

EXPLORATION**Human Fetal Growth**

Complete development of a human fetus takes about 38 weeks. Increases in size and mass are two of the many changes that the fetus undergoes. The increases do not occur at the same rate. Many factors affect the birth size of a human baby, but there is an average mass and an average length standard for each stage of development. The approximate age of a fetus can be determined from its mass and length.

OBJECTIVES

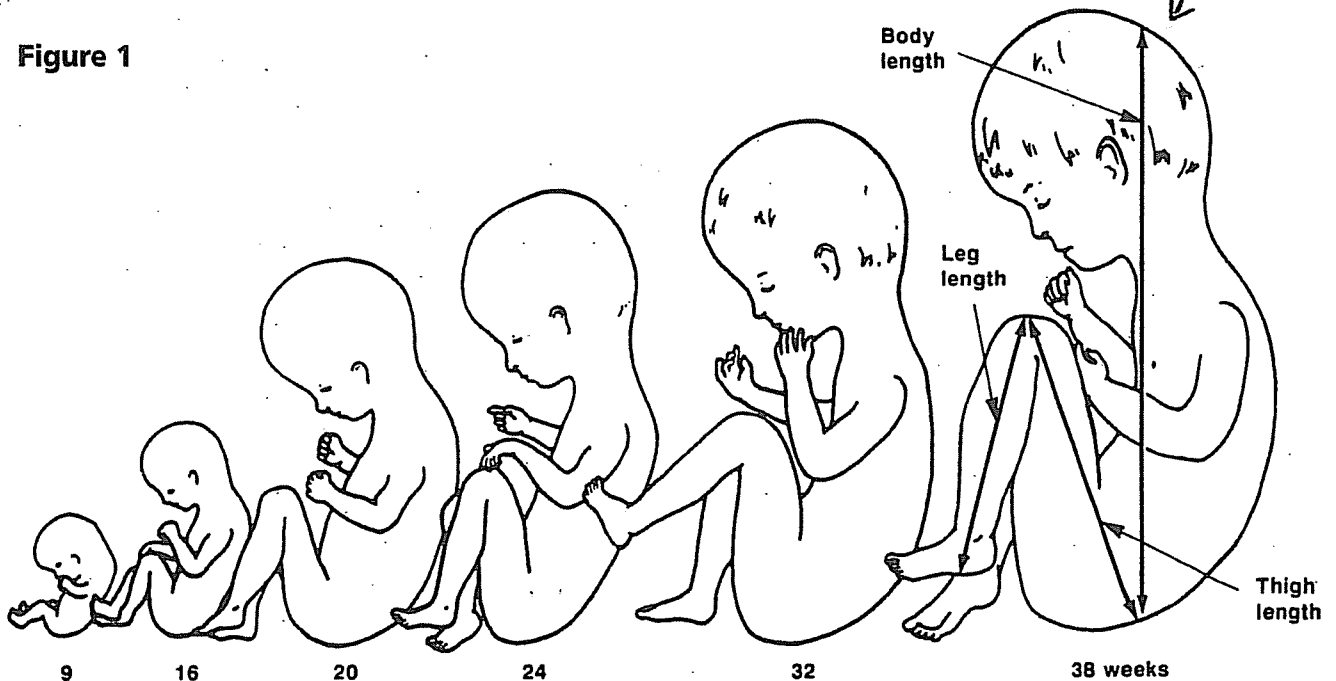
- Calculate the length of a human fetus at various stages of development.
- Graph the length of a developing human fetus.
- Graph the mass of a developing human fetus.
- Determine the period of fetal development during which the greatest changes in mass and in length occur.

MATERIALS

metric ruler
goggles

PROCEDURE**Part A. Development of a Human Fetus**

1. Examine Figure 1. It shows six stages of a developing human 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.

Figure 1

Human Fetal Growth**PROCEDURE continued**

- Measure each length listed below in millimeters. Record your data in the spaces provided in Table 1.
 - Measure the body length from the rump to the top of the head.
 - Measure the thigh length from the rump to the knee.
 - Measure the leg length from the heel to the knee.
- Add the three measurements for each stage together. Record the total length in the space provided in Table 1.
- 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.

