

How blood gets around the body, czyli biologia w klasie dwujęzycznej

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Rewolucja związana z przywróceniem po dwóch dekadach ośmioklasowych szkół podstawowych spowodowała, że zarówno dyrektorzy, jak i nauczyciele wielu szkół zdecydowali się na utworzenie klas dwujęzycznych. Z jednej strony jest to ukłon w stronę rodziców, którzy są coraz bardziej świadomi potrzeby kształcenia językowego swoich dzieci, zwłaszcza w wypadku języka angielskiego, z drugiej – zrodziła się naturalna potrzeba znajomości tego języka, uznawanego za *lingua franca* XXI w., od najmłodszych lat.

Według opublikowanego w 2015 r.¹ raportu ewaluacyjnego Ośrodka Rozwoju Edukacji nauczanie dwujęzyczne w szkołach podstawowych nie było realizowane tak często, jak w szkołach gimnazjalnych i ponadgimnazjalnych (stan na 2013 r.: 1452 uczniów w szkołach podstawowych, 19 383 uczniów w szkołach gimnazjalnych i 9403 uczniów w szkołach ponadgimnazjalnych). Nowa sytuacja na rynku oświatowym, tj. wygaszenie szkół gimnazjalnych oraz utworzenie klas siódmych i ósmych, spowodowała wzrost liczby klas dwujęzycznych w szkołach podstawowych (klasy takie mogą być tworzone od klasy siódmej). Ułatwiają to przepisy prawne: oddziały dwujęzyczne mogą powstać w każdej szkole na wniosek dyrektora – poparty przez radę pedagogiczną, samorząd uczniowski i radę rodziców – skierowany do rady miasta. Po podjęciu uchwały przez organ prowadzący i dokonaniu zmian w statucie szkoły możliwe jest uruchomienie oddziału dwujęzycznego.

Prosta procedura, wzrastające zainteresowanie tymi klasami oraz przekształcanie dwujęzycznych oddziałów gimnazjalnych w klasy siódme i ósme nie idą jednak w parze z dostępem do materiałów dydaktycznych. Stosunkowo mała ich liczba, zwłaszcza w dziedzinie nauk przyrodniczych (biologia, chemia, fizyka), może być znacznym utrudnieniem dla nauczycieli podejmujących się zadania uczenia w tego typu klasach. Zmuszeni są oni do tworzenia materiałów autorskich, co, po pierwsze, jest niezwykle pracochłonne, po drugie, ogranicza możliwości czasowe dydaktyków, którzy ten czas mogliby poświęcić uczniom.

W odpowiedzi na te potrzeby zrodził się pomysł opracowania zestawu scenariuszy lekcji z biologii dla dwujęzycznych klas siódmych². Niniejszy artykuł przedstawia dwa wybrane konspekty dotyczące układu krwionośnego.

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1 Analiza danych obejmowała stan placówek oświatowych z kształceniem dwujęzycznym na 30 września 2013 r.

2 Scenariusze są częścią większego projektu, który ma na celu stworzenie szczegółowych konspektów lekcji biologii dla dwujęzycznych klas siódmych z zakresu materiału obowiązującego w podstawie programowej na tym etapie kształcenia.

Scenariusze

Lesson plan 1. *The human circulatory system: how the blood gets around the body?*

Form: students of the 7th grade of primary school

Realization time: 45 minutes

General aim: The students will get familiar with the human circulatory system

Objectives:

At the end of the lesson the students will be able to:

- explain how the blood gets around the body;
- enumerate functions of the primary organs of the human circulatory system;
- explain differences between oxygenated and deoxygenated blood;
- explain the role of the circulatory system for human body.

Students' background knowledge:

Students should know the basic function of heart and circulatory system. Their English level should be A2+/B1 (pre-intermediate or intermediate).

Methods and forms of work: brainstorming; listening for general information; matching words to their definitions; gap-filling; pair work.

Didactic support: recording; handout (a tape script of recording); diagram of human circulatory system (copies for each student).

