

MiSP HUMAN GROWTH AND DEVELOPMENT L3

Teacher Guide

Introduction

This MiSP unit utilizes data from the Centers for Disease Control and Prevention (<http://www.cdc.gov/growthcharts/>). This is the data that parents and health care professionals typically use to monitor children’s growth and development. *CDC growth charts consist of a series of percentile curves that illustrate the distribution of selected body measurements of children in the United States.*

Classes will work with head circumference and body length data in children ages birth to 36 months and stature data for ages 2 to 20 years. Data for boys and girls will be provided for each data set. It is not essential that students work with both genders’ data sets. However, if they do not, it will be important to find a way to display both data sets on the same graph so that boys’ and girls’ growth curves can be compared. The MiSP work will be utilizing data only for the 50th percentile. Teachers must endeavor to have students understand that these are the measurements in the middle. They are not “normal” or “ideal.”

Middle school–age students are very sensitive about their bodies and body measurements. For that reason, metric measurements are used and weight is not studied. Teachers should anticipate that students will be looking at the stature data for their age and analyzing whether they are above or below the 50th percentile. Teachers may view and print charts from the website above if they want to share the other percentile measurements.

Reproduction and development, including that of humans, is part of both the Intermediate Science and the Living Environment core curricula, but this type of study is beyond the basic core requirements. The likely place to use this unit is during the study of human reproduction and development.

Standards

ILST Core Curriculum — Major Understandings:

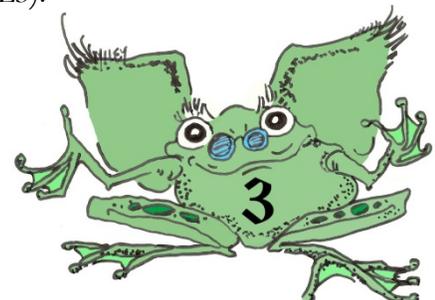
Standard 4 The Living Environment 4.3a, 4.3c, 4.3f

The Living Environment Core Curriculum — Major Understandings:

Standard 4 Physical Setting 4.1a, 4.1d, 4.1e

Lesson Objectives: After completing this unit, students will be able to:

- Explain the basic aspects of growth and development: cell division, increase in cell number, and cell differentiation
- Graph and interpret data on head circumference, length, and height of children
- Determine and use the unit rate of change on human growth graphs (L2)
- Determine and apply the formula for a line on human growth graphs (L3).



Day 1 — Introduction to Human Growth and Development

Short background resources on height:

[http://www.steadyhealth.com/articles/Water Retention Edema Causes %3Cbr%20/Talness too short for my age a391.html](http://www.steadyhealth.com/articles/Water_Retention_Edema_Causes_%3Cbr%20/Talness_too_short_for_my_age_a391.html)
<http://www.height-increasing.com/category/facts-growth-height/>

Most teachers will be doing this MiSP unit after teaching and learning about human reproduction. This topic may include human growth and development from fertilization through birth. So the MiSP unit may be part of a continuing story.

Key points for the introduction:

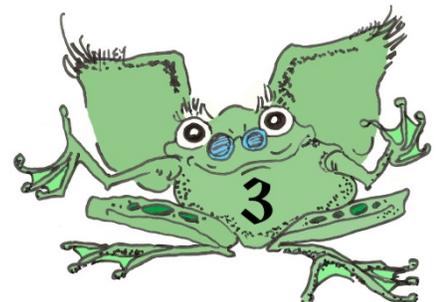
- Growth occurs because of cell division. Unlike plants, animal cells' enlargement does not significantly contribute to growth.
- Cells differentiate. Most differentiation occurs before birth.
- The data being studied is for the 50th percentile. Half of the population at a particular age has a measurement above that number and half below.
- There are no normal height, weight, or other measurements of body size.
- Many things contribute to growth, mainly genetics, nutrition, and general health. Some resources also suggest height is impacted by stress, exercise, and amount of sleep.

Students should start graphing the height data on day 1. Teachers may want to assign the completion of the graph for homework.

After the students complete the activities, teachers may want to distribute or display a chart showing the range of weights or stature at the various percentiles (see http://www.cdc.gov/growthcharts/clinical_charts.htm#Set1) and then discuss an example of the data shown.

Question of the Day:

Why do pediatricians and parents monitor children's growth and compare individual measurements with data from the general U.S. population?



