

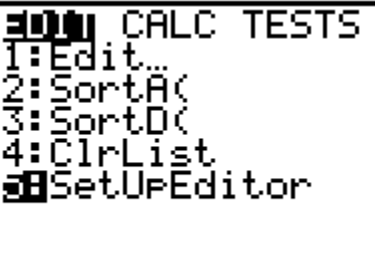




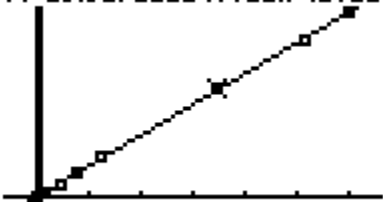
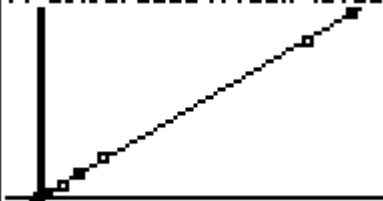
NSES Content Standards:

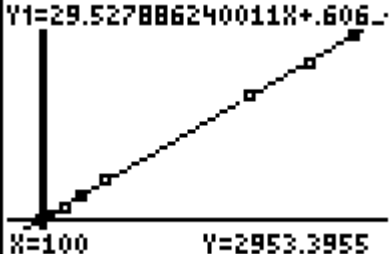
- Unifying concepts and processes in science.
- Science as inquiry.
- Physical science.
- Science and technology.
- Science in personal and social perspectives.
- History and nature of science.

<p><b>Activity 4: An Ounce of Prevention</b></p>	
<p>In this activity we will:</p> <ul style="list-style-type: none"> <li>• Collect measures off of containers for the volume in both milliliters and ounces.</li> <li>• Combine your data with the others in your class.</li> <li>• Enter the data into your handheld and explore it.</li> <li>• Set up a plot to determine the relationship between the two measures.</li> <li>• Give this relationship a name.</li> <li>• Predict values for volumes in one unit, given the other.</li> <li>• Check your relationship with the Truth.</li> </ul>	
<p>As homework, find 3 containers – one large, one medium, and one small. Read the label and record the number of ounces and milliliters.</p>	
<p>Send your data to your teacher and then collect the data from the rest of the class.</p>	
<p>Enter the data into your handheld. Start by using the Setup Editor. From the Home Screen – press <b>2nd</b><b>MODE</b><b>CLEAR</b>.</p>	
<p>To get the command you need to press <b>STAT</b><b>5</b>.</p>	

	<pre>SetUpEditor</pre>																																
<p>Now we will name the two lists we plan to use to hold the measures we collected and a list for the size. Press <b>2nd</b><b>ALPHA</b> to lock into the alphabet mode. You will need to press <b>ALPHA</b> to take yourself out of the alphabet to get the comma. The three list names are: SIZE, OZ, and ML. Press <b>ENTER</b> to finish.</p>	<pre>SetUpEditor SIZE ,OZ,ML Done</pre>																																
<p>Now look at the List Editor by pressing <b>STAT</b><b>ENTER</b>.</p>	<table border="1"> <thead> <tr> <th>SIZE</th> <th>OZ</th> <th>ML</th> <th>1</th> </tr> </thead> <tbody> <tr> <td>-----</td> <td>-----</td> <td>-----</td> <td></td> </tr> </tbody> </table> <pre>SIZE(1) =</pre>	SIZE	OZ	ML	1	-----	-----	-----																									
SIZE	OZ	ML	1																														
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<p>Let's code the data for size using 1 for small, 2 for medium, and 3 for large. Key in the data for the class. Double check it for accuracy.</p>	<table border="1"> <thead> <tr> <th>SIZE</th> <th>OZ</th> <th>ML</th> <th>1</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4.4</td> <td>130</td> <td></td> </tr> <tr> <td>2</td> <td>32</td> <td>946</td> <td></td> </tr> <tr> <td>3</td> <td>150</td> <td>4430</td> <td></td> </tr> <tr> <td>1</td> <td>.27</td> <td>8</td> <td></td> </tr> <tr> <td>2</td> <td>20</td> <td>591</td> <td></td> </tr> <tr> <td>3</td> <td>128</td> <td>3780</td> <td></td> </tr> <tr> <td>1</td> <td>3.1</td> <td>93</td> <td></td> </tr> </tbody> </table> <pre>SIZE = {1, 2, 3, 1, 2, ...</pre>	SIZE	OZ	ML	1	1	4.4	130		2	32	946		3	150	4430		1	.27	8		2	20	591		3	128	3780		1	3.1	93	
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<p>Can you guess a number and operation that you could use to change the ounces to milliliters, such as add 7 or divide by 2? Test out a few data pairs. How well did your class do picking small, medium, and large containers?</p>																																	
<p>To set up the plot we can use the SciTools APP. Press <b>APPS</b><b>ALPHA</b>S to get down to the S APPS and then highlight the SciTools APP and press <b>ENTER</b><b>ENTER</b>.</p>	<pre>APPLICATIONS 1: Finance... 2: ALG1CH5 3: ALG1PRT1 4: AreaForm 5: CabriJr 6: CBL/CBR 7: CellSheet</pre>																																