Procedure and stages of the lesson:

1. Greeting

2. Checking the presence

3. Warm-up

Teacher: *Please sit still and quiet. Now put your fingers on your neck, underneath your chin, next to your larynx. What do you feel?*

Students' predicted answers (key-words): *pulse, beat, heartbeat*

4. Lead-in

Teacher says: *That's correct! Each pulse that you can feel now underneath your fingers equals one beat of your heart. Your heart keeps on beating all your life, which means*

it constantly pushes blood around your body to keep you alive.

*The blood travels round your body inside special tubes called **blood vessels**. (Teacher should write this phrase on a whiteboard). Before we learn how the blood gets around the human body I would like you to look at exercise 1. Please try to match words to their definitions. Don't worry if you don't know the answer. Do it in pairs (see: attachment 1)*

Teacher gives 3-4 minutes to do this exercise.

Teacher checks students' answers by asking them the following questions:

- *What is the definition of heart?*
- *What is an artery?*
- *What is a vein?*
- *What's the definition of carbon dioxide?*
- *Can you define oxygen?*
- *What are lungs?*
- *What are capillaries?*
- *Can you define aorta?*
- *What is oxygenated/deoxygenated blood?*
- *What are valves?*

Teacher says: *On the basis of these definitions we are now ready to see how the human circulatory system works.*

5. Presentation

Teacher: *Please remember/note that the heart and blood vessels make up the circulatory system. Now I will give you a diagram which presents the basic plan on which the blood vessels are arranged. In the meantime, you will hear a recording which explains how the human circulatory system works. I want you to listen to it and look at the diagram carefully. Don't worry if you don't understand everything, we'll explain it later (see attachment 2: diagram and attachment 3: recordings).*

6. Practice

Teacher asks students: *Did you find the text easy or difficult? What can you remember?* (Students attempt to answer as much as they can).

Teacher: *Now I'll give you the copies of the text you have just heard. You are going to listen to the recording once again. I would like you to try to fill in the gaps with appropriate words from what you hear. Use words/phrases below the text to fill in the gaps. (see attachment 4)*

Teacher says: *Now try to read this text together. (Teacher*

attempts to elicit answers from the students. He/She can also show the full text on a projector to make sure each student is able to check the correct answers).

Answers:

What Does the Circulatory System Do?

The circulatory system is made up of blood vessels that carry blood away from and towards the heart. **Arteries** carry blood away from the heart and **veins** carry blood back to the heart.

The circulatory system carries oxygen, nutrients, and hormones to cells, and removes waste products, like carbon dioxide. These roadways travel in one direction only, to keep things going where they should.

What Are the Parts of the Circulatory System?

Two pathways come from the heart:

- the **pulmonary circulation** is a short loop from the heart to the lungs and back again;
- the **systemic circulation** carries blood from the heart to all the other parts of the body and back again.

In pulmonary circulation:

- the pulmonary artery is a big artery that comes from the heart. It splits into two main branches, and brings blood from the heart to the lungs. At the lungs, the blood picks up oxygen and drops off carbon dioxide. The blood then returns to the heart through the pulmonary veins.

In systemic circulation:

- next, blood that returns to the heart has picked up lots of oxygen from the lungs. So it can now go out to the body. The aorta is a big artery that leaves the heart carrying this oxygenated blood. Branches off of the aorta send blood to the muscles of the heart itself, as well as all other parts of the body. [...]

At each body part, a network of tiny blood vessels called **capillaries** connects the very small artery branches to very small veins. The capillaries have very thin walls, and through them, nutrients and oxygen are delivered to the cells. Waste products are brought into the capillaries.

Capillaries then lead into small veins. Small veins lead to larger and larger veins as the blood approaches the heart. Valves in the veins keep blood flowing in the correct direction. Two large veins that

lead into the heart are the superior vena cava and inferior vena cava. [...]

Once the blood is back in the heart, it needs to re-enter the pulmonary circulation and go back to the lungs to drop off the carbon dioxide and pick up more oxygen.

Source: kidshealth.org/en/teens/heart.html

7. Summary

Teacher shows on the projector five sentences. Students have to decide which statements are true or false (see attachment 5)

Answers:

1. The heart and blood vessels make up the circulatory system (T)
2. Blood flows out of the heart inside arteries, and back into the heart inside veins (T)
3. Oxygen does not enter the blood as the blood passes through lungs (F)
4. When blood contains a lot of oxygen is deoxygenated (F)
5. When blood has lost most of its oxygen it becomes a more blueish-red and it is deoxygenated (T)

8. The ending

Teacher: As your homework, read the text again and try to remember the most important information. Revise vocabulary.

