Circulatory System

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Student Learning Reflection

1. The strategy, eliciting students’ ideas, was incorporated into my lesson on the first day. It was effective in a way that students really brought their experience and shared their knowledge into the classroom. By listening to students’ ideas, I was able to address alternative conceptions students had.

One example of showing the effectiveness of this strategy was students’ ideas on blood. On the first day when I had students share what they knew about the circulatory system, half of the students said they thought that blood was blue inside of the body and red outside of the body. Their reasoning was that blood vessels appeared to be blue under the skin. When blood was exposed to the air, then blood became red. After understanding their thinking, I could logically address these issues and guide their learning. One activity we did was looking at fish circulation under the microscope. Students could see individual red blood cells moving through blood vessels. This showed them the color of blood inside the body. Another example students discussed was blood donation. When nurses withdrew blood from the body, the blood was not exposed to the air and remained dark red. The reason that blood vessels appeared to be blue when looking through the skin was that the layers of skin and fat obscured the true color of blood. Therefore by knowing students’ prior knowledge and having discussions on these alternative conceptions, students have the opportunity to make sense of their knowledge and teachers can use that information to guide their learning.

The eliciting students’ ideas strategy was also very effective in getting students sharing their daily experience with their everyday language. For example, many students knew that heart rate can be affected by physical activity. They especially could relate it to
their PE class and described physical changes they experienced after running for a mile. Students knew there was something to do with blood and breathing. They described these relationships in phrases such as “the blood rushes through your veins quicker”, “heart pump blood faster so more blood can get to the body quicker”, “exercise makes you breathe harder and heavier”, etc. Some students also wrote the deoxygenated blood as the “blue blood” or the “bad blood”. Learning language student use to express their familiarity on this topic really helped me understand students’ level and enabled me to communicate in a way that students could understand.

2. I tried to incorporate inquiry phase 1 into my lesson where students could start constructing new knowledge based on their prior experience. However it did not go the way I hope it would. I was planning to have students go deeper into the relationship between physical activity and the circulatory system. I was also hoping to help students understand the connection between the circulatory system and the respiratory system. However there was not much continuity between each lesson thus students did not have the opportunity to build the knowledge on top of each other. On the second day when I tried to have students form a model/relationship between heart rate, breathing, blood flow, and physical activity, I was having a hard time getting them to come up with a model by themselves. I think I gave up too quickly too when students started to complain and express their frustration. Therefore in the later period I just presented the model as a fact (will discuss more of this in question 3).

There is a lot of potential in this unit where I can expand certain activity to be a larger inquiry project. As I mention in my revised lesson plan, I can elaborate on the
exercise activity where students investigate how and why various exercising levels affect the circulatory system. Many students know that heart rate increased when they exercise, but they do not know why. Therefore students can first list out all the physical changes they notice as they exercise and construct a model showing possible relationship between each element. With some research on background knowledge, students can come up with a testable question for each set of relationship. Maybe the class can break into different teams where one team look at heart rate vs. exercise, another team look at breathing rate vs. exercise, and another team on blood flow vs. exercise, etc. Together as a class we can construct and revise the model together. One major concern I have with this inquiry project is finding a visible indicator where students can measure. For example, I cannot think of an obvious and distinct indicator to measure blood flow. I also cannot think of an experiment where students can test how heart rate affect breathing (I found out from students work that they thought heart causes and controls breathing because as heart rate increase, breathing increase too; they totally forgot about the concept of diaphragm they learned from the previous week). I am also afraid that I am trying to have students test too many variables where it can get very complicated and confusing. However, if students are able to link all the evidences and the different sets of relationship together, then they can really see the interconnectedness between body systems and how one system cannot function independently.

3. One of my main learning objectives is having students recognize and understand the interconnectedness among different systems in accomplishing a process. On the first day I did a pre-assessment where students explained how they thought physical activity
affected pulse rate. Many students simply described that pulse rate would increase, breathing would become faster, etc, without providing many explanations. For the post-assessment, I asked the students “how does the circulatory system affect the respiratory system when you exercise”, and about 30% of the students still had similar response from the pre-assessment. Only about 40% of the class was able to explain the process and the connection clearly. These students explained that the body needed more oxygen when exercising and sent signal to the heart to increase the pumping activity. This therefore resulted in the increase of blood flow and breathing.

