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The method of encouraging more knowledge of the proportions of one's body is always of interest to students because adolescents are interested in their physical data. If the teacher chooses to implement the first part of the method, he or she can cooperate with the biology or art teachers and integrate the lesson into the art or biology part. The second part of the method is movement-oriented, so it makes sense to integrate with physical culture.

The method is designed to work with students in grades 5-8. The workplace can be nature, a library or other space that allows students to move freely. It is recommended to divide the students into pairs.

A student research sheet is prepared for the first part of the method. It is attached as well.

Part 1

Measuring parts of the human body.

It is possible to measure without using any tools. All we need to do to measure certain parts our body. For example, a meter is from the middle finger of the outstretched hand to the shoulder of the other hand (if you outstretched your left hand, you need to measure the distance from the middle finger of the left hand to the shoulder of the right hand). For a person of average height it is about one meter.

Another method is to measure distance from the thumb to the forefinger. It is approximately 18 centimeters. To measure one meter, 6 such distances must be taken.

The human gold ratio looks like a ratio of 1: 1.618, i.e., the lower part consists of 62% higher. Explanation: If the arm length is 1, then the hand plus forearm should be 1: 1,618. If the foot is 1, the foot plus the foot is 1: 1,618.

This and other methods of body measuring lead us to measure without tools. Because students are still growing and of varying heights, we advise you to take the time and allow students to measure different distances on their body before conducting experiments and research for the use in nature.

1. Measure width of your hand. Approximately the width of an adults hand is 10 centimetres.
2. Measure the distance between your thumb to the *middle-finger* . Approximately, the distance is about 20 centimetres.
3. Measure the distance between your thumb too your index-finger. The distance is shorter by 2 centimetres than the distance between your thumb to the *middle finger*.
4. Measure the distance between the two *stretched* fingers: the middle finger to index-finger. Typically, for adults, this distance is equal to 5 centimeters.
5. It is useful to know the length of your index-finger. It is about 9 or 10 centimetres as well.

When conducting these measurements a teacher can give students some hypothesis, which students would like to check correctness of the hypothesis. This collective work would unite students and show the importance of the contribution of each of them.

- **First Hypothesis:** The length of a human foot is equal to the distance from the elbow to the wrist.
- **Second Hypothesis:** Leg length is head height multiplied by 4.5.
- **Third Hypothesis:** The human height is equal to the distance between the big toe tips of the outstretched arms.
- **Forth Hypothesis:** The corners of the mouth line up with the pupils of the eyes.
- **Fifth Hypothesis:** The space between the eyes is approximately the width of an eye.
- **Sixth Hypothesis:** is the ancient rule, which says that the average length of an adult is approximately equal to half of the distance between a person's eyes and heel (ground).

Let students check the correctness of these hypotheses. Even more so, a teacher can ask students to make some new hypothesis about distances of their bodies. Doing this activity it would be the right time to speak about various measurement units and their relations. Students can be reminded of the proportions of the human body described by Leonardo da Vinci.
https://en.wikipedia.org/wiki/Vitruvian_Man .

Without a measuring ruler

It is quite convenient to measure long distances by counting your steps. We especially recommend doing that during camping with students. For this reason, we need to know the length of our own step and count the number of steps.

There are plenty of free phone apps which can help you to count the number of steps. Students like measuring their paths by steps. Pedometers work smoothly.

Teacher should measure the lengths of steps of their students. Each student has a different length of step. Teacher should take measurements before hiking. Students have to measure the length of the path which they traveled at medium speed. This method requires a measuring tape.

The method

We measure a section at least 20 meters long. Then each student has to go along that section counting their steps. Take your average speed or the way you plan to go during the hike, because your walking speed is changing step length. Discuss what you will do if there is an incomplete step left at the end. You can skip the left section if it is small or add one more step if the section is near full step, or you can count with the number expressed with the decimal fraction also. Let the students decide for themselves how to deal with this situation, and experiment and justify their opinion. So, we have the length of step linked with the hiking speed.

One ancient rule which speaks about walking speed.   A person hikes the same kilometers per hour as number of steps per 3 seconds. It is needed to mention that the rule is correct only for the certain step length. Even more, it is quite a large step. Let's count.

Let the length of the step be equal to a. The number of the steps is equal to n. Then during the 3 seconds a person will go n x a metres. During an hour   n x a x 3600 sec = 1200 m = 1.2 km.

Then let's make an equation:

$1.2 \times n \times a = n;$

$1.2 \times a = 1;$

$a = 0.83$ m.

We got the length of the step equal to 83 centimeters. Using the first rule about the length of the step and human height, we can say, that the person should be about 175 cm tall. Once you have found human footprints you can measure the distance between the footprints and roughly determine how tall the pedestrian was by using these rules. Wondering, isn't it? During the tour, it is quite interesting to apply such a calculation.