Lesson plan 2. The heart

Form: students of the 7th grade of primary school

Realization time: 45 minutes

General aim: Students will be able to identify parts of heart, as well as its function

Objectives:

At the end of the lesson the students will be able to:

- explain how the human heart works;
- enumerate heart functions;
- identify the four chambers of the heart;
- explain how the blood flows through the heart.

Students' background knowledge:

Students should know the basic function of heart and circulatory system. Their English level should be A2+/B1 (pre-intermediate or intermediate).

Methods and forms of work: brainstorming; listening for general information; gap-filling; pair work; group work.

Didactic support: video; handout; diagram of human heart (copies for each student).

Procedure and stages of the lesson:

1. Greeting

2. Checking the presence

3. Warm-up

Teacher: *We will start this lesson with a riddle that helps us to guess today's subject of our lesson. Are you ready? This 'thing' is the size of an adult's fist. It beats about 115,000 times each day and pumps about 7600 litres of blood a day. It is just under your ribs, slightly to the left of centre of your body. It has four chambers and it can continue beating even when it's disconnected from the body. What is it?*

Students' anticipated answer: a human heart, heart

Teacher writes the topic on a whiteboard: **The human heart.**

4. Lead-in

Teacher: *You're going to work in small groups of 3 or 4. Each group is going to get a set of 20 words or phrases. 10 of them are used to describe how the heart works. Please try to choose these words. Don't worry if you don't understand some of the phrases.* (see: attachment 1)

Students' anticipated answers: *systole, diastole, aorta, chamber, valve, artery, atrium, ventricle, oxygenated/deoxygenated blood, lungs*

(Please remember to tell your students that the remaining ten words are to describe the human reproductive system)

5. Presentation

Teacher: *Now I would like you to watch a short video about the human heart and circulatory system.*

Source: www.youtube.com/watch?v=CWFyxn0qDEU

After watching a video, the teacher asks the students: *On the basis of what you've seen, can you please tell me what is the function of human heart? Try to find at least three functions.*

(Brainstorming: students discuss the question in pairs)

Teacher writes students' answers on a whiteboard.

Teacher: *We already know what the heart functions are. The next step is to get to know how the heart exactly*

works. Please look at the diagram on the projector. (see: attachment 2). It explains how the heart works.

Teacher says:

The heart is made of muscle. This muscle contracts and then relaxes. When muscle contracts, it gets shorter. This makes the walls of the heart chambers squeeze inwards. This pushes blood out of the heart.

There are valves between the upper chambers and the lower chambers. The valves only let the blood flow from the upper chamber to the lower chamber. There are also valves in the big arteries coming out of the heart. These valves only let the blood flow out, not back into the heart. This is what happens during one heart beat: the heart muscle contracts, pushing blood out into the arteries; the heart muscle relaxes, allowing blood to flow into the heart from the veins.

Source: Jones, M., Fellowes-Freeman, D., Sang, D. (2013), Cambridge Checkpoint. Science. Coursebook 8, Cambridge University Press, pp. 34–35.

6. Practice

Students are given copies with the drawing of human heart (see: attachment 3).

Teacher: *Now I would like you to label the parts of human heart with the use of the words you have below the drawing. You have three minutes to do this exercise.*

Answers (given clockwise):

Pulmonary artery, left atrium, mitral valve, aortic valve, left ventricle, right ventricle, tricuspid valve, pulmonary valve, right atrium, aorta

Teacher elicits answers from students.

