About the Lesson

In this activity, students will explore how fast a human fetus grows. As a result, students will:

- graph data of human fetal growth

- describe the rate of human fetal growth

Vocabulary

- fetus

- mass

- independent and dependent variables

- linear pattern

- exponential pattern
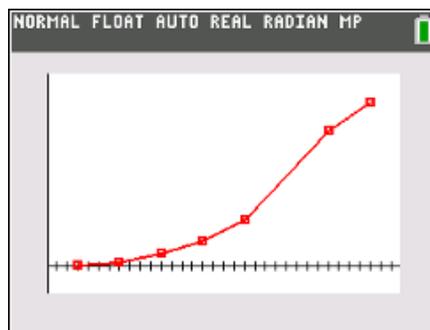
- rate of change

Teacher Preparation and Notes

- Students should know how to input data into lists and create graphs from their data. They should also know how to interpret a graph.

- Teachers may want to give more guidance regarding inputting data into lists and creating graphs.

- Students will be using the **SCI TOOLS** App in this activity.

Activity Materials

- Compatible TI Technologies:

    TI-84 Plus*
    TI-84 Plus Silver Edition*
    🌈TI-84 Plus C Silver Edition
    🌈TI-84 Plus CE

* with the latest operating system (2.55MP) featuring MathPrint^{TM} functionality.

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Tech Tips:

- This activity includes screen captures taken from the TI-84 Plus CE. It is also appropriate for use with the rest of the TI-84 Plus family. Slight variations to these directions may be required if using other calculator models.

- Watch for additional Tech Tips throughout the activity for the specific technology you are using.

- Access free tutorials at http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials

- Any required calculator files can be distributed to students via handheld-to-handheld transfer.

Lesson Files:

- Amazing_Fetal_Growth_Student.pdf

- Amazing_Fetal_Growth_Student.doc

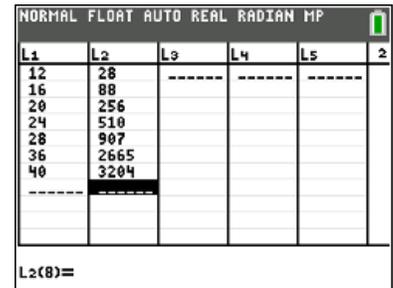**Amazing Fetal Growth**

TEACHER NOTES

Introduction

How fast does a human fetus grow? The data below are the average masses, at various stages of development, of a human fetus.

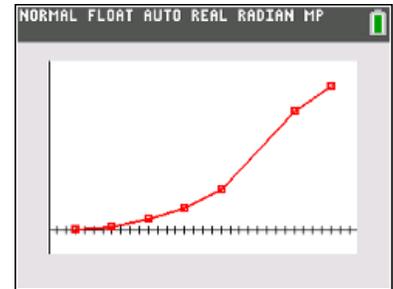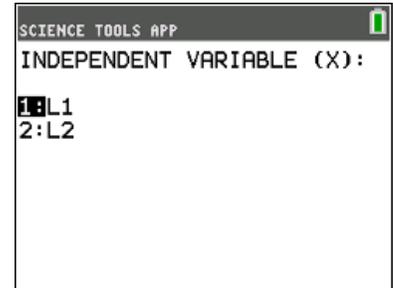| Weeks of development	Fetal mass in grams
12	28
16	88
20	256
24	510
28	907
36	2,665
40	3,204

Entering the Data

1. Turn on your calculator. Press [stat], [enter] to go to the **List Editor**.

2. Clear any data from the **List Editor** by using the arrow keys to move the cursor to the top of each column and pressing [clear], [enter]

3. Enter the data for weeks of development, from the first column in the table, into list **L1**. To do this, move the cursor to the first row of the column (this will be indicated at the bottom of the screen by "**L1(1)=**"). Then enter the number **12**. Press [enter] to move the cursor to the next row, and enter the number **16**. Continue this process for the rest of the numbers in the column.

4. Use the same process to enter the data for fetal mass, from the second column in the table, into **L2**.

5. Now, you will graph your data.

    Press [apps] and scroll to **SCI TOOLS**. Press [ENTER], and [3] to get to the Data/Graphs wizard.
    Press [WINDOW] to select **PLOT DATA**
    Press [WINDOW] to select **LINE GRAPH**.

6. Highlight **L1** and press ENTER. This identifies your independent variable as weeks of development, which will appear on the *x*-axis.

7. Highlight **L2** and press ENTER. This sets fetal mass as your dependent variable, which will appear on the *y*-axis.

Data Analysis

1. Describe fetal growth, in terms of mass and time, as it is shown on your graph.

    Answer: Fetal mass increases with time.

2. Is the mass increase linear or exponential? How do you know?

    Answer: The mass increase is exponential until almost 36 weeks, and then mass increases more slowly to 40 weeks. You can see that the growth is exponential because the curve gets steeper as it moves to the right.

3. According to the graph, what would be the mass of a baby born at 38 weeks? At 26 weeks?

    Answer: At 38 weeks, the mass would be between 2,665 g and 3,204 g. The y-value (mass) can be read from the graph if the points are plotted on graph paper. At 38 weeks, the mass of the baby would be about 2,935 g. At 26 weeks, mass would be about 700 g.

4. If the mass of a woman is 64 kg and she delivers a baby of average mass at 40 weeks of gestation, what percentage of the mother's mass is the baby's?

    Answer: A baby of average mass at 40 weeks of gestation has a mass of 3,204 g ÷ 64,000 g × 100 = 5% of the mother's mass.