CLIL LESSON GENERAL LAYOUT

1. **TITLE OF THE UNIT:** The science of heart.
2. **SUBJECT(S):** biology
3. **TEACHER IN CHARGE:** Artur Baranowski
4. **STUDENTS' LEVEL / AGE:** 13-16 years olds
5. **OBJECTIVES:**
    a. **CONTENT OBJECTIVES:**
        i. I know how the heart is build and I can point the main parts of the heart.
        ii. I can make the heart secton.
        iii. I know how the blood circulate in human body?
        iv. I can prepare the microscopic slides different kinds of muscles (skeletal, cardiac and smooth muscle)?
        v. I can differentiate three kinds of muscles and describe their role in the organism and their place in it.
    b. **LANGUAGE OBJECTIVES:** new vocabulary concerned with heart, blood circulation, circulatory system and muscles
6. **ACTIVITIES:** individual work, group work, brainstorm, working on tablets or phones, google documents,
7. **DETAILED SESSIONS**
    a. Aim
    b. Brain storm
    c. Activities 1-4.
    d. Preparing microscopic slides.
    e. Revision - Summary of the lesson: What was the aim of the lesson?
8. **ASSESSMENT** - kahoot.it or quizlet
9. **TIMING -** 45-60 minutes

Detailed plan of the Polish CLIL lesson

1. Welcome the class. Today we will know a lot about the heart and muscles.
2. **AIM**. **(PRESENTATION)** Give the objectives for the lessons:

   These are the aims of the lessons:

   a. I know how the heart is built and I can point the main parts of the heart.

   b. I can make the heart section.

   c. I know how the blood circulate in human body?

   d. I can observe (optionally prepare) the microscopic slides different kinds of muscles (skeletal, cardiac and smooth muscle)?

   e. I can differentiate three kinds of muscles and describe their role in the organism and their place in it.
3. **BRAINSTORM - questions to think about.**

   While listening to the questions make a list of words on the piece of paper connected to this subject and try to prepare the answers for the questions. You have got 1 minute for it. After 1 min every student says the written words, but not more than 1 of them. Polish ss write them on the board.

   a. what are muscles for?

   b. what is the source of their movement?

   c. where does the energy come from?

   d. are there different kinds of muscles and do they play the same role in our organism?

   e. what parts does the heart is build of?

   f. how does the blood circulate?

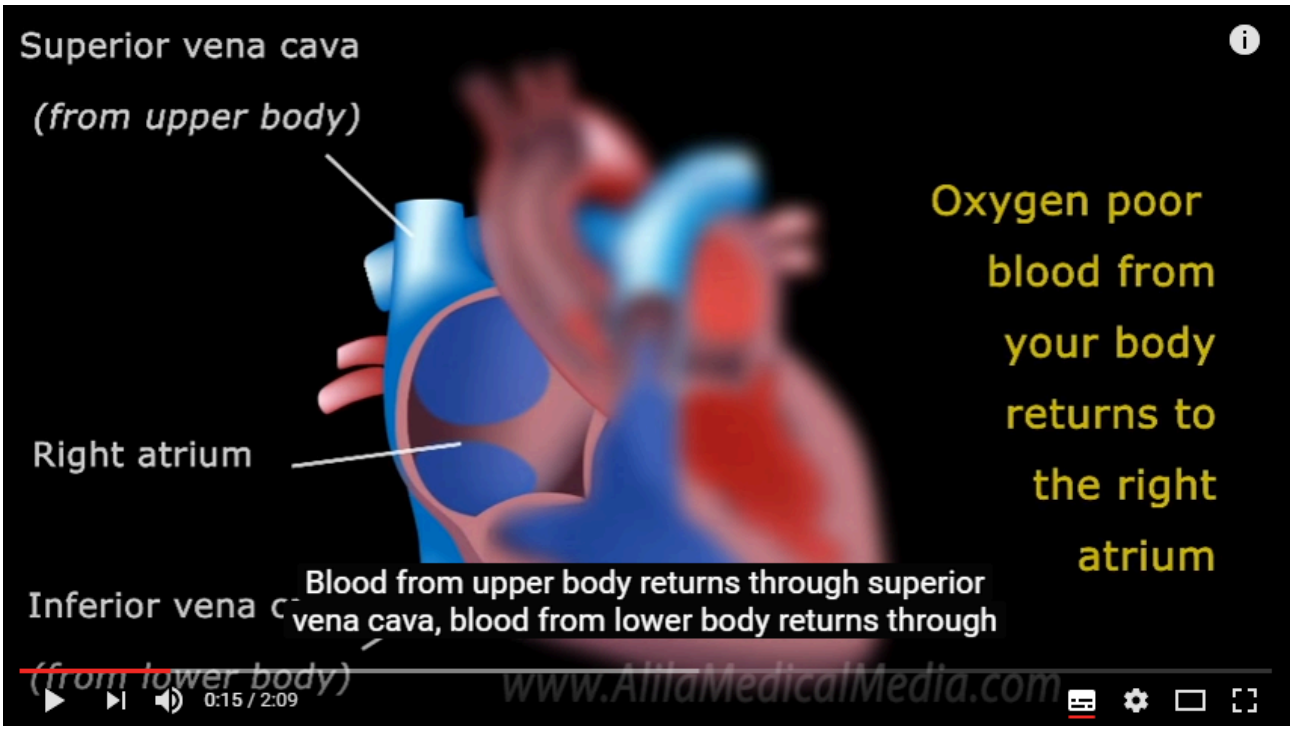
   You have got 3 minutes.