7. Summary

Teacher gives students the copies of an exercise (see: attachment 4)

Teachers says: *Please fill in the spaces in the paragraph below about human heart. The first letter of each missing word has been given. Please note that you may repeat the same word a few times. Read carefully.*

Answers: *Contracts, relaxes, contracts, blood, valves, chambers, chambers, arteries, contracts, arteries, relaxes, veins.*

8. The ending

Teacher says: *I would like you to remember the structure of human heart, the functions of heart and how it works. I believe you found this lesson interesting and useful. See you next time.*

Attachments

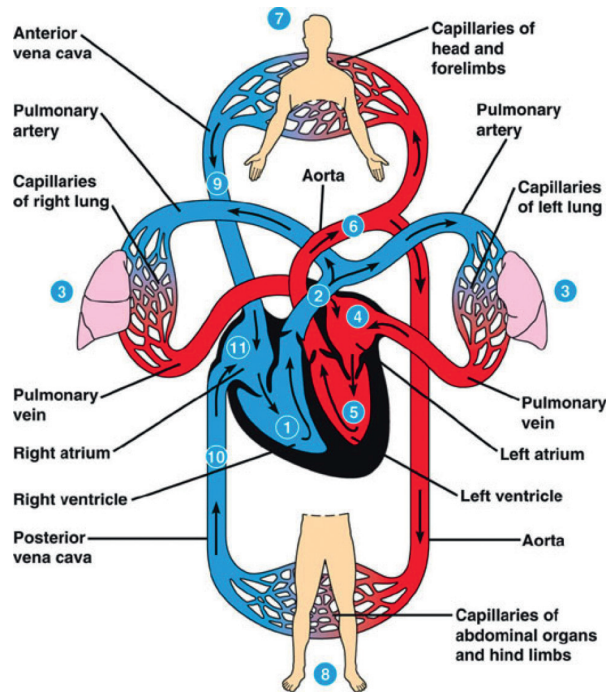
Lesson plan 1. *The human circulatory system: how the blood gets around the body?*

Attachment 1 Ex. 1. Draw lines to match each word to its correct definition.

Word	Definition
<i>Arteries</i> (singular: <i>artery</i>)	a colourless, odourless, tasteless gas that is necessary for life. Its chemical symbol is O.
<i>Veins</i> (singular: <i>vein</i>)	the vessels that carry blood away from the heart
<i>Heart</i>	it is carrying carbon dioxide to be expelled from body.
<i>Carbon dioxide</i>	a colourless gas which has a faint, sharp odour and a slightly sour taste. Its chemical formula is CO ₂ , which means that it consists of one atom of carbon and two atom of oxygen.
<i>Oxygen</i>	carry blood back to the heart.
<i>Capillaries</i>	a muscle that pumps blood around the body
<i>Aorta</i>	the smallest of the body's blood vessels. They have thin walls thanks to which oxygen and glucose can pass through and enter the cells. At the same time waste products such as carbon dioxide can pass back into the blood to be carried away and taken out of the body.
<i>Oxygenated blood</i>	they prevent the backward flow of blood.
<i>Deoxygenated blood</i>	the main artery that carries blood from the heart for distribution to all parts of the body.
<i>Valves</i>	it is carrying oxygen to deliver to body tissues

Source: www.brainpop.com/games/buildabodycirculatorysystem

Attachment 2



Source: clipart-library.com/clipart/riLoyk9rT.htm

Attachment 3:

Sound files are available in the online version of the article at www.jows.pl.

Attachment 4

What Does the Circulatory System Do?

The circulatory system is made up of that carry blood away from and towards the heart. **Arteries** carry blood from the heart and veins carry blood to the heart.

The circulatory system carries, nutrients, and hormones to cells, and removes waste products, like These roadways travel in one direction only, to keep things going where they should.

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Two pathways come from the heart:

- The **pulmonary circulation** is a short loop from the heart to the and back again.
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In pulmonary circulation:

- The pulmonary artery is a big that comes from the heart. It splits into two main branches, and brings blood from the heart to the lungs. At the lungs, the blood picks up oxygen and drops off carbon dioxide. The blood then returns to the heart through the pulmonary

In systemic circulation:

- Next, blood that returns to the heart has picked up lots of oxygen from the lungs. So it can now go out to the body.

The is a big artery that leaves the heart carrying this Branches off of the aorta send blood to the muscles of the heart itself, as well as all other parts of the body. [...]

At each body part, a network of tiny blood vessels called connects the very small artery branches to very small veins. The capillaries have very thin walls, and through them, nutrients and oxygen are delivered to the cells. Waste products are brought into the capillaries.

