MiSP Human Growth and Development Worksheet #2 L3

Name _____ Date _____

HEAD CIRCUMFERENCE AND LENGTH FOR INFANTS AGES BIRTH TO 36 MONTHS

Introduction:

A blog dealing with sizes of babies' heads had the following statement: "A baby's head is disproportionately large compared to its body and thin neck."

Do babies' bodies catch up with their heads as they grow and develop?

The attached chart lists babies' median (50th percentile) length, in centimeters, and median head circumference, also in centimeters. This data was collected by the Centers for Disease Control and Prevention. As in the last worksheet, measurements from many, many babies in the United States were used to calculate these numbers.

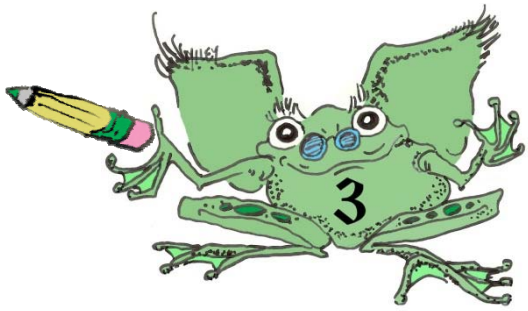
Procedures:

Review the data on the chart, "Babies' Median Length and Head Circumference." It lists the age, in months, from 0 to 36 and the median body length (cm) and median head circumference (cm) every two months for boys and girls. As in the last worksheet, median is also called the 50th percentile. That means that half of the children have lengths and head circumferences less than the 50th percentile length and head circumferences, and half of the children have measurements greater than the 50th percentile.

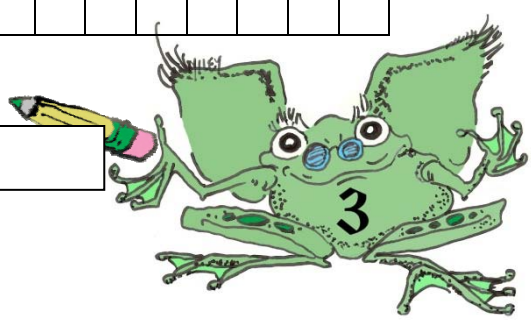
Graph the data:

Graph the boys' or girls' data on the next page to show the relationship between age (months) and the two physical measurements, length (cm) and head circumference (cm). Your teacher will assign you boys or girls or let you choose.

- Label the *x*-axis with age (months).
- Label the *y*-axis with length (cm) and head circumference (cm).
- Graph the data using two different colors: one for length and one for head circumference. Add a key to the graph.
- Connect the data points.
- Give the graph a title: "Median Length and Head Circumference of U.S. Baby Boys *or* Girls



Key:
Median Baby Length:
Median Head Circumference



Discussion Questions:

1. How is the shape of the growth curve for length from birth to 36 months similar to the shape of the growth curve for head circumference over the same time period?

   _____

   _____

2. How is the shape of the growth curve for length different from the shape of the growth curve for head circumference?

   _____

   _____

3. During what month range do babies have the most growth in length (the fastest growth rate)?

   _____

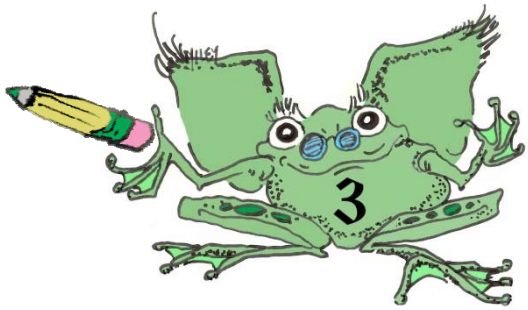
4. During what month range do babies have the most growth in the circumference of their heads (the fastest growth rate)?