4. **Activity 1. (Film + task)** I would like to divide the class into 5 groups of 3-4 person. Ss make the groups by reading the names. So, all groups sit together 1 - 6. Ss point where the groups of students should sit. Every group receives a tablet and a helper from the Polish team.

   Then all students watch the film about blood circulation.

   Then they put in the correct order the blood circulation in the set of sentences.

   Then students in pairs read the correct order.

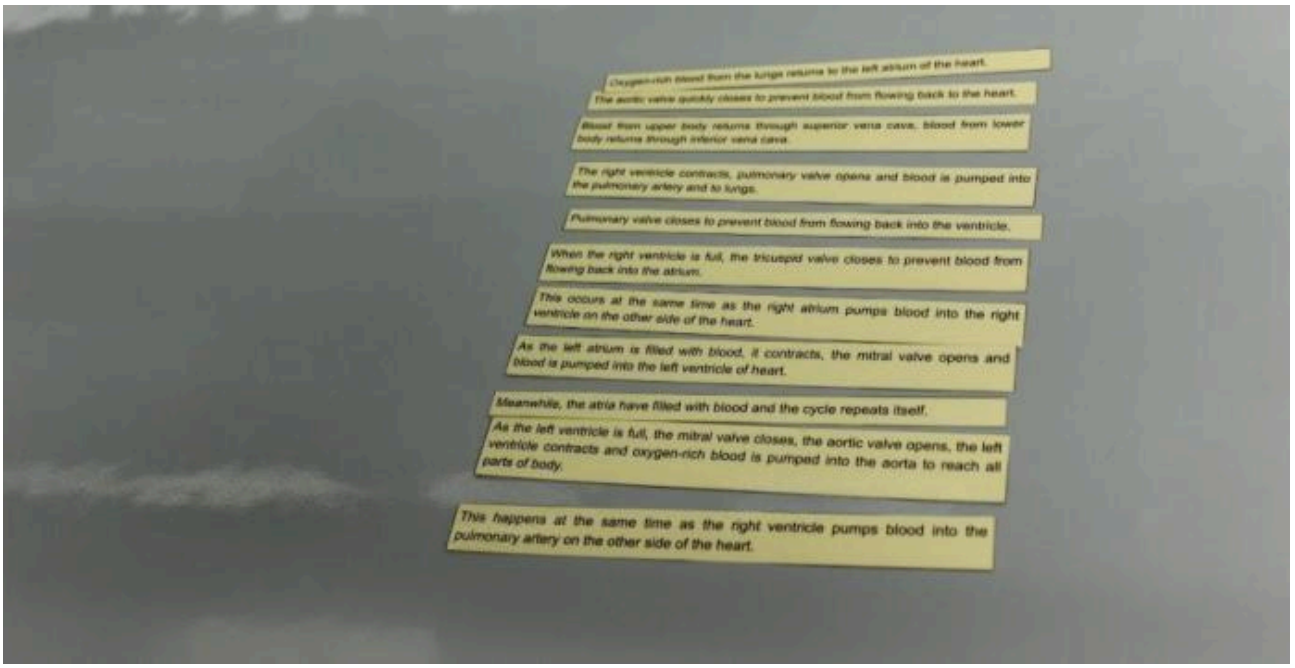


https://www.youtube.com/watch?v=BEWjOCVEN7M

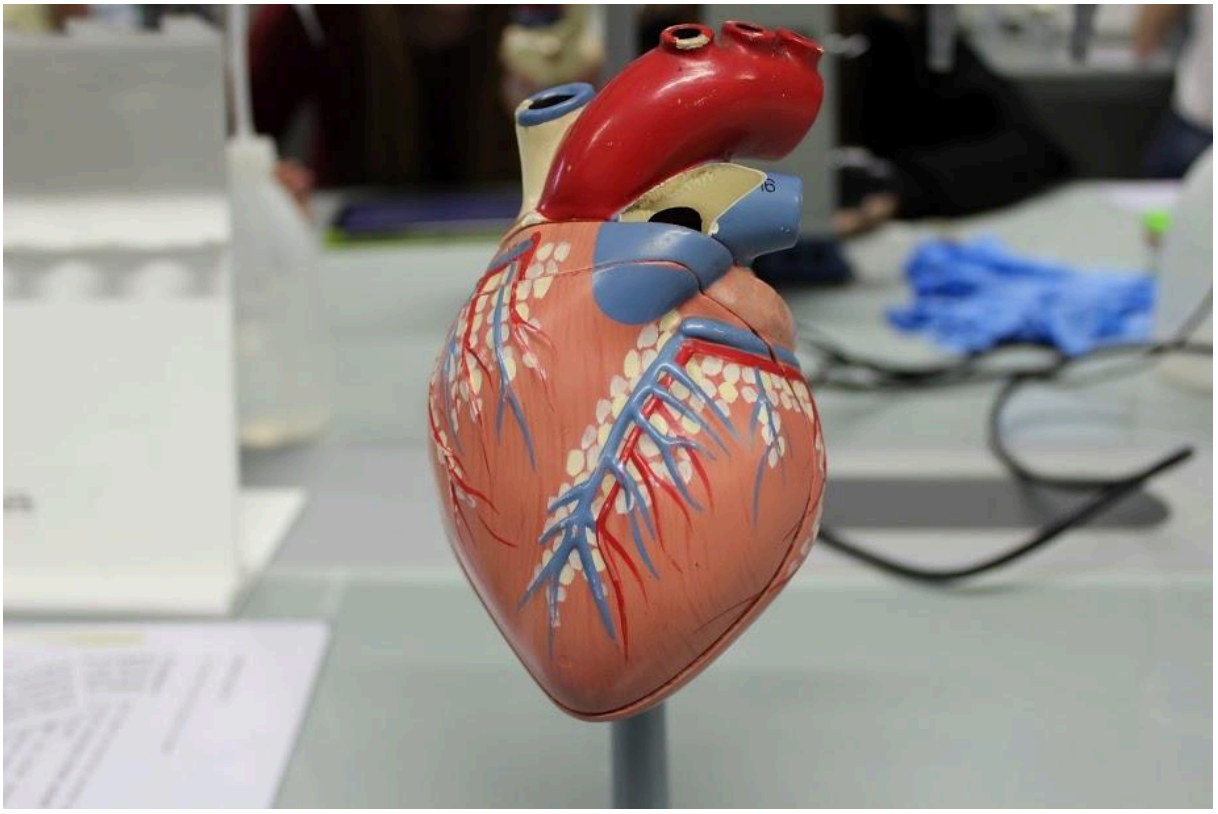
attachment 1

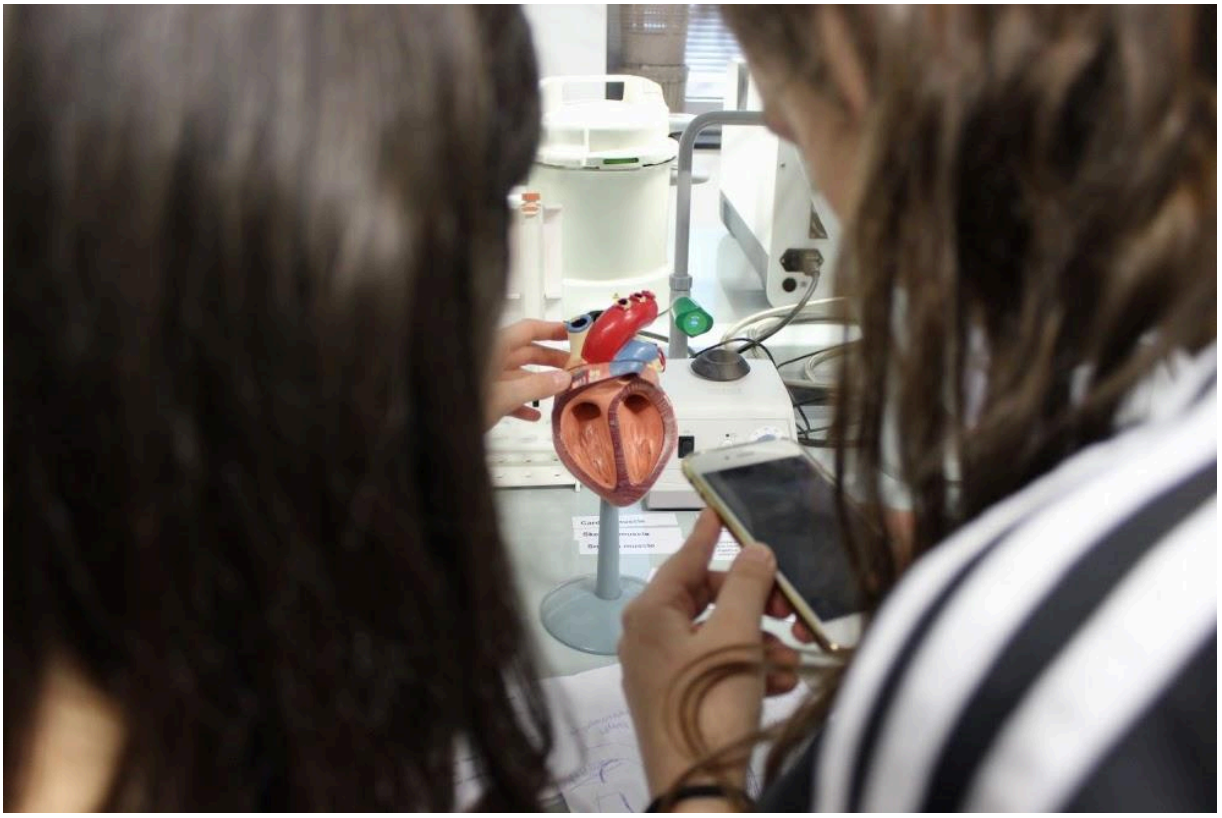
https://docs.google.com/document/d/1g7cjpXnLyGplMBLvP8Oun8Tz5GCZF0IC5TalVrR9PlU/edit?usp=sharing

You have got 7 minutes.



5. **Activity 2. (heart section)** - Polish students show the main parts of the hearts on the model. Then ss have to make a heart section by cutting them into the parts and show the main parts to each other. Then they clean up the tables.





attachment 2

https://docs.google.com/document/d/1hzxcy4uvKkUBAVfpanf4MBEBuDrMw1jYIFWuhwHOwDY/edit?usp=sharing

You have got 15 minutes.

