

Introduction: Graphing Calculator Applications to Data Collection Sets

The Lesson Plans

Graphing calculators are capable of a variety of data set analysis including water quality and biological parameters. Using the calculators in scientific inquiry gives the students a better understanding of the relationships among various parameters as well as equips them with tools applicable to high school TEKS objectives. These lesson plans provide applications of the graphing calculator to various sets of water quality, biological, and garbology data collected through E-SET activities. Used as supplemental lessons to existing curriculum, each unit provides additional exercises and activities to stimulate critical thinking skills and increase understanding of scientific and mathematical concepts. While each of the lesson plan sections address a unique set of parameters. Graphics provided in the units allow the teacher to easily recognize each section. All units all are organized as follows:

Unit Overview

Each unit is introduced with unit objectives, a table of contents, a description of material needs, time frames, and grade applications. A printout of the calculator keypad is provided as a handout in this section as well.

Section 1 – The Lesson



The lessons provide a scientific overview of the concepts to be applied to the graphs created on the graphing calculator. An explanation of the type of graph used in the unit is presented. Overheads and handouts are included providing visual aids of examples presented in the lesson.

Section 2 – In Class Demonstrations



This section provides the step-by-step instructions for using the graphing calculator to create the graph discussed in the unit. Data sets from the lesson example are used to create graphs in the demonstrations. All demonstration material is designed to be used as overheads and handouts.

Section 3 – Student Exercises



Designed as handouts, these exercises allow the student to apply all the information provided in the lesson and in class demonstrations. Student use the step-by-step instructions to apply graphing calculator skills to data sets similar to those used in the lessons. In most units, supplemental worksheets are provided. A list of questions are provided to challenge the student to apply the graph information to water quality concepts.



Section 4 – Long Term Projects: Other Exercises and “Take Action” Activities

This section provides additional exercises and “Take Action” activities for further applications of information provided through the unit.



Overheads and handouts are labeled with the book graphic in the upper right hand corner of the page.

Introduction: The Lesson Plans and Setting up the Calculator

This curriculum was developed with education grant funds through the Texas Education Agency and created in cooperation with E-SET, SFDRCSID, Texas Watch, and 4empowerment. Developed for nonprofit educational uses, the curriculum may not be sold or used for profit in any way.

Table of Contents

- The Lesson Plans
- Table of Contents
- Rubrics
- TEKS Table
- Getting Started:** Interfacing the Calculator with the Computer

Rubrics

(To be applied to each student exercise)

<u>Weight</u>	<u>Skills</u>	<u>Score(circle one)</u>	<u>Percentage Points</u>
20%	Follows directions for data selection/input into calculator	1 Unsatisfactory 2 Satisfactory 3 Good 4 Excellent	Score X 20= _____
20%	Follows direction for using calculator to create graph	1 Unsatisfactory 2 Satisfactory 3 Good 4 Excellent	Score X 20= _____
30%	Understands data selection process, relationships and organizes data for analysis based on this understanding	1 Unsatisfactory 2 Satisfactory 3 Good 4 Excellent	Score X 30= _____
30%	Can draw conclusions and explain relationship of ecosystem dynamics through analysis of graph	1 Unsatisfactory 2 Satisfactory 3 Good 4 Excellent	Score X 30= _____
Total Score			Total Points / 4 = _____

Introduction: The Lesson Plans and Setting up the Calculator

This curriculum was developed with education grant funds through the Texas Education Agency and created in cooperation with E-SET, SFDRICISD, Texas Watch, and 4empowerment. Developed for nonprofit educational uses, the curriculum may not be sold or used for profit in any way.

