

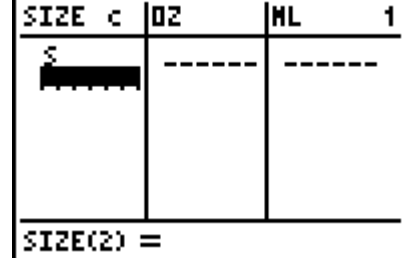
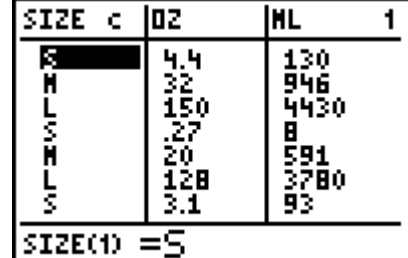
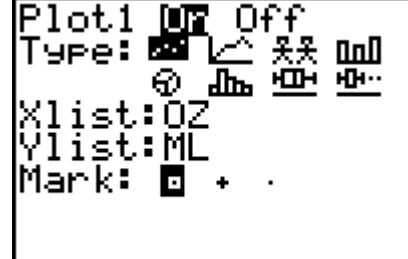
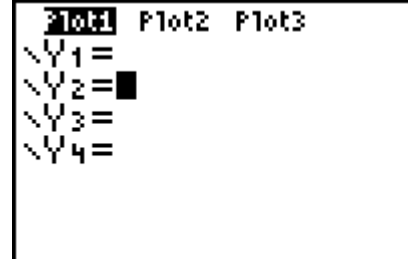
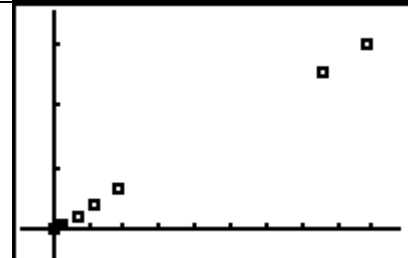


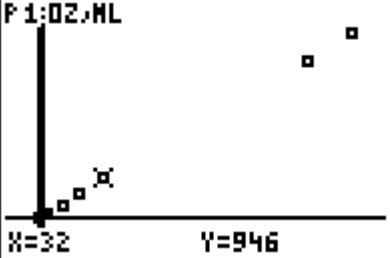
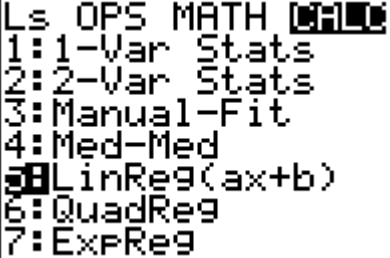
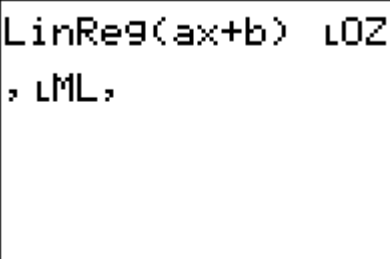
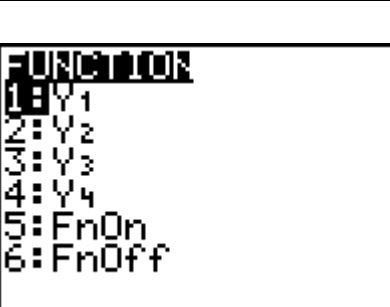
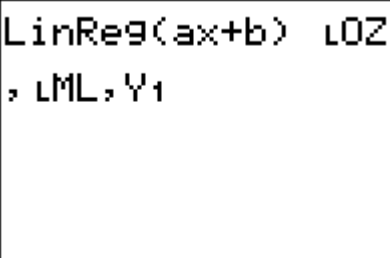
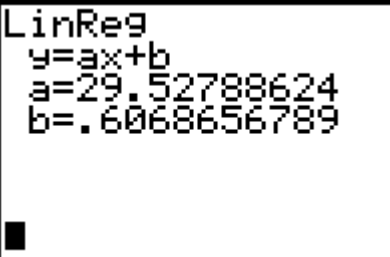
NSES Content Standards:

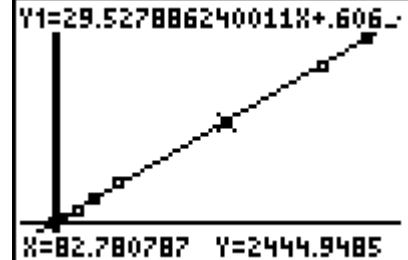
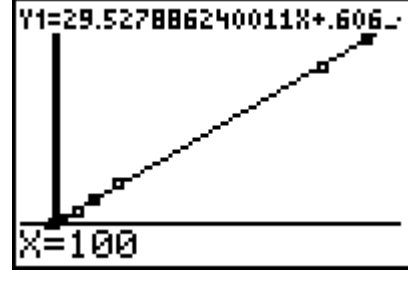

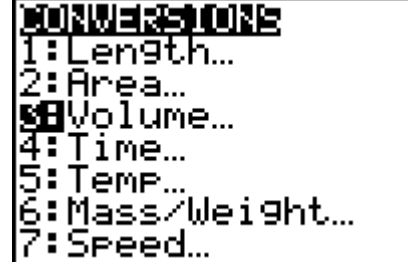
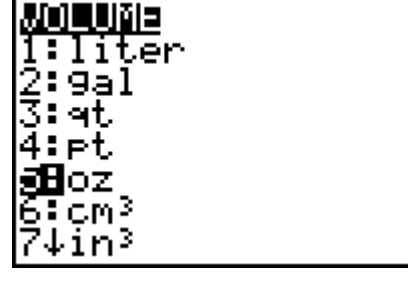

