate system*
- *Characteristic of ordered pairs in a quadrant*
- *Graph ordered pairs on a scatter plot*

Teacher Preparation and Notes
- *Before beginning the activity, students should clear all lists and turn off functions. To clear the lists, press* 2nd [MEM] *and scroll down until the arrow is in front of* **ClrAllLists**. *Press enter twice. To clear any functions, press* Y= *and then press* CLEAR *when the cursor is next to each Y= equation.*
- *This activity can serve as an introduction to ordered pairs, quadrants, graphing points and see the connection between a function and a graph.*
- ***To download the student worksheet, go to education.ti.com/exchange and enter "11638" in the keyword search box.***

Associated Materials
- *OrderPears_Student.doc*

Suggested Related Activities
To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.
- *"Fishing for Points" – Transformations Using Lists (TI-84 Plus family) — 8823*
- *Graphing Pictures (TI-84 Plus family) — 8659*
- *Solutions (TI-84 Plus family with TI-Navigator) — 6037*
- *Coordinate Graphing (TI-84 Plus family with TI-Navigator) — 6183*

Problem 1 – Ordered Pair

First, students explore the coordinates of a point in the various quadrants. They will enter the coordinates of a given point into lists **L1** and **L2**, where L1 is the *x*-value and L2 is the *y*-value. There should only be one number in each list at all times. Then students will graph the coordinate as a scatter plot using **Plot1**.

Students should press ZOOM and select **ZStandard** to see the standard viewing window. After selecting **ZStandard** for the first point, they can then press GRAPH for the other points.

Explain to students that when the first or second number in an ordered pair is equal to zero the point is on the *x*- or *y*-axis and is not in a **quadrant** since it is on the boundary between quadrants.

After students answer the questions about what quadrant an ordered pair is in, they will explore where ordered pairs are in general. They need to turn off **Plot1** and then press GRAPH. When students move the cursor, the coordinates will not be integers, but they should still be able to conjecture where the *x*- and *y*-values are positive and negative.

Ask students to tell you where specific points will fall, without using the calculator.

- Where will (5, 1) fall? *Quadrant 1* If it is in Quadrant 1, where will (–5, 1) fall? *Quadrant 2* (5, –1)? *Quadrant 4* (–5, –1)? *Quadrant 3*

- Continue with similar questioning until all students feel comfortable with the four quadrants.

Then students are to apply what they learned by plotting points to solve a puzzle. The solution of the puzzle is "MATH ROCKS."
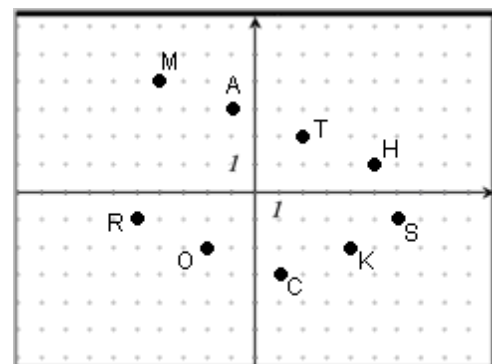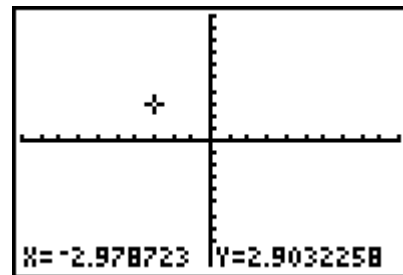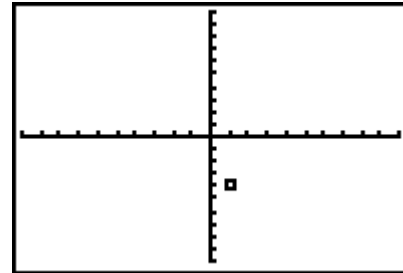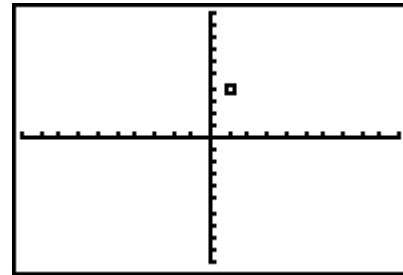
Problem 2 – Order Pears

Students are given a function for the cost of ordering pears. They need to enter 5 ordered pairs into lists **L1** and **L2**. Then they will set up **Plot1** to display the scatter plot of the pairs.
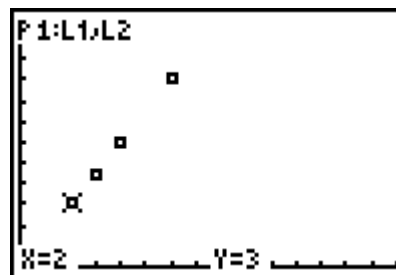
To set an appropriate window, students can press WINDOW and change the settings individually or press ZOOM and select **ZoomStat**.

Pressing TRACE and using the arrow keys will allow students to see the *x*- and *y*-value of a point.

Lastly, students will graph the line **y = 1x** and then adjust the slope so that the line goes through the ordered pairs of the scatter plot. This means that they will need to change the number from 1 as needed.
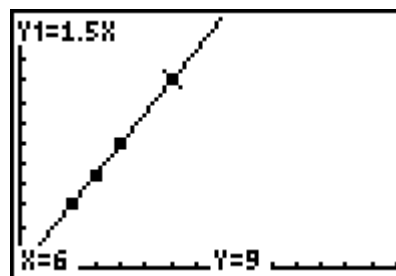
Students should see that the slope of the line is the same as the coefficient of the function given for the cost of ordering pears.

The **Manual-Fit** regression can also be used to allow students to adjust the line of fit on the graph screen. Press STAT, arrow to the CALC menu and select **Manual-Fit**. Press ENTER when Manual-Fit appears on the Home screen. Students can then adjust the slope and *y*-intercept until the equation fits their data. Once students are satisfied with the line, they can press Y= to see the equation.
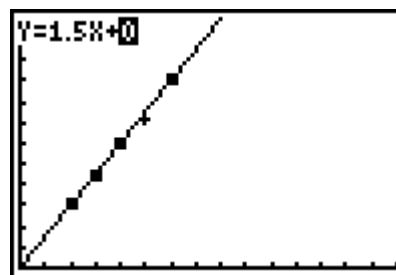
Extension

Extension 1

Students are to find some other real-life data and then represent it as a set of ordered pairs, table, and scatter plot. Teachers can show students how to use the Graph-Table split (found in the MODE screen) to see the graph and table at the same time.
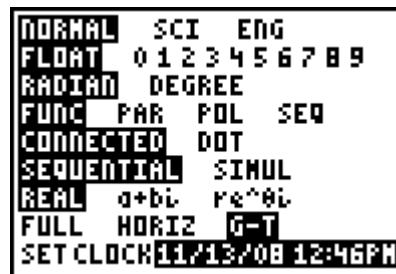
Extension 2

Students are to come up with their own puzzle like the one page 1 of the worksheet, which spelled "math rocks". They can share their puzzle with a friend or the class. Or students can draw a picture on a coordinate grid and identify key coordinate pairs. They then create two lists of *x*- and *y*-values to exchange with a partner. The partner will then redraw the image. Also, students could be given an image or two for practice. Trees and leaves make good examples.