Human Fetal Growth Lab

Background: As an embryo grows into a fetus, size and mass are just two variables that will change over the 38 weeks. Even though changes in size and mass do not occur at the same rate, an average mass and an average body length has been determined at various stages of development. From these two factors, an approximate age of the fetus can be determined.

Objective:
- calculate the length of a human fetus at various stages of development
- graph the length and mass of a developing fetus
- determine the trimester(s) in which the greatest increase of mass and size occur

Standards: SC.912.L.16.13 Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy. (moderate)

Procedure:
1. Examine the figure below. It shows six stages of a developing fetus. The stages are shown at 40% of the fetus’s actual size.

2. Study the lengths indicated on the diagram of the 38-week fetus. Use these as a guide to measuring the other diagrams.
3. Measure each length listed below in millimeters. Record your data in TABLE 1.
   a. Measure the body length from the rump to the top of the head.
   b. Measure the thigh length from the rump to the knee.
   c. Measure the leg length from the heel to the knee
4. Add the three measurements for each stage together. Record the total length in the space provided in TABLE 1.

Lab/activity taken in part or whole from Glencoe/McGraw’Hill Biology: The Dynamics of Life resources.
5. Multiply the total by 2.5 to give a figure that is close to the actual length of the fetus at each stage. Record the actual length in Table 1.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Length of a Developing Fetus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of fetus in weeks</td>
<td>Body Length (mm)</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td></td>
</tr>
</tbody>
</table>

Let’s make a GRAPH!!! Graphing Length
6. Obtain a piece of graph paper. Label the X-axis 0 – 38. Label the Y-Axis from 0-400 increasing each row by a factor of 25 (0, 25, 50, 75, 100, etc).
7. Title the graph “Length of a Developing Fetus”
8. The point showing the actual length (2 mm) of the 2 week fetus will need to be marked as an point on (2,0) on the graph.
9. Using the data in TABLE 1, mark a point that shows the age and actual length of each fetal stage.
10. Begin at 0, and connect the points to complete the graph.

Let’s make a GRAPH!!! Graphing Mass
11. Look at the data supplied in TABLE 2.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Mass of a developing fetus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (weeks)</td>
<td>Mass (grams)</td>
</tr>
<tr>
<td>4</td>
<td>0.5</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>20</td>
<td>300</td>
</tr>
</tbody>
</table>

12. Obtain a new piece of graphing paper. Label the X-axis just as the graph for Length of a Developing Fetus. HOWEVER, for your Y-axis label values 0-3400, increasing each row by a factor of 200 (0, 200, 400, 600, 800, etc).

Lab/activity taken in part or whole from Glencoe/McGraw’Hill Biology: The Dynamics of Life resources.
13. Title the graph “Mass of a Developing Fetus.”
14. Begin with 0, and connect the point to complete the graph.

**Analysis of the Data**

1. What is the actual length of a fetus at week 9?

2. How much mass does the fetus gain from 0 to 8 weeks of development?

3. Look at both of your graphs at week 19. Is the fetus about half of its full length?

4. At week 19, is the fetus about half of its full mass at this time?

5. During which time period shown in Table 1 does the fetus show the greatest increase in actual length?

6. During which time period shown in Table 2 does the fetus show the greatest increase in mass?

7. Why was the total length of each fetus multiplied by 2.5 to obtain the actual length?

8. Why do you think the length of a fetus increases more rapidly than the mass of a fetus?

9. At what week does the fetus reach about half its full length?_______. About half its full mass?______

10. If a premature baby is born with a mass of
   a. 2200 grams, about how old is the baby?__________
   b. 1800 grams, about how old is the baby?__________

Lab/activity taken in part or whole from Glencoe/McGraw’Hill Biology: The Dynamics of Life resources.