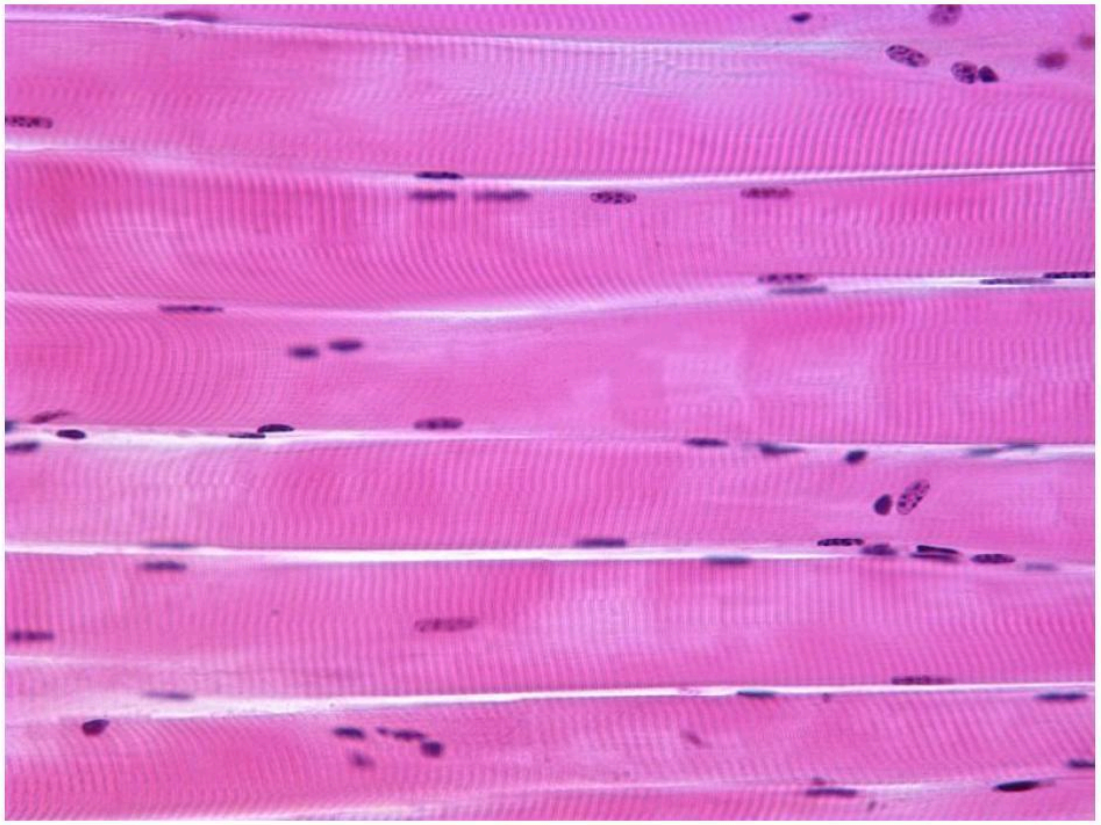
6. **Activity 3.** Draw the heart

attachment 3

https://docs.google.com/document/d/1fKRoBV7CNPzlA27IbgRhxN5SAVp3dbk0lsfH1X7uSs4/edit?usp=sharing

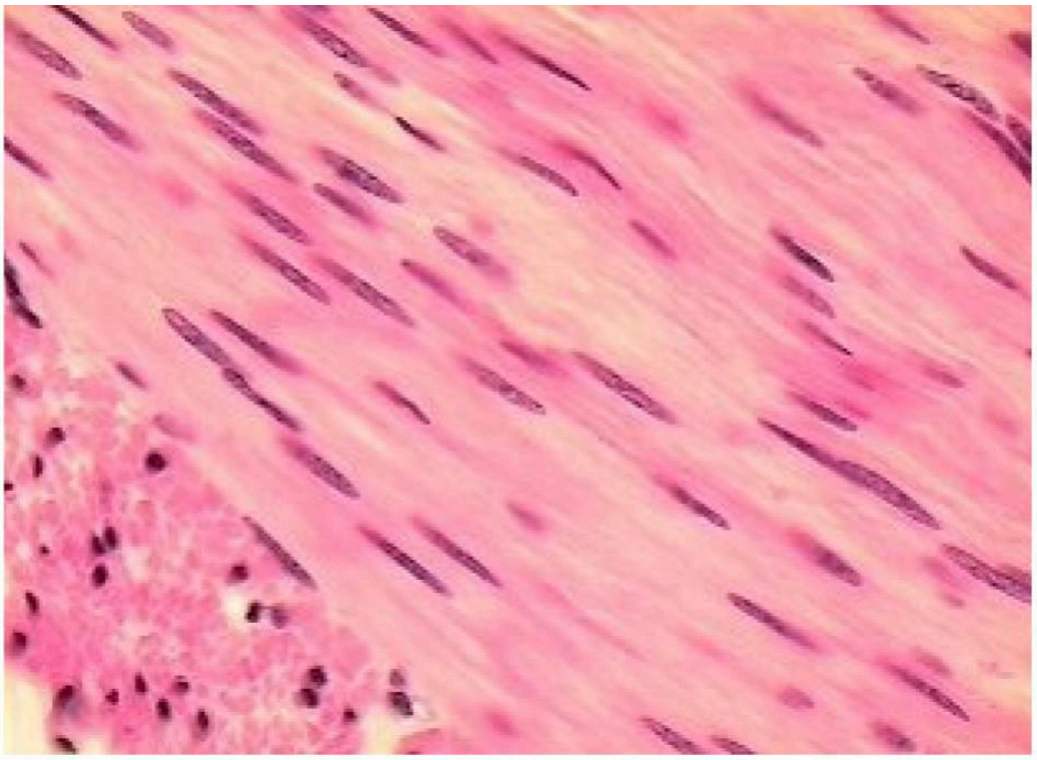
You have got 8 minutes.

