

GET IT PUMPING!

An elementary Science Lesson Plan
Designed for Inquiry
Based on the 5E Inquiry Model

GRADE LEVEL: 5

INQUIRY LEVEL: Guided Inquiry

SCIENCE CONCEPT: Life sciences- blood circulation through the heart

RELATIONSHIP TO CALIFORNIA SCIENCE CONTENT STANDARDS:

2. Plants and animals have structure for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:

- b. Students know how blood circulates through the heart chambers.

LEARNING OBJECTIVES:

Students will record their heart rate after completing self-selected activities.

EVALUATION IDEAS:

1. *Formative:* An initial assessment of the students' prior knowledge can be done during the first class discussion. As the students work on the activity, an assessment through observation can check for understanding of the process and content.
2. *Summative:* At the conclusion of the lesson, students will turn in their worksheets as a final assessment.

CONCEPTUAL BACKGROUND:

Our heart rate is dependent on how fast our blood pumps through our body. The more active we are the faster it pumps and the higher our heart rate goes. The more sedative we are the slower the heart pumps which causes our heart rate to decrease. Reptiles, such as lizards, have heart rates that change for different reasons.

LESSON IMPLEMENTATION PLAN:**ENGAGE**

- 1) Show students Schneider's skink and introduce it as a new member of the class community for the next week.
- 2) Brainstorm basic ideas about similarities and differences between humans and lizards.

EXPLORE

- 1) Present questions:
 - a. How are lizard hearts different and/or similar to human hearts?
 - b. Do they pump blood in different ways?
 - c. How does how fast or slow blood pumps affect the how many times your heart beats per minute?

- 2) To explore these ideas we will test to see what makes our heart rate rise compared to what makes a lizard's heart rate rise.
- 3) How do you think we could test this?
 - a. Hint: Focus more on how we can test how to make our heart rate rise as it is easier to test ourselves than a lizard.
 - i. Model for students how to test heart rate to determine how many times it is beating per minute (Emphasize that the faster it pumps the quicker the blood is flowing!)
 - b. Brainstorm as a class ideas of activities to try
 - c. Encourage students to continue brainstorming as they go along and try different ideas as they start their research
- 4) Give students time to explore different activities and observe whether it raises their heart rate.
 - a. Have them keep track of their findings on the provided data collection sheet
 - b. Remind students that if they do an activity that makes their heart rate significantly rise they have to wait for it to calm down before going on to the next activity or their results will be altered

EXPLAIN

- 1) Students will identify what activities made their heart rate rise and which caused it to stay the same.
- 2) Have students share their findings with peers.

ELABORATE

- 1) Students will research what causes a lizard's heart rate to rise and cause blood to pump through the heart at a faster rate.

EVALUATE

1. *Summative:* Students will create a record of their heart rate after a variety of activities. They will then consider if the factors that make their heart rate rise and fall are the same factors as what affects a lizard's heart rate.
2. *Formative:* Students will indicate the activities they choose to use to test their own heart rates. They will then record their heart rate when participating in each activity. Throughout the lesson the teacher should have conversations with the students to ensure understanding of the concept.

DIFFERENTIATION PLANS:

Behavioral: The interactive nature of the lesson will help keep students engaged and hopefully keep behaviors to a minimum. Clear behavioral guidelines should be set at the beginning of the lesson so the students know exactly what is expected of them as they participate in the activity.

Cognitive: Students who need additional academic support can be paired with a peer buddy. If this more open level of inquiry is too challenging for a student the teacher can provide some guidance on what activities could be tried.

Affective: For students who need additional emotional support provide praise, encouragement, and compliments from both peers and teachers

Language Demands: English language learners who need language support in the activity can be paired with a peer that speaks the same home language as the student. Posters can also be made to illustrate the key concepts within the lesson.

MATERIALS:

- jump ropes, yoga balls, any other materials that students can use to be active
- worksheets
- pencils