TEKS Correlations	Unit 1	Unit 2	Unit 3	Unit 4
110.42 English I	b.4.B-F b.21.B	b.4.B-F b.21.B	b.4.B-F b.21.B	b.4.B-F b.21.B
110.43 English II	b.4.B-F b.21.B	b.4.B-F b.21.B	b.4.B-F b.21.B	b.4.B-F b.21.B
111.36 Mathematical Models with Applications	c.1.B c.2.A c.2.B c.2.D c.3.A c.3.B c.3.C	c.1.B c.2.A c.3.A c.3.B c.3.C	c.1.B c.2.A c.3.A c.3.B c.3.C	c.1.B c.2.A c.2.B c.3.A c.3.B c.3.C
111.32 Algebra I	a.1,2,5,6 b.1.A-E b.2.C b.2.D b.3.A b.3.B c.1.A-C c.2.A c.2.B c.2.C	a.1,2,5,6 b.1.A-E b.2.C b.3.A	a.1,2,5,6 b.2.C	a.1,2,5,6 b.1.A-E b.2.C b.2.D b.3.A b.3.B c.1.A-C
112.42 Integrated Physics and Chemistry	b. 1-4 c.2.A-D c.9.D	b.1 b.2 b.4 c.2.A-D	b.1 b.2 b.4 c.2.A-D	b.1 b.2 b.4 c.2.A-D
112.43 Biology	b. 1-4 c.1.A-C c.12.D	b.1 b.2 b.4 c.1.A-C	b.1 b.2 b.4 c.1.A-C c.12.D	b.1 b.2 b.4 c.1.A-C c.12.C c.12.D
112.44 Environmental Systems	b. 1-4 c.2.A-D c.4.B c.5.B	b. 1-4 c.2.A-D c.4.B c.4.C c.5.A c.5.B c.5.F	b. 1-4 c.2.A-D c.4.B c.4.C c.5.A c.5.B c.5.F	b. 1-4 c.2.A-D c.4.A c.4.B c.4.C c.4.E c.5.A c.5.B c.5.F c.8.A
112.45 Chemistry	c.12.B			
112.46 Aquatic Science	b. 1-4 c.2.A-E c.4.B c.4.C c.5.A c.5.D c.8.B c.9.C	b. 1-4 c.2.A-E c.4.B c.4.C c.8.B c.9.C	b. 1-4 c.2.A-E c.4.A c.4.B c.4.C c.8.B c.9.C	b. 1-4 c.2.A-E c.4.B c.4.C c.5.A c.5.D c.8.A c.8.B c.9.C
126.22 Computer Science I	c.1.A c.1.B c.1.D c.2.A c.4.A c.8.C	c.1.A c.1.B c.1.D c.2.A c.4.A c.8.C	c.1.A c.1.B c.1.D c.2.A c.4.A c.8.C	c.1.A c.1.B c.1.D c.2.A c.4.A c.8.C

Introduction: The Lesson Plans and Setting up the Calculator

This curriculum was developed with education grant funds through the Texas Education Agency and created in cooperation with E-SET, SFDRCSISD, Texas Watch, and 4empowerment. Developed for nonprofit educational uses, the curriculum may not be sold or used for profit in any way.

Getting Started: Interfacing the Calculator with a Computer

The TI-83 Plus/TI-83 Plus Silver Edition graphing calculators come equipped with preinstalled programs much like computer-based software. In the APPS menu, you will find a variety of programmed activities that are user friendly and ready to use. In addition, the calculator will interface with a computer, allowing you to download files and spreadsheets directly into the calculator. To do this, however, you will need to install software provided with the calculator onto the computer.

For exercises provided within the units, the following software programs will need to be installed on the computer:

- The **TI Connect** software. This software should be installed *first* to allow the computer and calculator to talk to each other (via a USB cable). This software also allows the display of the calculator to be projected onto the computer screen and “captured” for inserting into documents.
- The **TI CellSheet Converter** software. This program should be installed *after* installing TI Connect. This program converts computer based files into calculator based file extensions and uploads them into the calculator.

To install the programs:

- 1) Insert the CD provided with the calculator into the disc drive of your computer.
- 2) In the Windows Explorer box, find the CD drive, and open the *TICD Projector Skeleton* application. Note: Opening this application will not install anything to your computer.

Installing TI Connect

- 3) In the right hand menu, click on *Computer Software and Documentation*
- 4) Click on *TI Connect* and follow installation instructions

Installing TI CellSheet Converter

- 5) In the right hand menu, click on *Handheld Software and Documentation*
 - 6) Click on the appropriate instrument (TI-83 Plus or TI-83 Plus S.E.)
 - 7) Click on *Install TI CellSheet Converter Software* and follow installation instructions
- Note: The detailed Product Guidebook for the calculator (in PDF format) is also provided on this screen.

Introduction: The Lesson Plans and Setting up the Calculator

This curriculum was developed with education grant funds through the Texas Education Agency and created in cooperation with E-SET, SFDRCSID, Texas Watch, and 4empowerment. Developed for nonprofit educational uses, the curriculum may not be sold or used for profit in any way.