Part B. Graphing the Length of a Developing Fetus

- The point showing the actual length (2mm) of the 2-week fetus has been marked on the grid in Figure 2.
- Using the data in Table 1, mark a point that shows the age and actual length of each fetal stage.

DATA AND OBSERVATIONS**Table 1**

Length of a Developing Fetus					
Age of fetus in weeks	Body length (mm)	Thigh length (mm)	Leg length (mm)	Total length (mm)	Actual length (mm)
2	—	—	—	—	2
9					
16					
20					
24					
32					
38					

- Begin at 0, and connect the points to complete the graph.

Part C. Graphing the Mass of a Developing Fetus

- Look at the data supplied in Table 2.
- Mark points on the grid in Figure 3 to show the age and mass of each fetal stage.
- Begin at 0, and connect the points to complete the graph.

Table 2

Mass of a Developing Fetus			
Time (weeks)	Mass (grams)	Time (weeks)	Mass (grams)
4	0.5	24	650
8	1	28	1100
12	15	32	1700
16	100	36	2400
20	300	38	3300

Human Fetal Growth

Figure 2

Length of a Developing Fetus

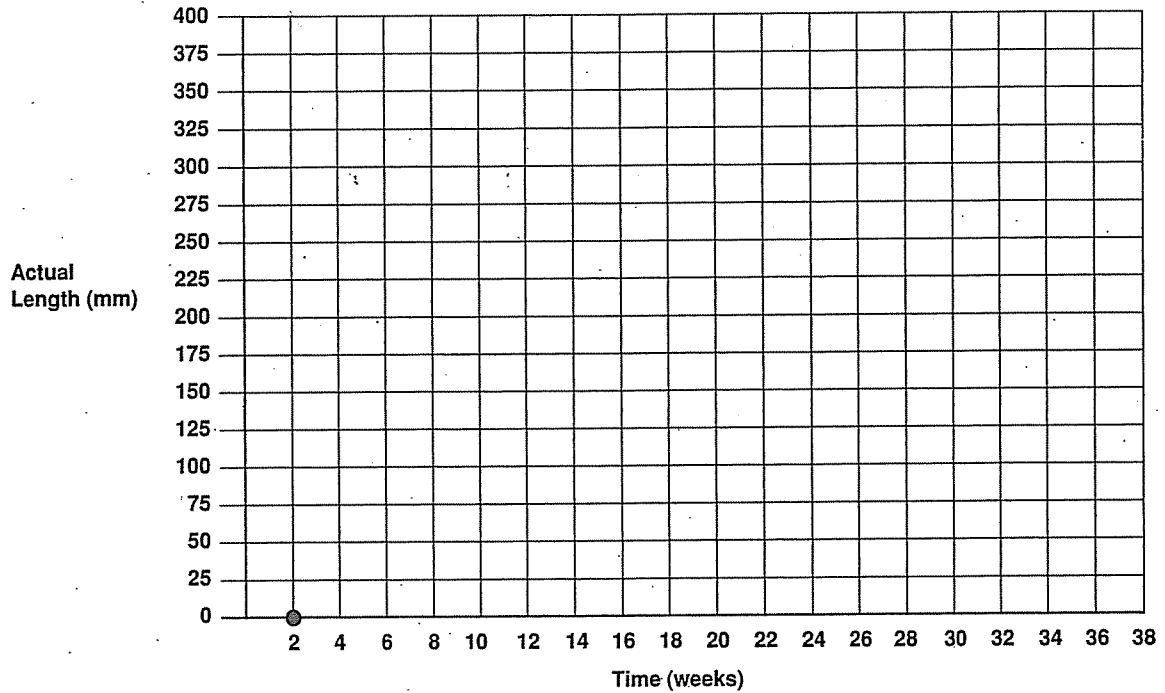
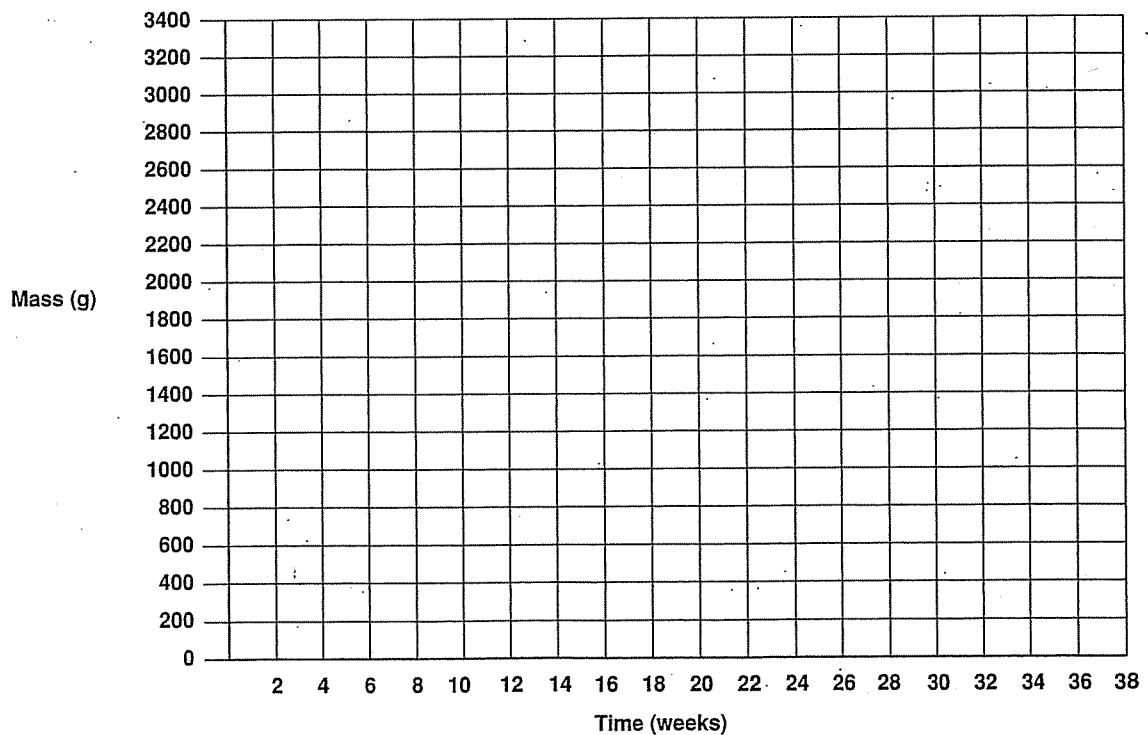


Figure 3

Mass of a Developing Fetus



Human Fetal Growth**ANALYSIS**

1. What is the actual length of the fetus at week 9? _____
2. How much mass does the fetus gain from 0 to 8 weeks of development? _____
3. Look at Figures 2 and 3 for the halfway point in development at week 19.
 - a. Is the fetus about half of its full length at this time? _____
 - b. Is the fetus about half of its full mass at this time? _____
4. During which time period shown in Table 1 does the fetus show the greatest increase in actual length?

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

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

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

8. At what week does the fetus reach
 - a. about half its full length? _____
 - b. about half its full mass? _____
9. 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? _____

FURTHER EXPLORATIONS

↙ Extra Credit ↘

1. A human is a mammal. Mammals come in all sizes. Using library references, make a table showing the average birth weights of at least 10 mammals.
2. Prepare a report on the factors affecting the birth weight of a human baby. See if you can find data on how a baby's birth weight might affect his or her later life.