What’s Somatotype With You?
Activity 3D

Activity Objectives:
Using somatotype charts and graphs and personal profile cards, the student will be able to:
- fill out a somatotype rating chart (Somatochart)
- graph and read a somatograph
- recognize and describe different body types
- infer ways in which to improve body composition

Activity Description:
The students will be given somatotype values for imaginary characters. The students will refer to these measurements when filling out a SomatoChart. This SomatoChart will give the students information they need to calculate coordinate points which they will plot on a SomatoGraph. From the SomatoGraph, students will be able to classify a person’s body type.

In this lesson the teacher will divide the class into groups of two. Each group will find the somatotype for six characters. After the students have found all six characters’ body types, they will then compare and contrast the characters. This compare/contrast will help lead them to the conclusion that even though some people weigh the same, their body shapes could be extremely different and that lifestyle choices can alter body composition and thus somatotype.

Activity Background:
Somatotype is defined as the structure or build of a person. Human body types fall into one of three classifications; endomorph, mesomorph, or ectomorph. An endomorphic person is an individual characterized by relative prominence of the abdomen and can be overweight, although being overweight is not the same as having an endomorphic body type. A mesomorphic person is an individual with a robust, muscular body build with well defined muscles. An ectomorphic person is an individual having lean, slightly muscular body build.

Differences in body composition can explain the three body types, which can be altered by diet and training techniques. After a period of weight loss, a person who was once considered an endomorph may begin to instead resemble an ectomorph. Likewise, and athletic mesomorph may begin to look more like an endomorph as he or she ages and loses muscle mass.
The study of somatotypes began in the 1940s by an American psychologist named William Sheldon. He attempted to associate body types with temperament. Over time, the link between body type and temperament was not supported by research and is now outdated. However, evaluating somatotypes is still a valid way to classify basic body types.

A somatotype analysis on an individual is expressed in a three-number rating representing endomorphy, mesomorphy, and ectomorphy components - always in the same order. For example, a 6-10-4 rating method is recorded in this manner and is read as six, ten and four. These numbers give the magnitude of each of the three components, so that in a rating of 6-10-4, 6 defines endomorphic characteristics, 10 mesomorphic characteristics, and 4 ectomorphic characteristics. Ratings on each component of 1/2 – 2 1/2 are considered low, 3 – 5 are moderate, and 5 1/2 – 7 and above are very high.

Note: The detailed technique for completing a somatotype analysis is included for teacher information only. The students will NOT be doing this level of detail!

Measurement techniques:
To determine the somatotype of an individual, ten dimensions will be evaluated. They are stature (height), body mass (weight), four skinfolds (triceps, subscapular, supraspinale, medial calf), two bone measurements (humerus and femur), and two limb girths (arm flexed and calf tensed). Listed below are examples of how to get accurate measurements.

• **Stature** (Height) - Take height with the subject standing straight, against an upright wall, and touching the wall with his/her heels, buttocks and back.

• **Body Mass** (Weight) - The subject wearing minimal clothing, stands in the center of the scale platform.

• **Skinfolds** - Raise a fold of skin and subcutaneous tissue firmly between thumb and forefinger of the left hand away from the underlying muscle at the targeted site. Take all skinfolds on right side of body. The subject stands relaxed, except for the calf skinfold, which is taken with subject seated. Refer to [www.pubmedcentral.nih.gov/articlerender.fcgi?artid=522149&tools=bot](http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=522149&tools=bot) for further explanations of how to properly conduct skinfold measurements.

• **Triceps Skinfold** - With the subject’s arm hanging loosely in the anatomical position, raise a fold at the back of the arm at a level halfway on a line connecting acronium the olecranon process. See Figure 1.
• **Subscapular Skinfold** - Raise the subscapular skinfold on a line from the inferior angle on the scapula in a direction that is obliquely downwards and laterally at the 45 degrees. See Figure 2.

• **Supraspinale Skinfold** - Raise fold 5-7 cm (depending on the size of the subject) above anterior superior iliac spine on a line to the anterior axillary border and on a diagonal line going downwards medially at 45 degrees. See Figure 3.

Read stature and girths to the nearest millimeter, biepicondylar 0.1 millimeter or 0.5 millimeter on other calipers.

**Note:** the following detail is provided for teacher to have an understanding of the level of detail behind the values provided in the student Somatocards.

**Determining Somatotype**
The way to determine somatotype is to enter the data onto the Heath-Carter Somatotype Rating Form and follow the guidelines for evaluating each set of instructions.

**ENDOMORPHY CHARACTERISTICS**

1) Record the measurements for each of the three skinfolds; *triceps*, *subscapular*, and *supraspinale*.

2) Sum the *triceps*, *subscapular*, and *supraspinale* skinfold; record the sum in the box opposite *Sum of 3 Skinfolds*.