The main reason I think students did not comprehend the concepts was that they did not have the opportunity to construct this knowledge themselves. I presented the model to them as a fact. During the lab write up, many students could translate the diagram into words. However during the test when I rephrased the question, they could not answer it. Several students even misunderstood that breathing is part of the circulatory system or breathing is controlled by the heart. Students could not see a clear distinction between these two systems because these reactions all seemed to happen at once (I was so discourage to read their response, but they are great reflective tools for my teaching).

If I can do this unit again in the future, I would let the students struggle and have them construct the model themselves. I should not give up too quickly when students expressed their frustration. If students can do an inquiry project as describe in question 2, they will have the opportunity to make sense of the relationships between different factors themselves.
* I really learned a lot from teaching this unit. I feel I am not being “inquiry” enough in my lesson. Often times I found out that I was doing most of the talking because it was hard to get the conversation going (I really need to practice on the wait time). In order to use the questioning and answering strategies, I need to encourage students to think and use that to construct new knowledge. I hate to just keep calling on students who always raise their hands or put the shy students on the spot if they do not know the answer. I also don’t want to just “fish” for the right answer and say no to the students when they don’t get the answer. However I just do not know how I can do this with the whole class. Even though I am frustrated with this overall process (especially I could not find the balance and think of a good inquiry lab where students can really explore themselves), this is a great learning process and a reflective opportunity for me. I love to have any suggestions or ideas to improve the lessons or the overall flow of the unit! ☺
CONTEXT:
7th grade science, Human Body - Circulatory System

RATIONALE:
It is important for students to understand the circulatory system because it is one of the main body systems that sustain human life. The topic is related to many essential ideas in science, i.e., interrelatedness between systems, external/environmental influences. These concepts are also the building blocks for advanced science concepts, such as ecology. Students are able to connect these phenomena to their daily lives because they experience body changes in respond to their environment constantly. There are also many health issues that are caused by external factors. Therefore, understanding the interconnections among body systems and its relationship to the environment helps students be more scientifically literate citizens.

UNIT OBJECTIVES
Content Objective 1: Students will understand the mechanism and function of the circulatory system as one of the necessary systems to maintain human life. (EALR 1.2.8)
   Goal 1.1: Students will recognize the interconnectedness among different systems (i.e., respiratory & circulatory) in accomplishing a process.
   Goal 1.2: Students will understand the structure and the function of heart
   Goal 1.3: Students will understand the function of blood
   Goal 1.4: Students will illustrate the path taken by blood through the circulatory system

ESSENTIAL QUESTIONS
Day 1: How does physical activity affect heart rate?
Day 2: Why does physical activity affect heart rate?
Day 3: What are the structures and the functions of heart?
Day 4: How does blood circulate around your body?

* main concept students should learn:
1) the interconnectedness between and among body systems

**Pre-assessment question: How does physical activity affect your pulse rate?
**Post-assessment question: How does the circulatory system affect the respiratory system when you exercise?
Day 1 Reflection

Strengths in the lesson:
This day is an introduction to a new topic, the circulatory system. The “hook” (e.g., doing jumping jack, measuring pulse rate, looking at fish circulation, etc) really raised students’ interest. Students were engaged in the activities and shared great questions and comments as they performed the activities. There was also a variety of instructional strategies to help diverse learners (i.e., kinesthetic, visual, audio). The KWL chart also helped students to share their prior knowledge.

Surprises I encountered:
1) I was surprised that most students were reluctant to share their ideas and thinking. I was not sure whether it was the classroom atmosphere, or they felt embarrassed, or they were afraid that they might make mistakes. Therefore the overall class discussion was not very interactive. However, when I read their journals, they had a lot of experience to offer and share. Therefore I need to apply other strategies to really encourage students to value and share their prior knowledge as they are great resources to the classroom! Maybe in the future I can have students write the KWL chart or concept maps on a poster and share that with the class. I found out that students are less intimidated to share in small groups and use writing to communicate their thoughts.
2) I was surprised that many students did not know how to graph and interpret data. I originally planned to have students graphed and analyzed the heart rate vs. exercise data, but they could not do it! Even when I walked them through it, many were still confused. I dropped the graphing activity after the first period, but it was such a disappointment that it didn’t work out. I wonder whether it was because students were not familiar with graphing, or I didn’t go deep enough into it. Learning how to graph and read graph should be a lesson by itself. Maybe I was doing too much in this part of the lesson especially when the students could not interpret the graph.

