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# Graphing Contour Maps with TI Calculator

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## Repository Citation

# Generic Lesson Plan Template

You should submit this form in addition to any computer generated files/documents/models to your group folder on Angel. Please create a .zip file and upload the group of files as a single archive.

| Name: Suzanne Wade |
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| Grade level(s)/Subject taught: Earth Science (9), Living Environment (10), Advisor of Envirothon Team |
| Objectives: The objective of this activity is to get students comfortable using the TI calculator to graph profiles for contour maps. |

Please provide a rich **one-page, single-spaced**, description or a *vision* of your best thinking on a way or ways you might teach the planned lesson. (approximately ½ page for the teacher role, ½ page for the student role). Also, construct a tentative rubric that you might use with your students (see example)

Items to include in your lesson plan: (Choose your discipline/concepts from your own area).

1. *Write* the Mathematical Concept or "key idea" that modeling will be used to teach: (e.g. Students use mathematical modeling/ multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships)

and/or…

1b. *Write* the Science Concept or "key idea" that modeling will be used to teach: (e.g. Organisms maintain a dynamic equilibrium that sustains life).

| The science concept I am working with here is contour mapping, specifically profiling. Students will learn to make profiles and then will enter the data onto the calculator to learn the importance of the spacing of the data points. Students will enter data without concern for horizontal distance, the with concern for horizontal distance and compare the two profiles. |
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Materials:
Students will need to bring their graphing calculators with them to class.
Handout on drawing profiles and drawing profiles
Sample maps for practice

Using TI graphing calculators I plan on having my students create lists of elevation data that can be graphed to reveal a profile of a landscape.

The lesson will begin by me asking students what the word profile means to them.  I assume a variety of answers will come up for discussion.  After students input their ideas we will clarify what is meant by the word profile in the contour mapping unit.   The activity will begin with students using simple a contour map to approximate what the land looks like from the side.  I will allow students to partner while trying to figure out how to draw a profile.  The portion of the activity will only be about 3-4 minutes long.  I will monitor progress by moving throughout the classroom, posing questions such as where do you think the slope will be the steepest?
I will call the attention back to the front of the classroom and show them my approximated profile.  I will talk them through how I think they should have approached this task, as well as things I heard that I thought were good while students were making their own profiles. (5 minutes max).  Next I will pass out the hand out, demonstrate on the overhead how to make the profiles (more accurate than the ones that we just did).  Students will work step by step through the profiling process practicing the technique (10 – 15 minutes).  Once students have completed the first example I will have the students take out the calculators and enter the data as instructed on the handout.  The data will be elevation data obtained from the same contour map student just worked with.  There will be no horizontal distances given at this time.  The goal is to have students come to the conclusion that how closely spaced the horizontal points are makes a great difference when it comes to creating a good profile.  Using STAT PLOT, students will have to compare their profiles with the graphs created using STAT PLOT.  Students will be grouped into groups of 4 or 5 and asked to compare the 2 graphs trying to determine why they look different from one another. (Groups will be given 2-3 minutes for this discussion).  What other data would be important to create a more accurate profile of the land?  We will regroup to discuss the answer to this question and we will brainstorm ideas about how that data can be generated.  Using a metric ruler with units of centimeters, students will measure the distance away from the original point and read the elevation off of the map.  The horizontal distance will be measured using the ruler and entered into L1, the vertical distance will be given by the value of the contour line and should be entered into L2.  Directions will be written on the board during the brainstorming activity.  The projector for the TI will be on the overhead for students to follow along.  As an extension, students who can draw profiles on their own, can move onto a slope activity (not included) with a partner.  Students can work independently as the instructions are designed to guide students without teacher direction.  This will allow students who need more time for practice to create more profiles using traditional methods and TI calculators.  Assessments will occur, but not on profiling alone, so no formal assessment is included because this is only a small portion of the contour maps unit.  During the unit test students will be assessed using an overlay on top of the profiles generated by each student.  I typically use a transparency and lay it on the student generated profile.  Students will earn 100% if all of their plotted points are correctly positioned and they have connected them with an appropriate line.  If they miss 1 or 2 of the points or their line is not connected correctly they will lose partial credit.  Students who miss or than 2 points and their line is not correctly connected will receive no credit.