TangIn

Tangible Programming & Inclusion

TangIn Toolbox

Circulatory System

7-9 years old

Human Circulatory System | Itineraries

Probotic

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/tanginproject

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Summary

Draw the Circulatory System while differentiating venous and arterial blood.

Expected duration: **50min** (the lesson plan duration is flexible, and teachers can adapt them accordingly to their needs and class duration).

Learning Outcomes

At the end of the session, students are expected to:

- Know the positioning and characteristics of some of the main organs in the human body;
- Understand the heart's central role for blood pumping;
- Distinguish between venous and arterial blood;
- Program the robot adequately;
- Value STEM areas;
- Develop transversal competencies such as problem-solving, communication and reasoning;
- Develop group work skills, namely, to respect and favor the inclusion of all elements, regardless of gender, culture, etc.

Links With Curriculum Topics

Covered Curriculum Topics		
Subject		**Topics**
Engineering	**Mathematics**	Geometry • Location and orientation – itineraries
	Science	Human body • Circulatory system
	Technology	Programming • Concepts of programming • Programs – Results, errors, and troubleshooting Robotics • Programming objects to solve challenges

Notes for Teachers

The teacher should propose to the students a previous (extra class) research on the human circulatory system and should approach the subject from the data that they have obtained.

The teacher should also prepare, in advance, all the materials needed and the classroom according to the activities to be developed.

The teams should be as heterogeneous as possible to foster the integration of all students.

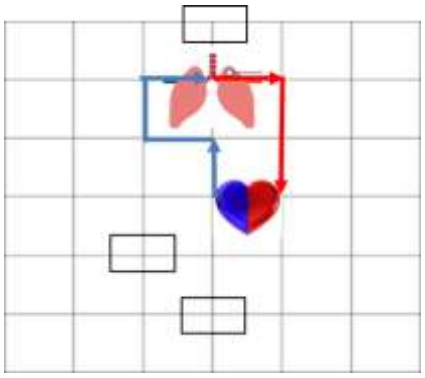
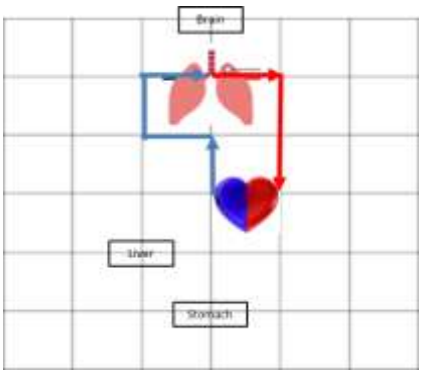
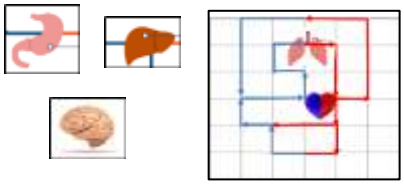
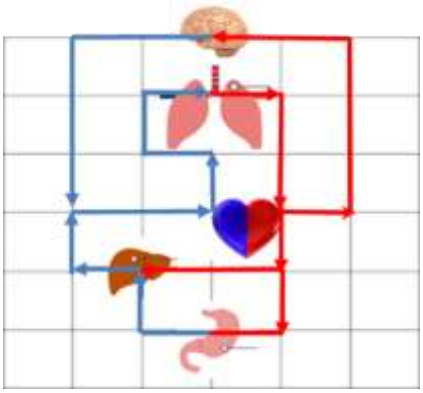
It's important that clear rules are established in terms of group work. This way, it avoids the most active children assuming the lead and the quitter ones only observing.

More than having the circuit completely correct, the most important is to have blue on one side and red on the other. And also, to the understanding that both (venous and arterial blood) do not mix on the heart and need always to go through the lungs to purify.

The teacher must circulate through the various groups to support the activities and the dynamics of each one. In the end, it should promote a collective discussion of the main issues focused and the constraints and difficulties experienced.

Lesson Plan

Intro	10'	Class	Educator discusses with the class the human circulatory system, in specific: the difference between arterial and venous blood. Discuss also the main function of the four organs: heart (blood pump); lungs (breading, exchanging CO_2 by Oxygen; liver (blood cleaning) and Stomach (processing food and nutrients).	

Prep	30'	Group	Split the class into groups. Each group will have a Set (6x6 grid) where they will draw the scheme in the picture using markers. They will now fill the boxes with the matching organ names	
Play			Each group will also receive a circulatory system map and a card for every organ. The goal will be to complete the circuit (drawing) according to the map (following the colors and directions) using the Bot with the correct marker. Starting from the Heart on the arterial side (red), the sequence can be dictated either by taking a card at random or imposed (heart-brain-heart then heart-lungs-heart then heart-liver-heart and finally heart-lungs-heart-stomach and ending in the liver). Important: make sure to use the correct marker (blue or red) while following the map.	 
Share	10'	Class	All groups put the cards on the correct position on the circuit and briefly share their conclusions about the blood circulation. Examples: • All blood always goes through the heart; • Venous blood has always to go through the lungs (to take oxygen) before going back to the heart to be pumped to another organ; • Every organ, except the lungs, trades oxygen for CO_2 with the blood.	

Resources List & Support Material

Per each group:

- A robot Kit with drawing capabilities;
- Two markers for each group (easy to erase/clean) – blue and red;
- Alcohol for cleaning the scenarios (for teacher use only);
- Transparent scenario with a 6x6 grid;
- 3X Shape cards – Organs and 1X Shape Map (Annex).