

First Lego League Curriculum - Ontario

Activity Sheet	
Gr 5 - Lesson #2	Curved Move – Circulatory Track
Date:	Name(s):

**Check That I'm Done**

Commented on my code    
 Modify it task    
 Coding Challenge

**Learn**

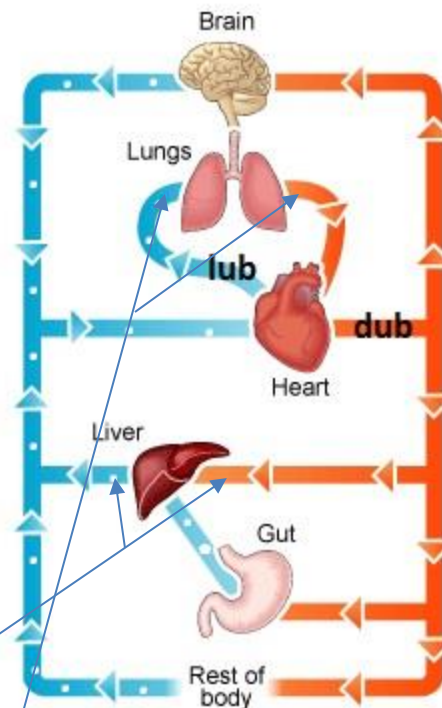
The heart is a pump that pushes blood throughout the body, providing oxygen and nutrients to all of the body's tissues.

To understand how this works, we can study a simplified path that the blood takes throughout the body.

The red path is meant to represent oxygen rich blood, while the blue path represents blood that has been used by the tissues, and is in need of more oxygen.

You can see in the diagram that oxygen rich blood enters organs, and oxygen poor blood leaves them.

You will also notice that the lungs are the only organ that can turn de-oxygenated blood, into oxygenated (oxygen rich) blood.



## First Lego League Curriculum - Ontario

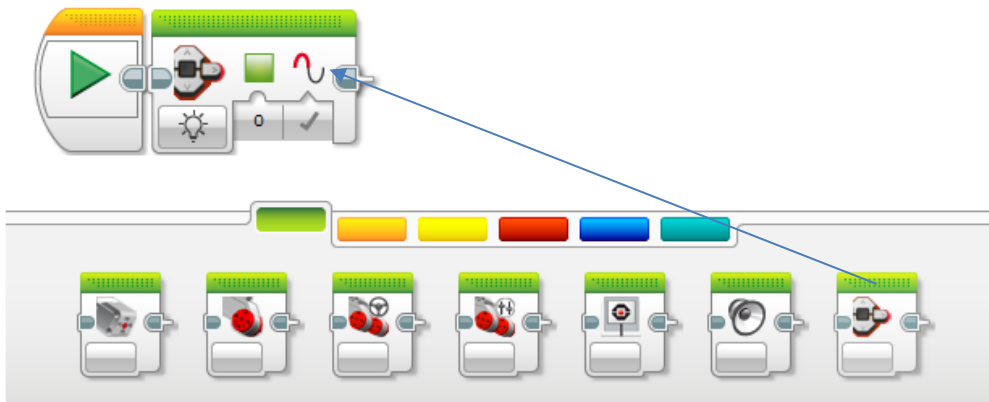
If you listen to your heart you will hear it make a “lub-dub” sound. These are the two distinct pulses your heart makes with each beat. The lub is the smaller push to the lungs, and the dub is the larger push to the rest of the body.

### Predict and Plan

Remembering that the heart is a pump, where do you think the blood is travelling the fastest? Put a “\*” on the previous diagram above to mark your guess.

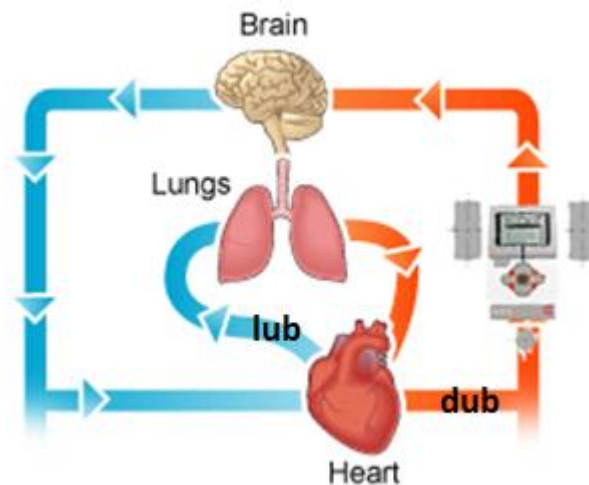
### Demonstrate/Design/Discover

- ✓ In the coding part of this lesson, you learned how to accurately control the path of your robot. For this lesson, you’ll also need to use the light status block, which simply changes the brick’s LED to red, yellow, or green.



## First Lego League Curriculum - Ontario

- ✓ Your robot is going to 'turn into' a red blood cell, and demonstrate the process of carrying oxygen to the brain.



- ✓ Your robot must:
  - Start off with the status light red
  - Shoot out away from the heart (dub) and loop up towards the brain
  - Slow down as it exists the brain, and change from red to green (there is no blue, so here we will use green)
  - Enter the heart, pause, and speed towards the lungs (lub)
  - Change from green to red as it travels through the lungs smoothly
  - End back at the heart waiting to start again
  - Use a loop so it repeats!
  - \*Do your best to star on track\*

Tips: There are lots of ways to achieve the results above, taking it one step at a time.

First Lego League Curriculum - Ontario

**Record**

How many blocks did you need to use to complete your program? \_\_\_\_\_  
 Compare to another group and see what they did differently:

\_\_\_\_\_

**Questions**

Question 1 Science	What happens to your heart when your organs need more oxygen, such as in physical activity?
-----------------------	---

**It begins to beat more rapidly, speeding up the flow of blood around the body.**

Question 2 Science	Looking at the human's body plan, why do you think the heart and lungs are placed so close to each other?
-----------------------	---

**Because with every beat, the heart must first pump blood to the lungs, and then to the rest of the body.**

Question 3 Science	The simplified diagram we used, only included the most major blood vessels in the body. Take a guess at how the blood makes it to all the millions of tissues throughout the organs in the body.
-----------------------	--

**By using smaller and smaller blood vessels, that branch out.**

Question 4 Science	Measure your heart rate by counting the number of beats in 60 seconds (or in 15 seconds and multiple by 4). What would be the robots beats/minute from your demonstration. What does this tell you about the speed at which your blood travels?
-----------------------	---

**Ex 80 bpm for student. The robot will be 2 or so. Blood travels quickly!**

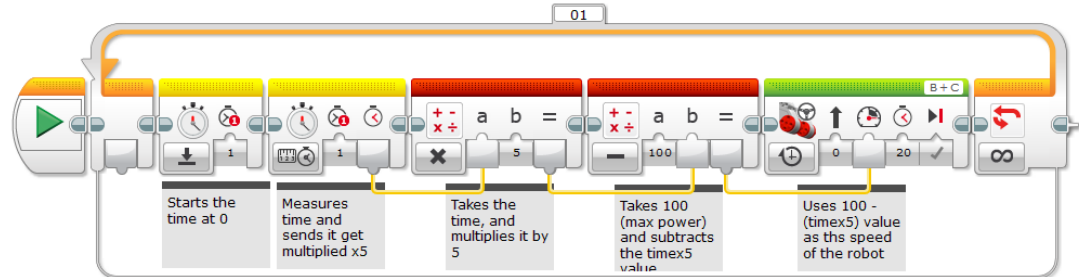
Question 5 Science	When a doctor performs chest compressions, they are trying to move the blood around the body, even though the heart is not beating. Why do you think this works?
-----------------------	--

First Lego League Curriculum - Ontario

Because the heart is a pump, and when you squeeze it, it still works to some degree.

Extension  
Coding  
and  
Science

Use the code below to create an even more accurate blood cell traveling throughout the blood stream



The effect of this code is that the robot will start of quickly, and as time goes on, slow down smoothly, like something flowing through a pipe.