	<p><b>APPLICATIONS</b></p> <ul style="list-style-type: none"> <li>↑ SciTools</li> <li>: SmartPad</li> <li>: SMILEMth</li> <li>: SolveIt</li> <li>: Start-up</li> <li>: StudyCrd</li> <li>↓ TestGard</li> </ul> <hr/> <p style="text-align: center;">  <b>TEXAS INSTRUMENTS</b>          Science Tools           1.10          PRESS A KEY          © 2001 TEXAS INSTRUMENTS       </p>
<p>Select the Graph Wizard.</p>	<p style="text-align: center;"><b>SELECT A TOOL</b></p> <ul style="list-style-type: none"> <li>1: SIG-FIG CALCULATOR</li> <li>2: UNIT CONVERTER</li> <li><input checked="" type="checkbox"/> 3: DATA/GRAPHS WIZARD</li> <li>4: VECTOR CALCULATOR</li> </ul> <p style="text-align: center;">(EXIT)</p>
<p>We already have the data entered so we can go straight to the PLOTDATA option. Press the softkey - <b>WINDOW</b>,</p>	<p style="text-align: center;"><b>DATA/GRAPHS WIZARD</b></p> <p style="text-align: center;">         DATA = NEW/EDIT DATA  <input checked="" type="checkbox"/> = PLOT DATA          STAT = ANALYZE DATA       </p> <p style="text-align: center;">(DATA) <input checked="" type="checkbox"/> (STAT)</p>
<p>Tell the computer to use the Scatter Plot by pressing the softkey <b>Y=</b>.</p>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> = SCATTERPLOT (2 VAR)</li> <li><input checked="" type="checkbox"/> = XY LINE (2 VAR)</li> <li><input checked="" type="checkbox"/> = MOD. BOXPLOT (1 VAR)</li> <li><input checked="" type="checkbox"/> = HISTOGRAM (1 VAR)</li> </ul> <p style="text-align: center;"> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> </p>
<p>Now select the independent variable (x). In this pass through we would like to use the ounce list OZ.</p>	<p style="text-align: center;"><b>INDEPENDENT VARIABLE (X):</b></p> <ul style="list-style-type: none"> <li>1: LARM    7: LML    D: LSIZE</li> <li>2: LC      8: BLOZ   E: LSTEP</li> <li>3: LF      9: LPROB F: LTAILS</li> <li>4: LHEADS A: LRATB G: LTALL</li> <li>5: LHOOR   B: LRH    H: LTEMP</li> <li>6: LLEG    C: LSHOE I: LTFALL</li> </ul>