Concerns I have:
There were times when I did not get a lot of feedbacks or discussions going, but I really wanted the students to keep thinking without me giving the answer. However I also worry that if I stretch too hard I may kill the interest or enthusiasm of the activity. My question now is how much reflective thinking and writing can students handle? Should I keep them struggling or should I just get to the point? I do not want to fall into the IRE pattern where I am just fishing for the right answer or doing 2/3 of the talking. I guess finding this balance is where I struggle the most at the moment.

What I learned about student’s thinking:
There are many things I learned about students’ thinking from today’s lesson:
• Many students thought that blood is blue inside the body and it becomes red once it is exposed to the air.
• Students have a general ideas about the relationship between heart and blood (i.e., heart pumps the blood, blood goes around the body)
• Students know that the circulatory system is necessary to maintain life.
Some students know that blood carry oxygen and nutrients to different parts of the body

*Evaluation:*
I think the students were engaged in today’s activities overall. However I felt the lesson did not flow very well. It seemed as if we were doing separate tasks that were not directly related to each other. For example, students might see little connections between the jumping jacks exercise and looking at human blood. It felt like I was trying to cram too many activities in one lesson that I did not go deep into each one (but my CT said if I keep going for too long, I may loose students’ interest; where do I find the balance?). I revisited my learning objective and evaluated how each activity might reflect the learning goals. The fish circulation and the human blood did not really connect to the objective; they were just interesting things to see and they served as tools to generate students’ questions/thinking. Maybe I should do more activities that are related to physical activities and go in depth with its relationship to the circulatory system. I should save the fish circulation and the human blood to days where students study about that part of the circulatory system.

Since I think students walk out of this lesson feeling pretty random, the next day I did a recap on the main theme from the first lesson and had them answer the essential question of the day in the journal.
CONTEXT:
7th grade science, Human Body - Circulatory System, Day 1 - Introduction

OBJECTIVES
Content Objective 1: Students will understand the mechanism and function of the circulatory system as one of the necessary systems to maintain human life.
(EALR 1.2.8)

Goal 1.1: Students will analyze how physical activities affect the circulatory system.
Goal 1.2: Students will learn how to measure pulse rate.

ESSENTIAL QUESTION
How does physical activity affect heart rate?

ACTIVITIES

❖ Part 1 – Students' prior knowledge

1) Answer the essential question of the day (pre-assessment). *Have students share with their neighbors. After small group sharing, some can share with the whole class if they feel comfortable.*

2) Make a table with two columns in their lab journal. On one column write down what they know about the circulatory system (e.g., heart, blood, health issues, etc). On the other column write down what they want to know. (Students with little English proficiency can express their thoughts in pictures or directly talk to the teacher).

3) *Share their ideas with their lab partner (in groups of 3). Use the chart format and write the group ideas on a poster. Be ready to present to the whole class.*

* to prevent to much repetition, each group will share just one thing they know and one thing they like to learn.

❖ Part 2 - How does physical activity affect your pulse rate?

Instruction Outline:
Write the following question on the board: “How does physical activity affect your pulse rate?”

1) Ask students to first practice taking pulse rate for 15 seconds. When everyone is comfortable finding and taking their own pulse, *tell the students to multiply that number to 4 to make it beat-per-minute.* Take an official pulse rate for 15 seconds, *multiply by 4,* and record the data. (note: students can feel their pulse at the wrist or neck).

2) Perform jumping jacks for 45 seconds. Take pulse rate right after exercising. Record data.

3) Create a table in their journal to organize their data.

4) Take the third pulse rate after resting for 5 minutes.
5) Write down at least 2 observations students notice from their data or any physical changes they experience from the exercise.

Part 3 – Make an Initial Model

1) List the changes students notice on the board (i.e., breathing changes, heart rate changes, muscle gets sore, etc).
2) Write each component on an index card
3) On another sheet of poster, have students arrange the cards with arrows to show relationship between each component.

Part 4 – Teamwork
- write one thing nice about your lab partner in their lab notebook from today’s working experience

* Leave the discussion open and keep students wonder. This will lead into the next day activity where students will do a more thorough investigation on the relationship between heart rate and physical activity (and possible health problems that is associated with this).