Day 2 — Human Growth from Ages 2 to 20 Years — Worksheet #1

Students will graph and analyze CDC growth data for children ages 2 to 20 years. The data is on a separate spreadsheet that should be printed. The data will be the median (50th percentile data) for those ages. The worksheet directs the students to graph boys and girls. Questions comparing the boys' and girls' data are included.

A big challenge to student understanding of the data is that it represents measurements gathered from many people, so extremes are smoothed out. The growth spurt that really does occur (question 1c) for some children is not obvious, although careful analysis of the charts shows a steeper slope between ages 12 and 14 in boys and ages 11 and 12 in girls. The students may need help in understanding that just because a person is above the 50th percentile at one age does not mean that she or he will be above the 50th percentile at other ages (questions 3a and 3b).

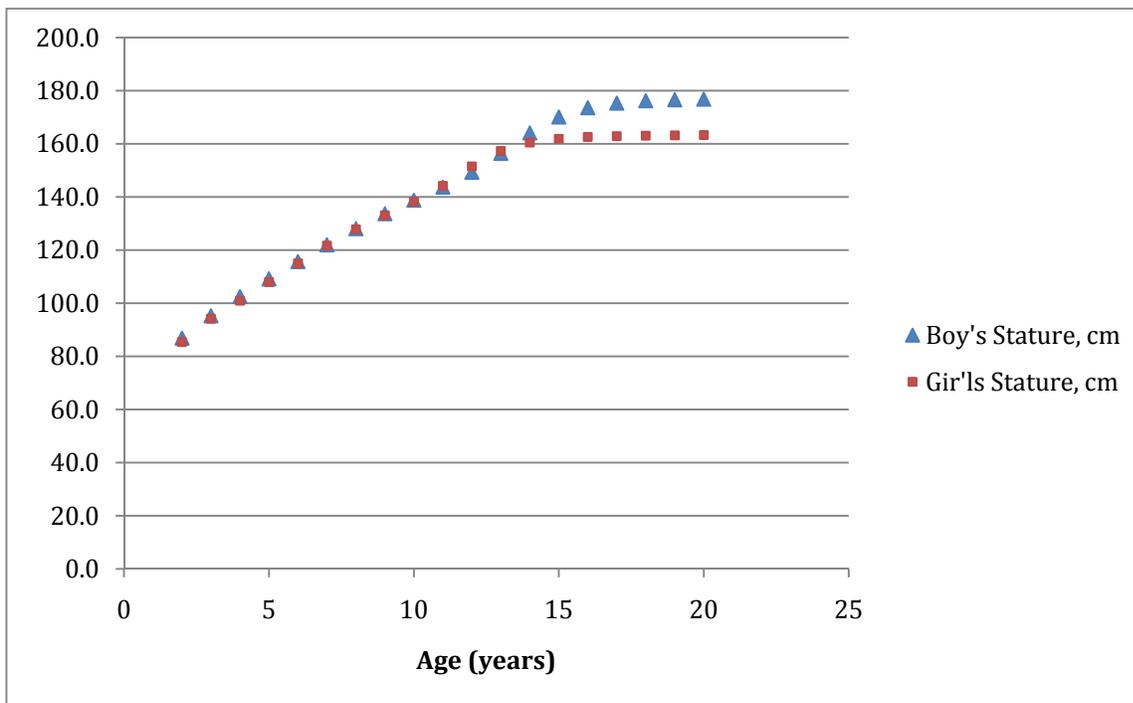
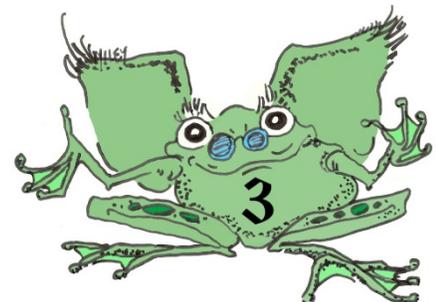


Figure 1. Boys' and girls' stature ages 2 to 20 years.

Question of the Day:

The heights of men, on average, in the poorer countries of Asia like North Korea and Vietnam are shorter than the heights of men in the richer countries of Asia like Japan, China, and South Korea. What are possible causes for that difference?



Days 3 and 4 — Head Circumference and Length for Infants Ages Birth to 36 Months — Worksheet #2

Students will graph and analyze CDC data for infants on a separate spreadsheet. The big idea is that both head circumference and body length increase from 0 to 36 months, but the body grows faster so gradually the head becomes smaller in proportion to the overall body length. Graphs of the data are attached below.

Day 5

Administer the assessment: *MiSP Human Growth and Development Assessment L3*.