3) Correct for height by multiplying this sum by \( \frac{170.18}{\text{height in cm}} \)

4) On the table to the right of the *Sum of 3 Skinfolds Box*, circle the value closest to the number in the box. Note: The table is read vertically from low to high in columns and horizontally from left to right in rows. “Lower limit” and “upper limit” on the rows provide exact boundaries for each column. These values are circled only when *Sum of 3 Skinfolds* are within 1 millimeter of the limit. In most cases circle the value in the row of “midpoint”.

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**Figure 2**

**Figure 3**
5) In the row for endomorphy, circle the value directly under the column for the value circled in number 4 above.

**MESOMORPHY CHARACTERISTICS (6-10)**

1) Record height and breadth of upper arm *(humerus)* and thigh *(femur)* in the appropriate boxes.

2) Make the corrections for skinfold before recording girths of biceps and calf. To make the *skinfold correction*:
   
   a. Convert triceps skinfold to centimeters by dividing by 10. Subtract converted triceps skinfold from biceps girth.
   
   b. Convert calf skinfold to centimeters, subtract from calf girth.

3) In the *height row* directly to the right of the recorded value, circle the *height value nearest measured height* of the subject (Note: Regard the height row as a continuous scale.)

4) For each *bone breadth and girth*, circle the number nearest the measured value in the appropriate row (Note: Circle the lower value if the measurement falls midway between the two values. This conservative procedure is used because the largest girths breadths are recorded.)

5) Deal only with columns, not numerical values for the two procedures below. Find the average deviation of the circled values for breadths and girths from the circled value in the height column as follows:
   
   a. Column deviations to the right of the height column are positive deviations. Deviations to the left are negative deviations. (Circled values directly under the height column that have deviations of zero are ignored.)
   
   b. Calculate the algebraic sum of the plus and miss deviations (D). Use this formula: \( \text{mesomorphy} = \frac{D}{8} + 4.0 \). Round the obtained value of mesomorphy to the nearest one-half (1/2) rating unit.

6) In the row for *mesomorphy*, circle the closest value for *mesomorphy* obtained in number 9 above. (If the point is exactly midway between two rating points, circle the value closest to 4 in the row. This conservative regression toward 4 guards spuriously extreme ratings.)
ECTOMORPHY CHARACTERISTICS

1) Record weight (kg). Note: 1 Kg = 2.2 pounds

2) Obtain height divided by cube root of weight (HWR). Record HWR in the appropriate box.

3) Circle the closest value in the HWR table to the right. (See note in number (4) above.)

4) In the row for ectomorphy, circle the ectomorphy value directly below the HWR.

5) Move the bottom section of the rating form. In the row for Somatotype, record the circled ratings for Endomorphy, Mesomorphy and Ectomorphy.

6) Sign your name to the right of the recorded rating.

PLOTTING THE SOMATOTYPE

Traditionally, the three-number somatotype is plotted on a two-dimensional somatochart using X, Y coordinates derived from the rating. These coordinates are calculated as follows:

\[ X = \text{ectomorphy} - \text{endomorphy} \]
\[ Y = 2 \times \text{mesomorphy} - (\text{endomorphy} + \text{ectomorphy}) \]

These points on the somatochart are called somatoplots. If the somatoplots for the subject is far from expected when compared to a suitable reference group, check the data and calculations.

SOMATOTYPE CATEGORIES

Somatotypes with similar relationships between the components are grouped into four major categories named to reflect their relationships. All other somatotypes plotted within the same section of the somatograph are assigned the same category name. These categories are:

- **Central**: No component differs by more than one unit from the other two.
- **Endomorph**: endomorphy is dominant, mesomorphy and ectomorphy are more than one-half unit lower.
- **Mesomorph**: mesomorphy is dominant; endomorphy and ectomorphy are more than one-half unit lower.
- **Ectomorph**: Ectomorphies is dominant, endomorphy and mesomorphy are more than one-half unit lower.

Note: For more information, refer to Carter, J.E.L, Ph.D. *The Heath-Carter Anthropometric Somatotype Instructional Manual* Pages 1-26 March 2002 RossCraft Surrey, Canada

2007 PROTOTYPE
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Activity Materials: (per groups of 2)
- 2 Calculators
- 6 SomatoCards
- 2 Copies Student Information Page
- 2 Copies Student Data Page

Activity Management Suggestions:
1. It is suggested that the teacher divide the class into groups of two. Each partner will analyze three of the six characters described in the SomatoCards and compare and contrast the three somatotypes with their partner.

2. Copy the SomatoCards onto card stock and laminate for reuse.

3. If students do further research they may find that early attempts to relate body type to personality traits have been found to be inaccurate. Explain to them that the body composition analysis is still considered a valuable way to look at general body types, but the psychological component of the early work is not.

Modifications:
Allow for students to work with a partner who will be able to complete the final activity and explain the terminology as needed.

Extensions:
When done with the lesson, have students who are interested in somatotype perform the steps on an individual. The proper way to get the measurements for the somatotype rating form is described in the teacher background information.

Activity References Used: