



# Human Body Systems

## Virtual Learning

# 9-12th PLTW<sup>®</sup> HBS

PLTW<sup>®</sup> 4.3.4 Cardiac Output

April 23, 2020



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9-12th PLTW<sup>®</sup> HBS

Lesson: April 23, 2020

## Objective/Learning Target:

Students will be able to identify the major pulse points in the body, explore the movement of blood in the cardiovascular system, and calculate cardiac output used to assess overall heart health. (*Reference: PLTW<sup>®</sup> 4.3.4 Cardiac Output*)

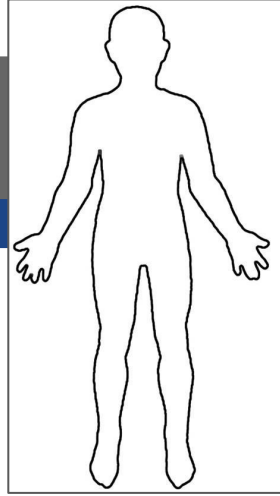


# Let's Get Started/Warm Up Activities:

Before we start our lesson today, watch the following videos:

- [How the Heart Actually Pumps Blood](#)
- [What is My Target Heart Rate?](#)

# Lesson/Activity:



Watch this video:

## [Locating Pulses of the Body: How to Find Them](#)

### Activity #1:

- Draw a rough sketch of the human body in your notebook or on a piece of paper. Title your graphic organizer “Major Pulse Points of the Body.”
- Using the video above as a reference, draw and label the following pulse points on your graphic organizer. By each term, describe how to specifically locate.
  - Carotid pulse
  - Temporal pulse
  - Bracial pulse
  - Radial pulse
  - Politeal pulse
  - Posterior tibial pulse
  - Dorsalis pedis pulse



# Lesson/Activity continued:

Watch this video:

## [How to Check Your Heart Rate](#)

### Activity #2:

Using the video above and a website or cellphone timer, take your own resting heart rate at various pulse points. (Remember, do not use your thumb!) For practice, test two other *willing* participants (parent, guardian, etc.).

Pulse Points	Heart (BPM)		
	Me	Person 1	Person 2
Radial Pulse			
Carotid Pulse			
<i>Choose another pulse and write here</i>			



# Lesson/Activity continued:

Watch this video:

## [What is Cardiac Output?](#)

### **Activity #3:**

Using the video above as a reference, answer the following questions in your notebook or on your paper:

1. Define the following:
  - a. Cardiac output:
  - b. Cardiac rate:
  - c. Stroke volume:
  - d. Cardiac output equation:
2. Write down the cardiac output example on your paper. Try calculating it yourself using a website or cellphone calculator.

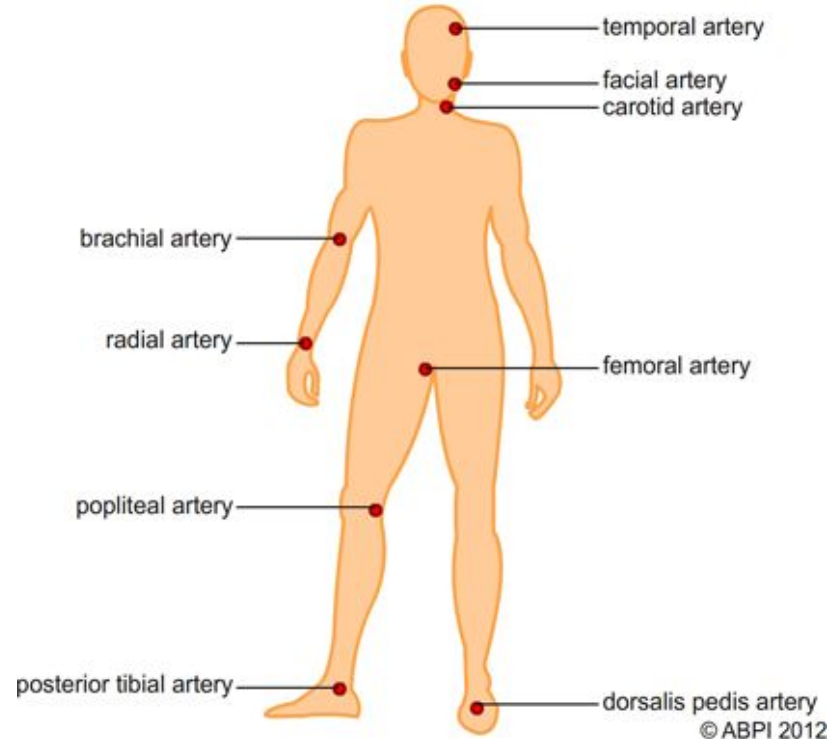
# Lesson/Activity Answers:

## Activity #1 Answer(s):

Click [HERE](#) or see the diagram to the right for the pulse points of the body.

## Activity #2 Answer(s):

Click [HERE](#) to see how to check your heart rate. Heart rate will vary from pulse to pulse and person to person. Remember, do not use your thumb to find pulse points, because it has a pulse of its own. Finally, remember that the assessments completed in this activity are not designed to be diagnostic in purpose.





# Lesson/Activity Answers:

## Activity #3 Answers:

Click [HERE](#) to see the video:

1. Define the following:
  - a. Cardiac output: **The volume of blood pumped per minute by each ventricle.**
  - b. Cardiac rate: **Pumping ability of the heart in beats per minute.**
  - c. Stroke volume: **Volume of blood ejected from heart per heart beat**
  - d. Cardiac output equation: **cardiac output (mL/min) = cardiac rate (bpm) x stroke volume (mL/beat)**
2. Write down the cardiac output example on your paper. Try calculating it yourself using a website or cellphone calculator. Click [HERE](#) to see the answer.



# Practice:

Using the following equation, calculate the cardiac output for each of the following:

$$\text{Cardiac output (mL/min)} = \text{cardiac rate (bpm)} \times \text{stroke volume (mL/beat)}$$

	Heart Rate (beats/min)	Stroke Volume (mL/beat)	Cardiac output (mL/min)
A	60	80	
B	80	60	
C	100	100	
D	55	90	
E	120	140	

# Practice Answers:

## Practice Answer(s):

See the table below for the cardiac output answers.

	Heart Rate (beats/min)	Stroke Volume (mL/beat)	Cardiac output (mL/min)
A	60	80	<b>4,800</b>
B	80	60	<b>4,800</b>
C	100	100	<b>10,000</b>
D	55	90	<b>4,950</b>
E	120	140	<b>16,800</b>



# Additional Practice and/or Resources:

Learn More:

## [HBS Unit 4.3.4 Flashcards](#)

Test your knowledge of cardiac output by clicking on the link above.

## [Amazing Facts About Heart Health and Heart Disease](#)

From the size of the heart to the timing of heart attacks, here are five facts about the human heart everyone should know.

## [Why Do Athletes Have a Lower Resting Heart Rate?](#)

Learn why endurance athletes often have a lower resting heart rate than others.