



### Observing

The students observe what happens in the human body when a person does nothing.

One group leaves the classroom for a moment. Arrange two rows of chairs right opposite each other (at a close distance from each other). Give the group that remains in the classroom the following task: they are to sit in one row and...do nothing. Go to the second group and give them the following instructions: when they come into the classroom they should sit right opposite their classmates (one person opposite another) and for a few moments observe and write down all the movements their classmate does.

After a few minutes have passed stop the exercise. Ask both groups what they think the task of the other group was? Then the students who did the observing say what kind of movements their friends made during the time they were supposed "to be doing nothing".

Sum up: what do you think are the different types of movement the human body must perform each day? Does the fact that you are resting mean that nothing is happening in your body?





#### Movement game

The students play a game in which they bend an artificial arm to see how its muscles work.

#### Materials:

- 2 sticks (they can be broom handles) to imitate the bones of an arm,
- rubber or some other narrow material that stretches, approx. 6 meters/20ft in length, ideally red in color, which will imitate muscle,
- string, min. length of 1 m/3ft, for binding the bones together,
- printed Hand - picture (pdf) or you can draw the outline of your hand on some cardboard

#### Instructions:

1. The students form two rows perpendicular to each other and imagine that they are a bent arm. Specify which students will represent the arm, the shoulder and the forearm, the elbow, and who will be the wrist (as in the attached graphic).
2. Give one stick to the students performing the function of the arm, and the second to those representing the forearm. The child representing the wrist gets the paper hand.
3. The pupil playing the role of the elbow will hold the string binding the two sticks (i.e. bones) together.
4. Choose one student each from the "arm" and the "forearm" and ask them to hold the ends of the rubber imitating the muscle. Tell them that they are occupying the place of the muscle attachment.
5. To see how muscles work the students should do the following:
  - first "straighten" the arm, i.e. the students playing the role of the forearm and wrist should take several steps back so that both sticks (bones) stop in a straight line; at this moment the rubber is pulled tight.
  - then, they bend the hand at a right angle once more and the rubber contracts.
  - they bend the hand more, so that both sticks (bones) are almost parallel with one another; lift the loosely hanging rubber so as to show the students that the muscle has contracted as far as it can go, but at the same time has become thicker.

#### Conclusions:

**When the hand moves, its muscles change their dimensions – their thickness and length.**



#### Experiment

The students observe the effect physical exercise has on their body (when their muscles are working).

1. Give each of the three teams a worksheet and equipment needed to measure the following parameters:

- body temperature - thermometers (ideally electronic or forehead strip thermometerers)
- number of breaths per minute – pre-prepared devices (straws with small plastic bags, instructions in Get Ready)
- speed of heart beat (heart rate, pulse) – stethoscopes/ electronic devices for measuring blood pressure

2. Explain to each team how each device works. The heart rate and number of breaths should be measured over the course of 30 seconds. When breathing through the straw, the movements of the bag will make it easier to count the number of breaths.

3. The students measure the different parameters of each person from their group and record the results on worksheets.

4. Then, the students perform a series of physical exercises for 5 minutes, e.g. squat jumps, forward bends, jumping jacks, jumping, running on the spot.

5. Afterwards, the students measure physiological parameters once more and record the results on worksheets.



Optionally, you may decide not to divide the students into groups so that each student will be able to measure the three parameters in turn. In such a case, prepare a larger number of materials corresponding to the number of students in the class.