MATERIALS
Part 1: Students’ prior knowledge
Poster
Markers

Part 2: Pulse Rate and Jumping Jack Activity
Timer/watch

Part 3: Make an Initial Model
Index card
Poster
Markers
Glue stick

ASSESSMENT
Observational/informal assessment (while students are working in groups):

- Students discuss relationship they notice between physical activity and heart rate
- Students share prior knowledge they have about the circulatory system
- Students are engaged in classroom activities (group discussion, reading, writing, etc)

SET UP
- Write the essential question on the board: How does physical activity affect your pulse rate?
- Draw a table on the board

<table>
<thead>
<tr>
<th></th>
<th>Heart Rate (bpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Jumping Jacks</td>
<td></td>
</tr>
<tr>
<td>Immediately After Jumping Jacks</td>
<td></td>
</tr>
<tr>
<td>5 Minutes After Jumping Jacks</td>
<td></td>
</tr>
</tbody>
</table>
Day 2 Reflection

Strengths in the lesson:
This lesson provided background knowledge for the circulatory system. It served as a reference and the building blocks for the later lessons. There were also some demonstration and activities that went along with the reading to reinforce the concepts.

Surprises I encountered:
Even though students read the books and saw the demonstration, they could not recall much from this day’s lesson when we revisit some ideas later in the week. During the lesson they were able to answer all the questions. However students did not comprehend the information they learned; the information was merely fact that did not mean much to the students.

Concerns I have:
Looking back at the overall flow of the unit, I felt this lesson was not as meaningful as it could be. I was first hoping that this lesson could be the building block for later learning, but students did not seem to apply this knowledge. In fact there were not many opportunities where students could utilize this background knowledge either. Therefore this lesson felt disconnected from the rest of the activities we did in this unit.

What I learned about student’s thinking:
There were not many “thinking moments” in this lesson. Therefore I learned that when students do not get the opportunity to think for themselves or apply their knowledge, they do not remember it.

What I learned the most about students’ thinking from this day’s lesson was the post write-up exercise I had the students did from day 1. I was able to learn some misunderstanding students have on the relationship between physical activity and heart rate:
- heart causes and controls breathing
- breathing rate affects heart rate

* Evaluation:
To address students’ misunderstanding on physical activity versus heart rate, it will be valuable and meaningful if students can do a more in depth investigation to explore the relationship themselves. Thus instead of having a book reading session, it may make more sense to continue the “hook” activity with a thorough investigation on the relationship. It will be a more logical flow for the lessons too.
* This is a completely new lesson

**CONTEXT:**
7th grade science, Human Body - Circulatory System, **Day 2 – Heart vs. Exercise** (may be a 2 day lesson?)

**OBJECTIVES**
Goal 1: Students will understand the mechanism and function of the circulatory system as one of the necessary systems to maintain human life. (EALR 1.2.8)
- Goal 1.1: Students will understand why physical activities affect the circulatory system.
- Goal 1.2: Students will analyze the relationship between the circulatory system and the respiratory system.
- Goal 1.3: Students will learn to read and interpret graph

**ESSENTIAL QUESTION**
Why does physical activity affect heart rate?

**ACTIVITIES**

- **Part 1 – Recap from Day 1**
  Revisit the model students came up with the first day. They will revise their models at the end of the investigation.

- **Part 2 – Background Reading**
  o Prepare handouts on heart function, blood function, relationship between the heart and the lung.
  1) Students should answer the following question after they finish reading:
     - What is the primary function of the heart? (pump blood)
     - What is the primary function of the blood? (carry gas, nutrients, and waste around the body)
     - What signals does the heart receive to change its heart rate? (the pacemaker in the heart detects oxygen level in the body and controls the beating rate of the heart)
     - What is the relationship between the heart and the lung?
  * student will use this information to further construct their scientific model

- **Part 3 – How and why does your circulatory system react with different exercising level?**
  
  **Instruction Outline:**
  o Students will break into 3 main groups: students who exercise 4 times a week, students who exercise 2 times a week, students who do not exercise at all. Work in
groups of 3.

1) Measure your heart rate and breath at 3 different conditions: resting, walking, and running (see step 2). Organize the data in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Resting</th>
<th>Walking</th>
<th>Running</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heart Rate (bpm)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># of Breath</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flush skin (skin appear redder?)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other physical changes?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2) Before you start doing any exercise (resting stage), take your heart rate for 15 seconds and convert that to beats-per-minute. Also count your breath for 15 seconds and convert the number into breath-per-minute. Record data in the table.

3) Walk for 5 minutes. Take your heart rate for 15 seconds and convert that to beats-per-minute. Also count your breath for 15 seconds and convert the number into breath-per-minute. Observe other physical changes. Record data in the table.

4) Run for 5 minutes. Take your heart rate for 15 seconds and convert that to beats-per-minute. Also count your breath for 15 seconds and convert the number into breath-per-minute. Observe other physical changes. Record data in the table.