   _____

5. Use the graph to estimate the median (50th percentile) length and head circumference of babies who are 13 months old:

   length at 13 months - _____

   head circumference at 13 months - _____



6. Between 0 months and 36 months, by what percent did median babies' length and head circumference increase?

$$\% \text{ increase} = \frac{\text{36 Month Measurement} - \text{0 Month Measurement}}{\text{0 Month Measurement}} \times 100$$

Work Space for Length	% Increase in Length:

Work Space for Head Circumference	% Increase in Head Circumference:

7. Think about your answers to #1-5. Based on the data and graphs, do babies' bodies catch up with their heads as they grow and develop? Explain your answer.

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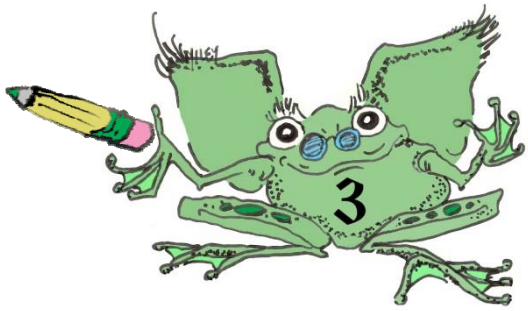

8. Compare the growth in length and the growth in circumference of the head in the same age range on your graph by calculating the unit rate of change (slope) for each set of data **from 26 to 36 months**. Draw a best-fit line, if needed.

Unit Rate of Change =

$$\frac{\Delta y}{\Delta x} = \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{\Delta \text{ Measurement (length or head circumference in cm)}}{\Delta \text{ Age (months)}} \times 100$$

Graphed data Ordered pairs	Δ Size (cm) Δy	Δ Age (months) Δx	**Unit Rate of Change (slope)** $\Delta y/\Delta x$
Length (26 mo. _____) (36 mo. _____)			
Head circumference (26 mo. _____) (36 mo. _____)			

9. Based on the unit rates of change, which measurement is increasing faster—length or head circumference?

_____

10. Does your answer to #9 support your answer to #7 or go against it? Explain.

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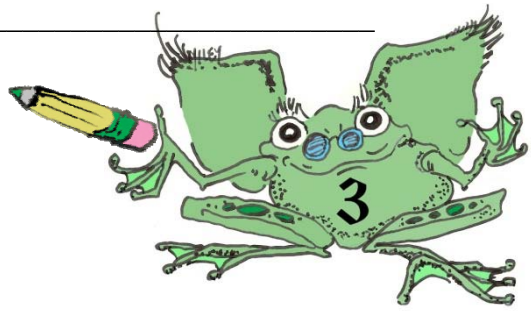
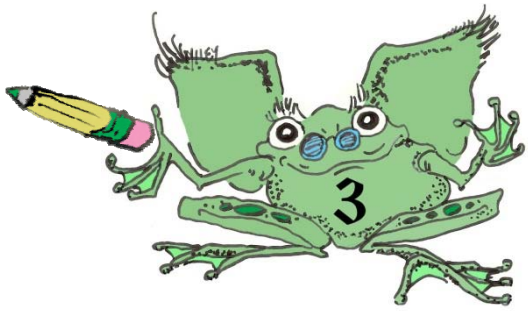


11. If the line segments for length and head circumference from 26 to 36 months were extended in both directions, they would intersect the *y*-axis ($x = 0$ months). Determine the *y*-intercepts for the lines using the unit rate of change (slope) you calculated, the equation for a line ($y = mx + b$), and one of the ordered pairs above. Use the table on the next page for your calculations.

Y-Intercept — Length, 26–36 months line	*Y*-Intercept — Head circumference, 26–36 months line
$m =$ Ordered pair $(x, y) = (\_\_\_, \_\_\_)$ $y = mx + b$ Solve for b:	$m =$ Ordered pair $(x, y) = (\_\_\_, \_\_\_)$ $y = mx + b$ Solve for b:

12. Write an equation for the two 26–36 months lines based on your calculated slopes and *y*-intercepts.

Equation — Length	Equation — Head circumference



13. Use the formulas you determined above to calculate the length and head circumference for babies at ages 29.5 months and 38 months.

Age	Calculated Length (cm)	Calculated Head Circumference (cm)
29.5 months		
38 months		

14. Which of the calculated measurements above is most reliable? Explain.

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