7. **Activity 4. (microscopic slides)** Ss observe 3 microscopic slides from 3 different kinds of muscles through microscope and take pictures. They also match one of three descriptions to every kind of muscle (attachment 4). They send all pics to one Polish student who makes a gallery and description of the workshop on google+ and then publish to FB.
   Ss match the description of the muscle with the proper name.
   Eventually students can observe slides already done or observe them on-line (webpage: http://histology.medicine.umich.edu/resources/muscle).
   a) skeletal muscle:



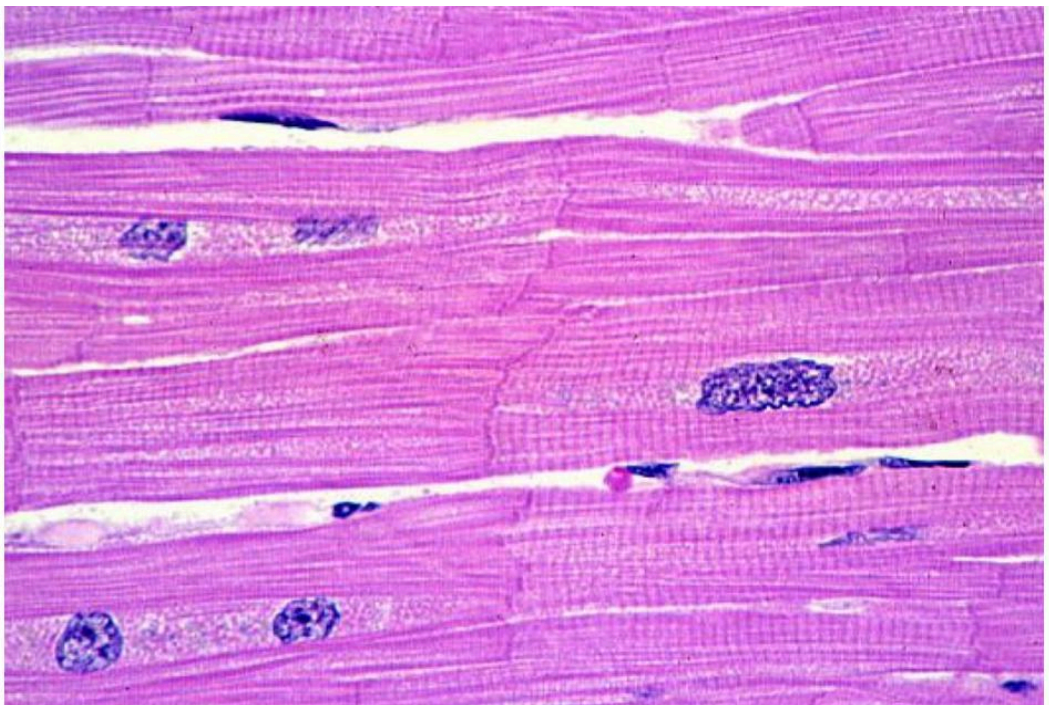
- https://docs.google.com/drawings/d/1OaZsjXzAg7TxPGlQkM31mZAbpmYnBdsOUDuY9BgyUgw/edit?usp=sharing
- http://141.214.65.171/Histology/Basic%20Tissues/Muscle/058thin_HISTO_83X.svs/view.apml

b) smooth muscle (small intestine):

