

Jeff Zittergruen ED 350 t3 W07 I-Chart	Question #1	Question #2	Question #3	Interesting Facts	New Questions
Research Topic: Use of Graphing Calculators in the Classroom	What ideas or concepts are best taught using a graphing calculator?	Are there any reservations about using calculators too much, hindering student learning?	Does the use of graphing calculators enhance student performance?		
What I Know	Graphing various functions Finding roots of functions	Diminishes algorithmic abilities of students	I would assume graphing calculators would enhance performance		
Source 1: http://www.vccae.edu/inquiry/inquiry-spring99/i41clutter.html	Use the graphing calculator to examine the behavior of families of functions. This eliminates plotting numerous points and the teacher can have the student compare numerous graphs quickly. The students can see a connection between graphs and algebra. The NCTM has standards for when graphing calculators are appropriate in the classroom.	Calculators have gotten so advanced that they can perform any algebra or calculus operation needed. Students would rely too heavily on their calculators as a crutch to their learning. Also, there are too many models of graphing calculators that teachers can not get familiar with all models.	Student performance can focus more on deep level thinking because the number crunching that was previously taught in math classrooms can be eliminated with the use of calculators. This promotes deeper understanding.	I did not focus the idea of using graphing calculators as a highly successful method of creating relationships for students.	What sorts of lesson plans are available for teachers to incorporate using graphing calculators in the classroom? How can a teacher get grants to cover the use of graphing calculators for the class?
Source 2: http://www.oise.utoronto.ca/field-centres/TVC/Ross/Reports/vol11no1.htm	The constructivist approach to teaching has lent itself best to the incorporation of graphing calculators in to the curriculum. Students can focus on developing deeper conceptual understanding of the material.	For teachers to obtain the full benefits of having students learn with the graphing calculators, teachers must require students to use the graphing calculators when they are being evaluated. This causes problems when calculators can too much thinking for the students.	The current focus on students as problem solvers is appropriate because the graphing calculator can eliminate mechanical operations to enable students to concentrate on acquiring a deeper conceptual knowledge of mathematics.	In our teaching secondary methods of math class, we really emphasized the constructivist approach in teaching math, and it was neat for the authors to tie that with using technology in the classroom.	Is there any information or material available for getting students to understand the capabilities of graphing calculators other than experimentation? The article discusses getting teachers informed, but are there activities that teach students to use graphing calculators?
Source 3: http://www.worsleyschool.net/info/calculators/intheclassroom.html	Graphing calculators has increased the capability of students to study various alternative functions. The study of the exponential, sinusoidal, absolute value,	Relying on the calculator to do basic operations like multiplication and integer operations carries a negative effect. Students who are enrolled in advanced math	Teachers are expected to provide opportunities for students to use them, and students must become proficient in their use. High school mathematics courses	I enjoyed the emphasis of starting students using high-powered calculators at the middle school level. I do not remember using graphing calculators at that level and	What is the fine balance between losing mathematical operation skills and increased time to look at more material in school year? How does NCLB

	<p>reciprocal, and cubic functions has been made possible by graphing calculators. Also, more material can be covered throughout the year because the calculator can take away some of the busy work of mathematics. Teaching long division in elementary no longer becomes a large topic because it can be completed easily with a calculator.</p>	<p>classes and can not perform basic operations without a calculator have a harder time succeeding in college math classes.</p>	<p>are designed around the use of a scientific/graphing calculator. As a result, students in lower grades must know how to use a calculator properly.</p>	<p>it would have been beneficial when getting to high school if I had previously used the graphing calculators. Making the students proficient in their use becomes the first step in finding the higher capabilities that are available on graphing calculators.</p>	<p>affect the use of graphing calculators in a math classroom?</p>
<p>Summaries</p>	<p>If teachers use graphing calculators correctly, students can study aspects of mathematics that would have been impossible in the past. Students can easily compare functions and other mathematical relationships simply because their calculator allows them to do so rapidly. Teachers need the skills to appropriately incorporate these machines into their classrooms and students will be able to gain a deeper comprehension of mathematics that most teachers strive for while teaching.</p>	<p>The danger of using graphing calculators in the classroom is that students will lose the operational skills that are important for testing of math in NCLB. Calculators are so advanced that they can perform most of the basic algebra and calculus operations. Teachers need to emphasize to students when the use of graphing calculators is appropriate in the classrooms. When used successfully, graphing calculators can provide a huge advantage; however, when used negatively, the students can start to lean on the calculator as a crutch rather learning device.</p>	<p>Student performance will be enhanced if calculators are used properly. Students will be able to focus greatly on the deeper meaning and comprehension of math instead of worrying about mechanical calculations. Instead, students can improve as problem solvers in mathematics and strive for deeper understanding of more complicated material.</p>		