- Unifying concepts and processes in science
- Science as inquiry
- Physical science
- Science and technology
- Science in personal and social perspectives
- History and nature of science

<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. 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 <code>[2nd][MODE][CLEAR]</code>.</p>	
<p>To get the command you need to go to the <b>CATALOG</b> by pressing <code>[2nd][CATALOG]</code>.</p>	<pre>CATALOG ▶Ab/c ▶Ab/c↔d/e abs( and Ans augment( Autosimp</pre>

<p>Then using the alphabet select <b>S</b> to get to that part of the catalog. Press <math>\boxed{2nd}\boxed{[TEXT]}</math> to get the alphabet.</p>	<pre> A B C D E F G H I J K L M N O P Q R <b>S</b> T U V W X Y Z         </pre>								
<p>Now go down the list and select <b>SetUpEditor</b>. Highlight it and press <math>\boxed{ENTER}</math>.</p>	<pre> CATALOG Select( Send( seq( SetConst( SetMenu( <b>SetUpEditor</b> Shade(         </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 <math>\boxed{2nd}\boxed{[TEXT]}</math> to get to the alphabet and key in the three list names: SIZE, OZ, and ML. Don't forget to highlight Done and press <math>\boxed{ENTER}\boxed{ENTER}</math> to set up the three lists.</p>	<pre> SetUpEditor SIZE ,OZ,ML Done █         </pre>								
<p>Now look at the List Editor by pressing <math>\boxed{LIST}</math>.</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> <p>SIZE(1) =</p>	SIZE	OZ	ML	1	█	---	---	
SIZE	OZ	ML	1						
█	---	---							
<p>Enter the data for size using S for small, M for medium and L for large. With the cursor in the 1<sup>st</sup> position on the SIZE list, go to the alphabet by pressing <math>\boxed{2nd}\boxed{[TEXT]}</math>. To put in letters – categorical data – you must start with a quote for the 1<sup>st</sup> data point. Assuming your first point is small, key in “S” and then highlight Done and press <math>\boxed{ENTER}\boxed{ENTER}</math>.</p>	<pre> A B C D E F G H I J K L M N O P Q R <b>S</b> T U V W X Y Z &lt; &gt; " _ = ≠ &gt; ≥ &lt; ≤ and or <b>Done</b> " S "         </pre>								

<p>Now you can enter more sizes or fill in across with the ounces and then milliliters. Key in all of the data. Notice the C in the top of the SIZE list. This means that all the data in that list will be treated as words.</p>	 <pre> SIZE c   OZ   ML   1 ----- ---- ---- --- S                  </pre>
<p>Double check your data for accuracy.</p>	 <pre> SIZE c   OZ   ML   1 ----- ---- ---- --- S        4.4   130   M        32    946   L        150   4430   S        .27   8     M        20    591   L        128   3780   S        3.1   93    </pre>
<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>Set up the plot by pressing <math>\text{2nd}[\text{PLOT}][1]</math>. Don't forget to get the list names from the list of list at <math>\text{2nd}[\text{STAT}]</math>.</p>	 <pre> Plot1 <input checked="" type="checkbox"/> Off Type: <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>       <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Xlist: OZ Ylist: ML Mark: <input checked="" type="checkbox"/> + . </pre>
<p>Look at the Y= editor and make sure you have only plot turned on and that all the equations are gone or turned off as well. Press <math>\text{Y=}</math>.</p>	 <pre> Plot1 Plot2 Plot3 /Y1 = /Y2 = /Y3 = /Y4 = </pre>
<p>Set the window with the ZoomStat option. Press <math>\text{ZOOM}[7]</math>.</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>Let us have the computer name the line that represents the relationship shown between ounces and milliliters. Press <b>2nd</b><b>[STAT]</b><b>◀</b><b>[5]</b> to get the linear regression option.</p>	
<p>Now we need to get the list names for the x and y values. These are located in the list of lists. Press <b>2nd</b><b>[STAT]</b>. Don't forget the comma to separate.</p>	
<p>You will need to place the regression equation in the Y= editor, so press <b>2nd</b><b>[VARS]</b><b>2</b><b>[1]</b></p>	
<p>Press <b>ENTER</b> to make it happen.</p>	
<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?</p>	

<p>Press <b>TRACE</b> <math>\downarrow</math> <math>\rightarrow</math> <math>\leftarrow</math> to explore the function.</p>	
<p>Use your rule to predict values. Key in a number of ounces and press <b>ENTER</b>.</p>	
<p>Now let's see the True relationship between ounces and milliliters. Press <b>2nd</b><b>QUIT</b><b>CLEAR</b> to get back to Home Screen and cleaned up.</p>	
<p>We want to know what 1 ounce is in milliliters so we key in 1 and then go to the CONVERT Menu. Press <b>2nd</b><b>CONVERT</b> and select the volume option <b>3</b>.</p>	
<p>We have ounces so highlight oz and press <b>ENTER</b>.</p>	
<p>Now we have a problem. There is no choice for milliliter. We could choose liter and then multiply by 1000 though. Pick option 1 and press <b>ENTER</b><b>ENTER</b>.</p>	

<p>Multiply by 1000 and see how well you did.</p>	<pre>1 oz▶liter       .0295735296 Ans*1000       29.57352956 █</pre>
<p>Repeat the process going the other way. Let ML be the x-value and OZ be the y-value. What other units could you do this with? How about slugs and kilograms?</p>	