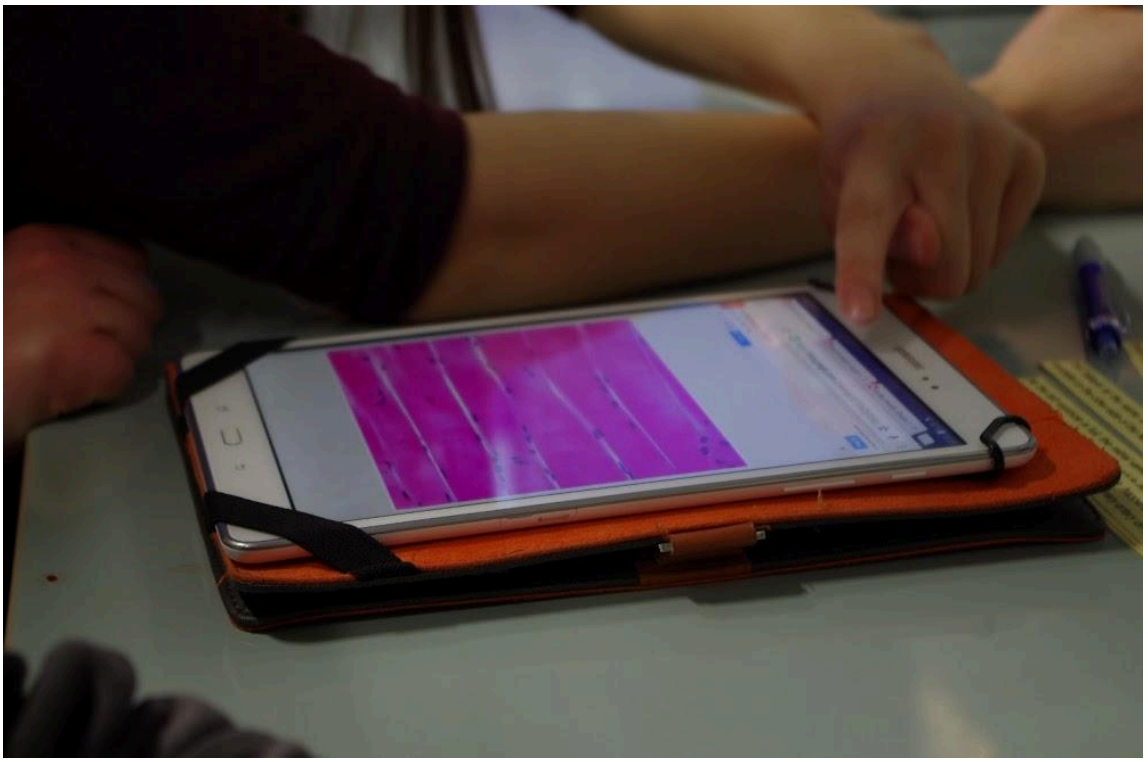


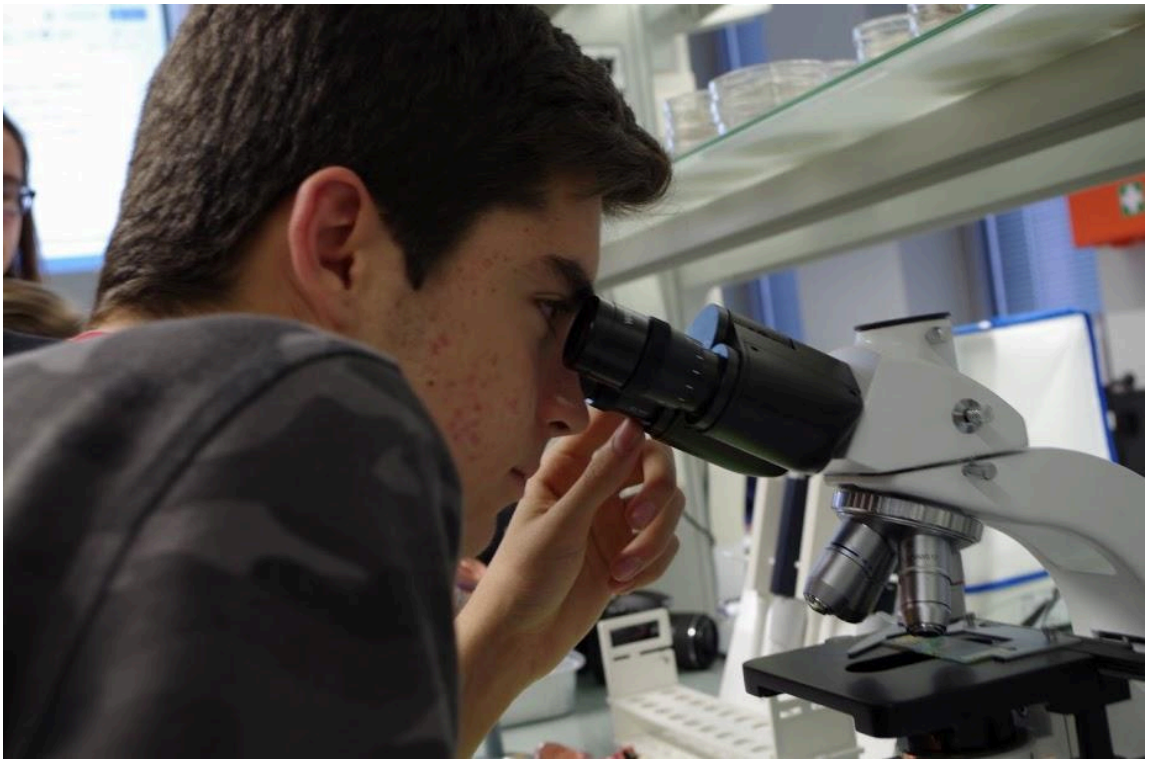
- https://docs.google.com/drawings/d/1_c6TxTU-XceHt7l4yER9D50H5QB03NBOJRKSDvj3CVE/edit?usp=sharing
- http://141.214.65.171/Histology/Basic%20Tissues/Epithelium%20and%20CT/029-1_HISTO_40X.svs/view.apml

c) cardiac muscle:



- https://docs.google.com/drawings/d/1QJHJx_TaU1JJUTqnnZXEh0Vadtmcxweo ZFLI4x5lQffw/edit?usp=sharing
- http://141.214.65.171/Histology/Basic%20Tissues/Muscle/057_HISTO_40X.svs/view.apml?x=-0.0103161973&y=0.3326723943&zoom=25.0000000000&transform=