Capillaries then lead into small veins. Small veins lead to larger and larger veins as the blood approaches the heart. Valves in the veins keep blood flowing in the correct direction. Two large veins that lead into the heart are the and [...]

Once the blood is back in the heart, it needs to re-enter the pulmonary circulation and go back to the lungs to drop off the carbon dioxide and pick up more oxygen.

artery	away	heart	aorta	oxy- gen	supe- rior vena cava	blood vessels	infe- rior vena cava	car- bon dio- xide	lungs	veins	oxy- gena- ted blood.	back	capil- laries
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Source: kidshealth.org/en/teens/heart.html

Attachment 5.

Decide which statements are true or false. Write T for true and F for the false answers.

1. The heart and blood vessels make up the circulatory system
2. Blood flows out of the heart inside arteries, and back into the heart inside veins
3. Oxygen does not enter the blood as the blood passes through lungs
4. When blood contains a lot of oxygen is deoxygenated
5. When blood has lost most of its oxygen it becomes a more blueish-red and it is deoxygenated

Source: Jones, M., Fellowes-Freeman D., Sang, D. 2013. *Cambridge Checkpoint. Science. Coursebook 8.* Cambridge University Press, pp.33.

Lesson 2: the heart

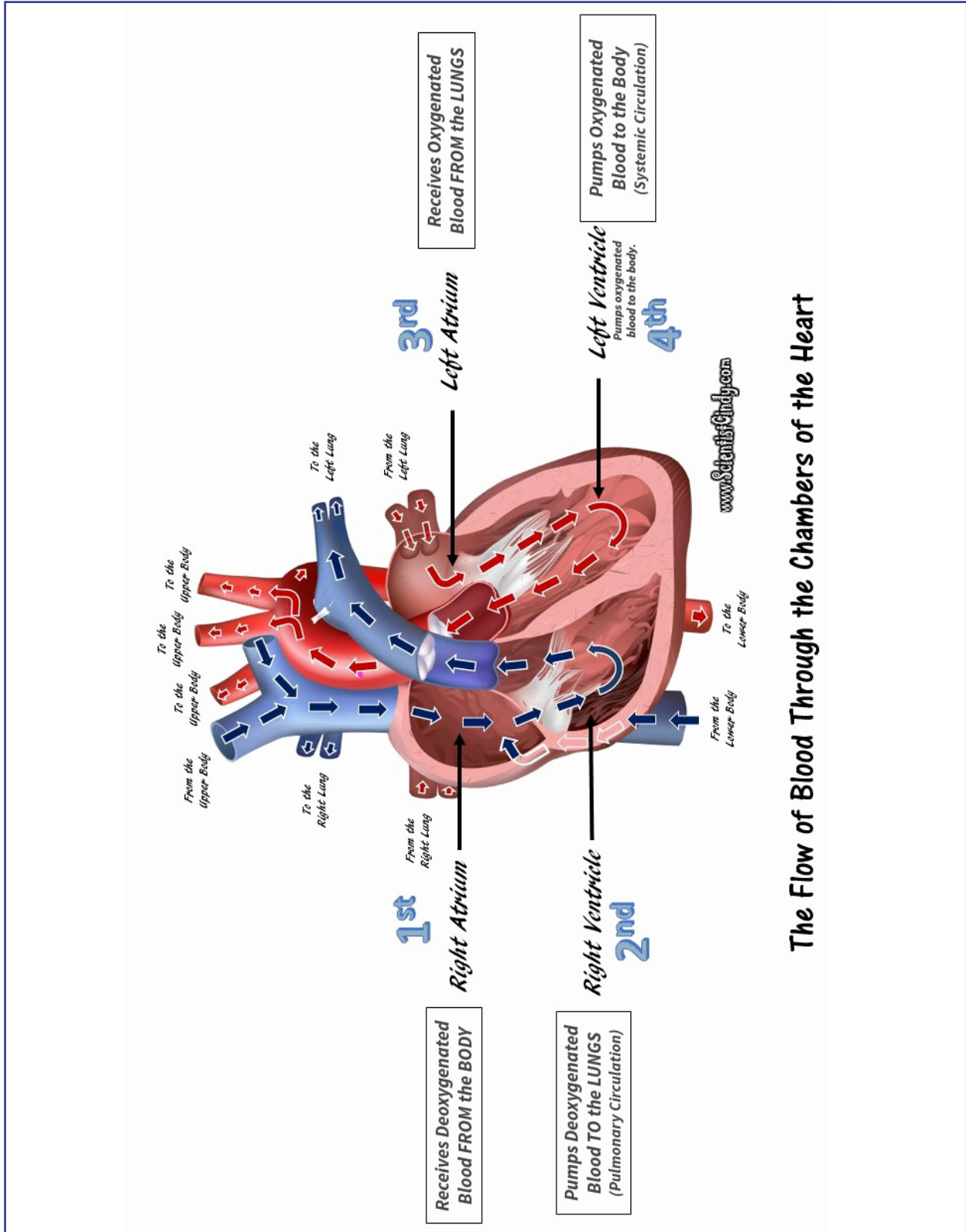
Attachment 1 (the human heart)