5) Graph your result

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**Part 4 – Debriefing**

1) Answer the following questions in your lab notebook:
   - How does your circulatory system (heart and blood) react to different exercising level? (be sure to include data)
   - How does the respiratory system (i.e., breathing) respond to the circulatory system?
   - Why does the circulatory system need to react to different exercising level (think back to the background reading)

2) Revise your model.

* To challenge some students: compare the data between groups that exercise 4 times a week, 2 times a week, and none at all. Are there any correlations?
*Guide students to come up with this similar model:

**Exercise increases → body needs more oxygen**

1. (sends signal to the heart)
2. (sends signal to the lung)
3. breathing becomes faster
4. heart rate increases
5. blood flow increases

**MATERIALS**

Part 2: Background Reading

Prepare reading for each group.

**ASSESSMENT**

Observational/informal assessment:

- Students describes body changes at various exercising level
- Students correctly display the relationship between the circulatory system and the respiratory system in the model
- Students’ model shows event consequence

**Concerns:**

The relationship between physical changes, the circulatory system, and the respiratory system is very complicated. I don’t think this investigation can thoroughly display a clear relationship between each component. Change of heart rate and breathing rate seems spontaneous, so it is hard for the students to distinguish the difference; students would just think that heart makes breathing happen. I am still struggling with how to help students see the relationship without mixing up the two systems. Any ideas?
Day 3 Reflection

Strengths in the lesson:
Having the hands-on experience was very powerful. Students really enjoyed looking and dissecting the heart. They were able to recognize the different structures of the heart. Students were also able to compare the different structure and analyze their function (e.g., ventricle is thicker than atrium because it pumps blood).

Surprises I encountered:
I was really worried that the lesson might not go very well because student would not be able to identify the different structures. However students were very engage and were fascinated to handle heart. I was surprised that students actually got it!!

Concerns I have:
The only concern I have is students may not see the connection between the blood vessels and the heart because we mainly focused on the structure of the heart. Another concern for the lab is behavior problems. For example, in one class one student threw the heart at another student. This was something I did not expect at all.

What I learned about student’s thinking:
The writing and the drawing in students’ lab notebook demonstrated that they understood the function of the heart and its structure. Confusions that some students had were they thought the blood vessels went through different chambers. Since we did not discuss much about the connection between the heart and the blood vessels, this will be something to add onto the lesson for students to see the connections better. It will also make this lesson more related to the other topics students have learned.
CONTEXT:
7th grade science, Human Body - Circulatory System, Day 3 – Heart Dissection

OBJECTIVES
Goal 1: Students will understand the mechanism and function of the circulatory system as one of the necessary systems to maintain human life.
(EALR 1.2.8)
   Goal 1.1: Students will understand the structure of the heart

ESSENTIAL QUESTION
What are the structure and the function of the heart?

ACTIVITIES

❖ **Part 1- Overview of heart structure**
  - Quickly go over the main structure of the heart.
  - Have students draw a simplify version of the heart in their lab notebook
  - Draw & identify the main blood vessel connect to each chamber

❖ **Part 2 – Heart Dissection**

1) Each lab table will have a chicken heart, a pair of gloves, and a paper clip (2 people per lab group)
2) First look at the heart and ask students how many different structures they notice (blood vessels coming out of the heart, ventricles, atrium, etc). **Give student an anatomy of chicken heart to compare with.** Students can use paper clips to feel the different structures.
   * be sure not to break the wall/membrane between the chamber with the paper clip because the wall/membrane is very fragile!
3) Draw the upper view and the front view of the heart with labels.
4) Go around to double check students got the structure.
5) Hand out razor blade for students to dissect the heart (cut vertically though the middle of the heart without cutting it in haves)
   * Guide students to note the wall thickness of the ventricle (in comparison to the atrium).
6) Draw the interior of the heart with labels

* Possible discussions if time remains: What are possible health problems associate with heart?

MATERIALS
Part2: Heart Dissection
   Chicken heart (1/lab group)
   Gloves (1 pair/lab group) * prepare non-latex gloves for students who are allergic
   Paperclip (1/lab group)
   Razor blade (1/lab group)
ASSESSMENT
Observational/informal assessment:

☐ Students correctly label the structure of the heart

Simplify Anatomy of Heart:
Day 4 Reflection

Strengths in the lesson:
Students were given opportunity to use evidences or observations they had collected in the last few days (structure of heat, blood vessels, etc) to construct a model of how blood circulates around the body (see original lesson plan).