Annotated Bibliography

Clutter, Martha. (1996). *Graphing calculators: The newest revolution in mathematics*. Retrieved February 12, 2007, from <http://www.vccaedu.org/inquiry/inquiry-spring99/i41clutter.html>.

The purpose of the Web site is to discuss the procession of graphing calculators throughout the last few decades, and the implications graphing calculators has had on teaching mathematics. The author is Mary Clutter, an Associate Professor of Mathematics at Virginia Community College. The article was published through a journal named the *Inquiry*, and is copyrighted by the Virginia Community College System. The content is taken from a talk given by Clutter at the 1998 New Horizons conference. The material covered is the opinion of the author, but very productive for teachers looking for ideas of incorporating graphing calculators into the everyday classrooms. The Web site was readily available on the Internet while looking for information about graphing calculators. The information is taken from a speech given in 1998, so is a little bit older but still useful for teachers in the field today. The Web site has not appeared to win any awards and the design could be improved by highlighting the importation sections of the piece more efficiently. However, the information and lesson ideas presented in this lesson are beneficial for all teachers of mathematics. (187 words)

Lee, Jane. (2006). *Mathematics teachers' conceptions and their teaching practices on using graphing calculators in their classrooms*. Retrieved February 12, 2007, from <http://www.oise.utoronto.ca/field-centres/TVC/RossReports/vol11no1.htm>.

The purpose of this Web site is to present information that a teacher found in an experiment she completed while in college. The research outlines the appropriate use of graphing calculations in the classrooms. The author of this Web site is Jane Lee, the Head of the Mathematics Department at Earl Haig Secondary School in North York. The Web site did not have a publisher because it is a doctoral dissertation. The content of the Web site is a research report conducted by Lee as a part of her Ph.D. thesis at the University of Toronto. This Web site was also located by typing in “graphing calculator use in the classroom” into Google. The Web site has 2006 listed as its creation which makes the information very current. While the Web site has not received any awards, because Lee was using the research as her doctorate thesis, the information should be highly valuable to teachers. The layout of the Web site could have been improved by highlighting important ideas with bolding or italicizing. The numbering of important ideas did make the Web site more readable. (185 words)

(2007). *Calculators in the classroom: When they are necessary and when they are not*. Retrieved February 12, 2007, from <http://www.worsleyschool.net/info/calculators/intheclassroom.html>.

The purpose of this Web site is to provide teachers with a resource on when it is appropriate for the use of graphing calculators in the classroom. The site outlines use of graphing calculators in both the middle school and high school levels. The author of this Web site is Worsley High School in Northern Alberta, Canada. The Web site is published and maintained by Bill Willis at Wunderland Web Site Design. The content of this Web site does provide bias because it is produced by a school without provided resources as sources of the information. However, the material covered in the Web site is highly beneficial to teachers and should not be taken as biased information. The Web site did appear when typing information about graphing calculators into Google. The Web site is current and maintained by Willis, having a copyright of 2007 as the latest date at the bottom of the Web site. The Web site does not list any awards that it has won but it contains quality information. The layout of the design is very easy to follow with all information being displayed down the center of the page and important information being bolded to stand out from other information. (204 words)