



<p>Ministry Licensed Resource Title:</p>	<p>TinkerPlots</p>
<p>Description of resource</p>	<p>TinkerPlots (Version 2) is data analysis and modelling software. This software allows students to use provided data sets, import data from other applications (i.e. Excel spreadsheets) or the Web, or enter data themselves. Once data has been acquired, students can build graphs quickly, making choices related to graph type, increment size on the axes, titles, labels and which attributes/variables are included so as to best represent (or misrepresent) the data. Students can also use this software to calculate measures of central tendency and remove/include outliers to see how these measures are affected.</p>
<p>Curriculum Connections</p>	<p><b>Grade 7 Mathematics: Data Management and Probability</b></p> <p>For all of the approaches to this task:</p> <p><u>Overall Expectation:</u></p> <ul style="list-style-type: none"> <li>• make and evaluate convincing arguments, based on the analysis of data</li> </ul> <p><i>Specific Expectations:</i></p> <ul style="list-style-type: none"> <li>• read, interpret and draw conclusions from primary data and from secondary data presented in charts, tables, graphs;</li> <li>• identify and describe trends based on the distribution of the data presented in tables and graphs, using informal language;</li> <li>• make inferences and convincing arguments that are based on the analysis of charts, tables and graphs</li> </ul> <p>For the approaches to this task that involve the collection of data by students:</p> <p><u>Overall Expectation:</u></p> <ul style="list-style-type: none"> <li>• collect and organize categorical, discrete or continuous primary and secondary data and display the data using charts and graph</li> </ul> <p><i>Specific Expectations:</i></p> <ul style="list-style-type: none"> <li>• collect data by conducting a survey or an experiment to do</li> </ul>

with themselves, their environment, issues in their school or community, or content from another subject and record observations or measurements

- collect and organize categorical, discrete or continuous primary data or secondary data and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of data
- identify bias in data collection methods

The “traditional” classroom practice and approach to the learning goals

Teachers provide students with a data set [textbook, Statistics Canada, newspaper (sports pages)] and ask students, using pencil and paper, to create one (or more) graphical representations of this data. Data analysis usually involves students answering questions posed by the teacher that explore the relationship between the two variables plotted on a graph. Changing the variables being considered is quite an onerous task as students would need to create new graphs so students get little experience making decisions about HOW to use and analyse the data.

SAMR:  
Substitution

This software provides several sample data sets and related learning tasks.

Attribute	Value	Unit	Formula
Case	1		
Gender	f		
Age	13	years	
RTime_Eyes	0.25	sec	
RTime_Ears	0.22	sec	
RTime_Both	0.26	sec	
Fastest_Sense	Ears		
Diff_EyesEars	0.03	sec	
<new attribute>			

Reaction times of 235 visitors to the Museum of Science in Boston, MA.

**Attribute Description**

**Case:** Number assigned to participant  
**Gender:** Gender of participant  
**Age:** Age in years  
**RTime\_Eyes:** Time to react with eyes  
**RTime\_Ears:** Time to react with ears  
**RTime\_Both:** Time to react using both eyes and ears  
**Fastest\_Sense:** Fastest sense to react  
**Diff\_EyesEars:** How much faster hearing was than sight

**Questions**

1. Are people faster to react using their eyes, their ears, or both? If they are faster in one of these situations, why might that be?
2. Do these data suggest that as people get older, they take longer to react?

These tasks include data on Health, Science and Nature, Sports & Entertainment and Social Studies. They can be found at:  
**File > Open Sample Document.**

<p>SAMR: Augmentation</p>	<p>Accessing the sample data sets included in TinkerPlots (Once a Sample Document is open, copy <b>All Cases</b> and paste them into a new file), students can experiment with making observations about data by choosing different attributes and considering how these attributes are related (or not!). Because students could easily explore the relationships that exist between multiple pairs of attributes, teachers could ask questions such as “Of all the attributes included in this set of data, which do you think has the greatest impact on <u>  </u> (an attribute chosen by the teacher)? What makes you say that? (a call for justification)</p> <p>Support to help students analyse the data can be found <a href="#">here</a>. As well, in the Sample Documents included in the software, there is a Tutorial related to analysing data (File &gt; Open Sample Document &gt; Tutorials &gt; Analysing Data).</p>
<p>SAMR: Modification</p>	<p>Teachers are able to create locally-relevant data sets to align with the interests of the class/school. Once compiled in an Excel file, this local data is easily imported into TinkerPlots. Teachers can ask the same sort of question described above, inviting students to explore a variety of relationships that exist between the presented attributes.</p> <p>Learn how to import data into TinkerPlots in this <a href="#">TinkerPlots Basics</a> tutorial.</p> <p>OR</p> <p>After exploring a provocation that is related to a teacher-provided data set, students can be encouraged to generate their own questions/wonderings and provided with the opportunity to explore the data to seek answers. Students can document their inquiry and present their findings through screen captures, screencasting, projecting their screen to classmates through the use of a document camera, etc.</p> <p>OR</p> <p>Students can be encouraged to develop their own inquiry question and then be supported to find relevant data sets. Once located, this data can be imported into TinkerPlots and students can analyse the data so as to try to answer their inquiry question. Findings can be presented as described above.</p>
<p>SAMR: Redefinition</p>	<p>Instead of analysing secondary data, students can use GoogleForms to collect primary data. This data could be collected from local</p>

	<p>groups (class/families/school) or, through the sharing of links via social media, collected from other groups across the province/country/world. Students can then use TinkerPlots to conduct the same sort of data analysis as is described above.</p> <p>It should also be noted that via blogs, wikis and other web resources, the results of these data analyses can easily be shared with audiences far beyond their local classrooms.</p>
<p>Considerations for Digital Citizenship:</p>	<ul style="list-style-type: none"><li>• When using secondary data, students should be encouraged to consider the trustworthiness of the data source.</li><li>• When creating a survey to collect primary data, students should be made aware that the wording of the questions may introduce unwanted bias into the collected data. Students must also consider who they survey (and who they do not) to be aware of the bias created by their data collection method.</li><li>• When collecting data from individuals, students should be reminded to respect the individual's privacy and not release personal information.</li><li>• When projects are created for the web, students must be helped to become aware of considerations about safely posting and sharing.</li></ul>