Surprises I encountered:
Students were confused!! It was too abstract that they did not even know where to start. Even when I guided them through, they still did not get it.

Concerns I have:
How much abstract thinking can students take at this age? How much instruction do they need to do inquiry? My students were use to teacher giving them answers. Thus when I asked them to put together this logic puzzle by themselves, they could not do it. Maybe it was because this activity was set up in a way that was confusing. However many students still rather had me tell them the answers instead of struggling through it.

What I learned about student’s thinking:
My CT did an alternative version of this lesson after I “experimented” my lesson with the first period. He had the students physically walked through how blood circulated through the heart, the lung, and the body. The students really loved it. They could see the “double loop” system clearly. This is a great activity to reinforce the relationship between the lung, the heart, the blood, and their function. It will especially work great after the inquiry investigation as it provided another way of seeing the interconnectedness.

I did not learn a lot of students’ thinking from the activity. However in their journal and test, I found out that some students thought veins are part of arteries (they could not distinguish the different blood vessels). This will be a good day to address and emphasize this concept.
CONTEXT:
7th grade science, Human Body - Circulatory System, Day 4: The Journey of Blood

OBJECTIVES
Goal 1: Students will understand the mechanism and function of the circulatory system as one of the necessary systems to maintain human life.
(EALR 1.2.8)
  Goal 1.1: Students will understand the path traveled by blood.
  Goal 1.2: Students will understand the mechanisms and function of the blood

ESSENTIAL QUESTION
How does blood circulate around the body?
What is the function of blood?

ACTIVITIES

✦ **Part 1 – Fish Circulation** (observe actual blood cells circulating through fish tail)
  - have students write in their lab journals what questions they have as they see the blood cells circulate. Share with the class.

✦ **Part 2 – The Journey of Blood**
  1) Draw the “double loop” blood circulation on the floor.
  2) Have students walk through the path.
  3) Set up water tank at the lung station and the body station. Students will “exchange gas” as they go through the lung and the body
     - At the lung station, pour the deoxygenated blood (blue water) into a bucket and get the oxygenated blood (red water) from another bucket
     - At the body station, pour the oxygenated blood (red water) into a bucket and get the deoxygenated blood (blue water) from another bucket
     * Students are simulating how red blood cells travel and exchange gas as they go around the body
  4) Tell students that the person is now running and the heart has to pump faster now!

✦ **Part 3 – Debriefing**
  - What similarity do you see between the fish circulation and the “running circulation” we just did?
  - Discuss the different blood vessels students traveled through

MATERIALS

Part 1: Looking at Fish Circulation
  Microscope and video microscopy unit
  Live goldfish
Part 2: Draw blood circulation

Chalks
Food coloring (blue and red)
Plastic cup (one per student)
4 buckets

ASSESSMENT
Observational/informal assessment:

☐ Students correctly walk through and describe the path traveled by blood
☐ Students correctly explain the function of blood
Puzzle Contest – Build a Model

There are many things we cannot see directly (for example, you cannot see what’s inside your body, you cannot see the interior of the earth). Therefore scientists always have to gather pieces of evidences & observations and put them together to solve the mystery. This is the process of making a model or a theory.

You are going to do what scientists do, that is putting together all the evidences to make a model: it’s like a puzzle! The mystery we want to find out is how your blood goes around the body. In other words, you are going to map out the path that is taken by the blood. Here are the clues we have so far (and they have been proven to be always true):

• Heart pumps the blood (blood goes through the heart)
• Heart has four chambers: right atrium, right ventricle, left atrium, left ventricle
• Each chamber is connected to 1 main blood vessel, either artery or vein
• Right side of the heart has 1 main vein and 1 main artery
• Left side of the heart has 1 main vein and 1 main artery
• Ventricle is the chamber that pumps the blood out
• Arteries are blood vessels that go away from the heart
• Veins are blood vessels that go back to the heart
• Right side of the heart pumps deoxygenated (oxygen-poor) blood
• Left side of the heart pumps oxygenated (oxygen-rich) blood
• The blood has to go to the lung to get oxygen and drop off carbon dioxide
• The blood goes around the body

Your diagram should include: heart, right atrium, right ventricle, left atrium, left ventricle, 2 arteries, 2 veins, body, and lung.

It’s challenging but it’s fun! Once you solve the puzzle, you will feel VERY GOOD and you can call yourself a REAL scientist!! 😊

* Use blue for deoxygenated blood and red for oxygenated blood.
* Hint: Follow all the clues one by one carefully. All clues are true at all time.