Choose 10 words out of 20 which suits the subject of human heart.

amnion, lungs, systole, foetus, embryo, atrium, chamber, umbilical cord, artery, birth, placenta, diastole, ventricle, menstruation, valve, ovulation, aorta, oxygenated/deoxygenated blood, gametes, zygote

Attachment 2 (heart diagram)

Source: www.integratedhealthandsocialunitythoughtareexpressionofmind.com/2019/02/human-heartchambers-diagram-and-disease.html

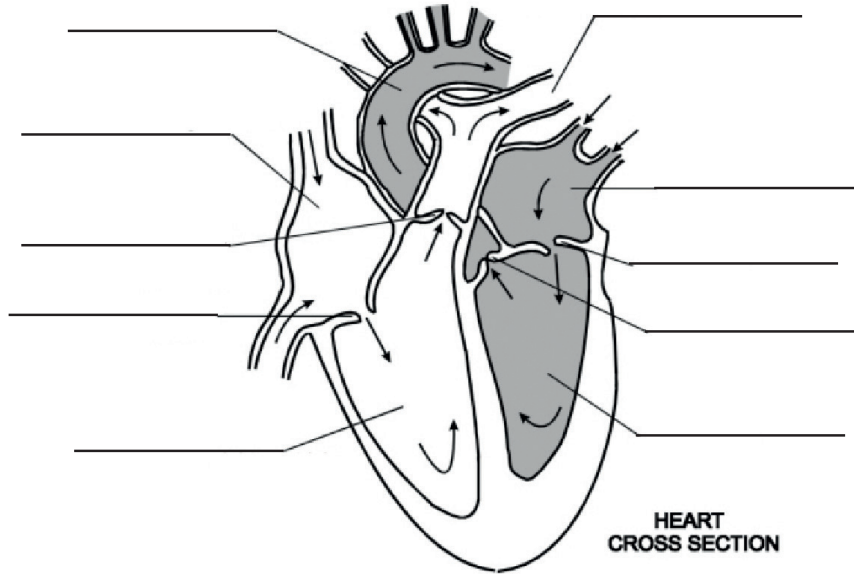


The Flow of Blood Through the Chambers of the Heart

Attachment 3

Label the parts of human heart with the use of words you have below the drawing.

aorta, mitral valve, left ventricle, tricuspid valve, pulmonary artery, left atrium, right atrium, pulmonary valve, aortic valve, right ventricle



Źródło: www.tes.com/teaching-resource/human-heart-6297475#

Attachment 4 (heart – summary)

Please fill in the spaces in the paragraph below about human heart. The first letter of each missing word has been given. Please note that you may repeat the same word a few times.

[Human heart] c..... and then r..... When muscle c....., it gets shorter. This makes the walls of the heart chambers squeeze inwards. This pushes b..... out of the heart.

There are v..... between the upper ch..... and the lower ch..... The valves only let the blood flow from the upper chamber to the lower chamber. There are also valves in the big a..... coming out of the heart. These valves only let the blood flow out, not back into the heart. This is what happens during one heart beat: the heart muscle c....., pushing blood out into the a.....; the heart muscle r....., allowing blood to flow into the heart from the v.....

contracts, relaxes, contracts, blood, valves, chambers, chambers, arteries, contracts, arteries, relaxes, veins.