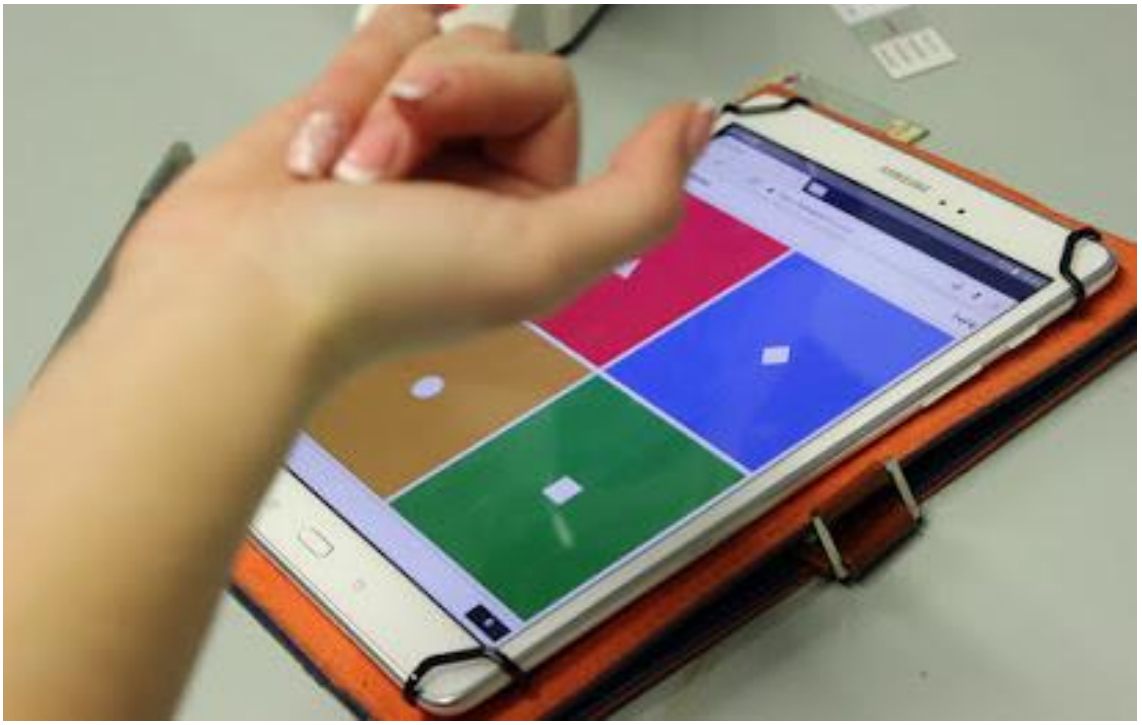


attachment 4

https://docs.google.com/document/d/1_v2CqXEF8EWXDfkflBhWGX5HoTd2OGHi30vehdV6Rqw/edit?usp=sharing

You have got 15 minutes.

8. **Summary of the lesson:** What were the aims of the lesson? Polish ss ask the questions or the questions will be asked in the short kahoot test. Students can use tablets.



Kahoot game: https://play.kahoot.it/#/k/09b2dcb9-db14-4d33-8844-b74a39234757

You have got 5 minutes.

Literature:

https://www.sciencelearn.org.nz/resources/1917-muscle-structure-muscle-under-the-microscope

http://histology.medicine.umich.edu/resources/muscle

Attachment 1
(before use the paper is printed and cut)

Blood circulation system:

Blood from upper body returns through superior vena cava, blood from lower body returns through inferior vena cava.
As the right atrium is filled with blood, it contracts, the tricuspid valve opens and blood is pumped into the right ventricle of heart.
When the right ventricle is full, the tricuspid valve closes to prevent blood from flowing back into the atrium.
The right ventricle contracts, pulmonary valve opens and blood is pumped into the pulmonary artery and to lungs.
Pulmonary valve closes to prevent blood from flowing back into the ventricle.
Oxygen-rich blood from the lungs returns to the left atrium of the heart.
As the left atrium is filled with blood, it contracts, the mitral valve opens and blood is pumped into the left ventricle of heart.
This occurs at the same time as the right atrium pumps blood into the right ventricle on the other side of the heart.
As the left ventricle is full, the mitral valve closes, the aortic valve opens, the left ventricle contracts and oxygen-rich blood is pumped into the aorta to reach all parts of body.
This happens at the same time as the right ventricle pumps blood into the pulmonary artery on the other side of the heart.
The aortic valve quickly closes to prevent blood from flowing back to the heart.
Meanwhile, the atria have filled with blood and the cycle repeats itself.

Attachment 2

To dissect and display a heart.

Procedure:

1. Position the heart so that the ventral (front) surface is facing you. You will notice the large coronary blood vessel running from right to left across the surface of the heart.
2. Identify the major the blood vessels that enter and leave the heart. Sometimes these blood vessels have been removed by the butcher.
3. Identify the atria (upper chambers) and ventricles (lower chambers).
4. Identify the right and left ventricles by squeezing the ventricles. The softer one is the right ventricle of the heart.
5. Using a scalpel make two incisions in the wall of the ventricles, approximately 2 cm apart.
6. Carefully slice away the ventral walls of the atria. Note the thin atrial walls.
7. Now slice away the ventral wall of the left ventricle to expose the bicuspid valve, the chordae tendinae and the cavity of the ventricles. Notice the thickness of the walls.
8. In a similar manner, slice open the right ventricle wall. Notice that the wall of the right ventricle is much thinner than that of the left ventricle.
9. Cut the window in the pulmonary artery and aorta close to the heart to expose the semi-lunar valves.
10. Try to identify all of the structures.
11. Make flag labels of the major parts of the heart and insert them into your dissection for display. Take a photo of it.
12. Write up (optionally) the dissection in your notebook.