<p>Then you will need to let the computer know that the dependent variable will be ML.</p>	<p>DEPENDENT VARIABLE (Y):            1: LHEADS 7: LTHEAD  <input checked="" type="checkbox"/> LML            3: LOZ            4: LPROB            5: LTAILS            6: LTFALL</p>										
<p>Look at the pattern in the plot. How well did we do with the distribution of small, medium, and large? Press <b>TRACE</b> and the <b>▶◀</b> to explore. Notice the gap in the sample to the right.</p>	<p>F1: OZ, ML</p>  <p>X=32 Y=946</p>										
<p>To get the name of the relationship press <b>2nd</b>[QUIT] and select the kind of regression that is best.</p>	<p>CHOOSE A FIT METHOD</p> <table border="0"> <tr> <td><input checked="" type="checkbox"/> 1: LIN REG</td> <td>6: CUBIC REG</td> </tr> <tr> <td>2: EXP REG</td> <td>7: QUART REG</td> </tr> <tr> <td>3: LN REG</td> <td>8: MED-MED</td> </tr> <tr> <td>4: PWR REG</td> <td>9: LOGISTIC</td> </tr> <tr> <td>5: QUAD REG</td> <td></td> </tr> </table>	<input checked="" type="checkbox"/> 1: LIN REG	6: CUBIC REG	2: EXP REG	7: QUART REG	3: LN REG	8: MED-MED	4: PWR REG	9: LOGISTIC	5: QUAD REG	
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<p>How does this expression relate to your guess on how to change from ounces to milliliter? Why would you expect b to be zero? Is it zero? Why? Press <b>Y=</b> to see it.</p>	<p><b>2nd</b>[Y=] Plot2 Plot3</p> <p><math>\sqrt{Y_1 = 29.527886240011X + .6068656789}</math></p> <p><math>\sqrt{Y_2 = X}</math>  <math>\sqrt{Y_3 =}</math>  <math>\sqrt{Y_4 =}</math>  <math>\sqrt{Y_5 =}</math></p>										
<p>Press <b>TRACE</b> <b>▶▶◀◀</b> to explore the relationship between ounces and milliliters.</p>	<p><math>Y_1 = 29.527886240011X + .606</math></p>  <p>X=86.603681 Y=2557.8305</p>										
<p>Use your rule to predict values. Key in a number of ounces and press <b>ENTER</b>.</p>	<p><math>Y_1 = 29.527886240011X + .606</math></p>  <p>X=100</p>										

	
<p>Now let's see the True relationship between ounces and milliliters. Press <math>\text{2nd}</math><math>\text{[QUIT]}</math><math>\text{2nd}</math><math>\text{[QUIT]}</math> to get back to the Menu to select the Unit Converter. Press <math>\text{2}</math> to select it.</p>	<pre> SELECT A TOOL 1: SIG-FIG CALCULATOR 2: UNIT CONVERTER 3: DATA/GRAPHS WIZARD 4: VECTOR CALCULATOR  (EXIT)         </pre>
<p>We have been studying volume, so select that option.</p>	<pre> UNIT CONVERTER 1: LENGTH      7: MASS 2: AREA        8: FORCE/WT 3: VOLUME      9: PRESSURE 4: TIME        A: ENERGY/WORK 5: TEMP        B: POWER 6: VELOCITY    C: SI PREFIXES  (CONSTANT)         </pre>
<p>We want to know what 1 ounce is in milliliters so we key in 1, highlight oz and <math>\text{ENTER}</math> then highlight ml and <math>\text{ENTER}</math> again.</p>	<pre> VOLUME cm³  mL  L  m³  tsp tbsp  in³  ozuk  oz  cup pt    qt    gal  galuk  ft³  1E0 oz▶  (CONSTANT) (EXPT) (COPY) (EDIT)         </pre>
<p>Notice the use of scientific notation. How well did we do? Test out some other values.</p>	<pre> VOLUME cm³  mL  L  m³  tsp tbsp  in³  ozuk  oz  cup pt    qt    gal  galuk  ft³  1E0 oz▶           2.957353E1 mL  (CONSTANT) (EXPT) (COPY) (EDIT)         </pre>
<p>Repeat the process going the other way. Let ML be the x-value and OZ be the y-value.</p>	
<p>What other units could you do this with? How about slugs and kilograms?</p>	