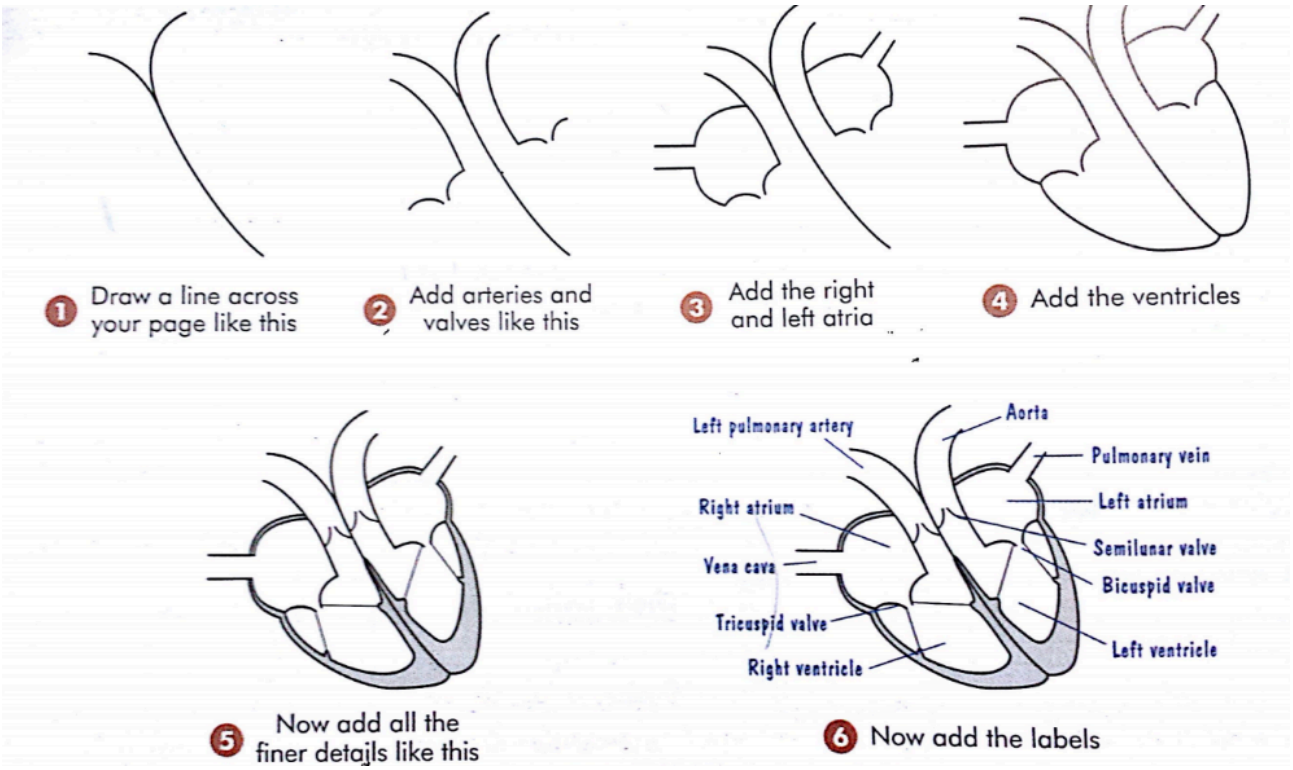
External and internal structure of the heart

Superior vena cava	**Arch of aorta**
Right pulmonary artery	**Left pulmonary artery**
Right pulmonary veins	**Aorta**
Right atrium	**Pulmonary artery**
Right coronary artery	**Left pulmonary veins**
Right ventricle	**Left atrium**
Inferior vena cava	**Descending branch of the coronary artery**
Left ventricle	**Apex**

Attachment 3

Draw the main parts of the heart and describe them

1. Draw a line across your page.
2. Add arteries and valves like this.
3. Add the right and left atria.
4. Add the ventricles.
5. Now add the finer details like this.
6. Now add the labels.



Attachment 4

Key:

Skeletal muscle

Skeletal muscle looks striped or "striated" – the fibres contain alternating light and dark bands (striations) like horizontal stripes on a rugby shirt. In skeletal muscle, the fibres are packed into regular parallel bundles. Occasional nuclei appear to be **not centrally located** but on the sides of the cells.

Cardiac muscle

Cardiac muscle tissue, like skeletal muscle tissue, looks striated or striped. The bundles are branched, like a tree, but connected at both ends. Unlike skeletal muscle tissue, the contraction of cardiac muscle tissue is usually not under conscious control, so it is called involuntary. Cardiac muscle cells branch and form a three-dimensional network. The nucleus is **centrally located** in a fiber.

Smooth muscle

Compared to skeletal muscle, smooth muscle cells are small. They are spindle shaped and have no striations. Instead, they have bundles of thin and thick filaments. Found in digestive system (stomach, small intestine), reproductive system (oviduct, vagina), urinary system (bladder) or circulatory system (veins, arteries).

Working sheet: (must be printed and cut in lines before use)

Smooth muscle
Cardiac muscle
Skeletal muscle
……. muscle looks striped or "striated" – the fibres contain alternating light and dark bands (striations) like horizontal stripes on a rugby shirt. In ……... muscle, the fibres are packed into regular parallel bundles. Occasional nuclei appear to be not centrally located but on the sides of the cells.
…….. muscle tissue, like skeletal muscle tissue, looks striated or striped. The bundles are branched, like a tree, but connected at both ends. Unlike skeletal muscle tissue, the contraction of ,..... muscle tissue is usually not under conscious control, so it is called involuntary. …….. muscle cells branch and form a three-dimensional network. The nucleus is **centrally located** in a fiber.
Compared to skeletal muscle, ……... cells are small. They are **spindle shaped** and **have no striations.** Instead, they have bundles of thin and thick filaments. Found in digestive system (stomach, small intestine), reproductive system (oviduct, vagina), urinary system (bladder) or circulatory system (veins, arteries).