

6-8
years

pri-sci-net



inquire
investigate
evaluate
connect

Science Content:

Biological Science

Target Concepts/Skills:

Function of the human body, connection between the heartbeat and breathing

Target Age group:

3-5 years

Duration of activity:

2 x 45 minutes

Summary:

Children investigate their ideas about the function of the human body with respect to breathing. They do investigations to find that the heartbeat and frequency of breathing is enhanced when the physical effort is increased. The research question posed is: 'How can you increase the heartbeat?'. Children are directed to design an investigation to measure this where they test measure their heartbeat after different types of activities. At the end they plot their measurements as a graph and interpret the results obtained.

Objective:

By the end of the activity children should be able to:

- Use a stethoscope to measure the heartbeat;
- Design an investigation to test how their heartbeat changes with exercise;
- Link the heartbeat to breathing rate and exercise done;
- Create simple graphs to represent measurements taken;
- Interpret graphs drawn and draw conclusions about the investigation.

Resources:

- Stethoscope (although the pulse can be measured instead)
- Stopwatch;
- Reference material (encyclopedia, internet etc.) on the human body

Heart Matters

Authors: Kristína Žoldošová, Iveta Matejovičová, Trnavska Univerzita v Trnave, Slovakia

The content of the present document only reflects the author's views and the European Union is not liable for any use that may be made of the information therein.



This project Pri-Sci-Net has received funding from the European Union Seventh Framework Programme (FP7 2007 /13) under grant agreement No.266647



Heart Matters

1. Engage (Forming hypotheses)

The teacher asks the pupils: How can we find out that a person is alive? The pupils talk about movement or breathing etc. Finally the pupils close eyes, place a hand near a nose and observe what is happening. What do you feel on your hand? Does air go just out or in as well? Does something move on your body when you are breathing? The questions are oriented to observe own body during breathing. The main target is to investigate how

we breathe and how it is related to the frequency of breathing and is connected to physical activity. The teacher just states that we breathe air which is transferred by blood and a heart works like a pump to push blood to whole body. Finally the pupils can listen to their heartbeat and try to touch a pulse (as a symbol of heartbeat).

2. Inquiry (Designing and running experiments and observations)

The teacher asks the pupils to propose a procedure for finding out the connection between breathing and physical activity and finally with working of heart. Pupils are divided into 4-5 members groups by their preferences. The teacher can give them stethoscopes (for better listening of heart beating) and the pupils listen to their own hearts and try to compare frequencies. Do they beat at the same frequency? Is it possible to make the heart beat faster? The aim of the questions is to find out pupils' ideas about how the heart works. The pupils try to propose one or more procedures of how to test their ideas in interactive group discussions. After finishing the work on the proposals, the teacher asks the pupils to write down the proposals and prepare for presentation in front of the whole class. While group of pupils presents their proposals, other groups should try to criticize the presented proposal to make it more precise. Teacher should promote the discussion about proposals by asking the presenting pupils to specify the exact way how they would like to realize the measurement. The teacher is a model of an inquiring person for the pupils and this is way how children can become inquirers. Now the teacher can

continue in two ways – he/she modifies the pupils' proposals or offers his/ her procedures if pupils' ones are not correct.

The pupils can start with the first task in the work sheets. The task is to find out number of heartbeats (while sitting) for a certain time limit (e. g. 10 seconds). The teacher measures the time. Each pupil writes down the number of heartbeats (or as many commas as heartbeats). Afterwards, the pupils compare their findings and debate whose heart beats the fastest and slowest. The next task is to measure heartbeat after slow exercising (they do 10 squats, after each squat they wait 5 sec.) after exercising they measure heartbeat again and note it. Finally they do 10 squats very fast (they are little bit tired) and measure heartbeat again. The results are marked into the third column of the first task. The teacher leads them to create results from measuring and try to explain what they have found. Each group presents their results and the teacher helps them to highlight differences between heartbeat while they are sitting and after intensive exercising.

3. Evaluation (Evaluating evidence)



The teacher leads the pupils to transfer obtained data from the first task into the table (second task in work sheets). The main target is to construct a simple graph which presents information about heartbeat during sitting and after fast exercising. The graph is constructed by colouring boxes (as many boxes as number is in the first task). Firstly they put data about all member of the group during sitting (green colour) and after 10 fast squats (red colour). The teacher helps them evaluate the results: Which is the longest row and what does it mean? Which is the shortest row and what does it mean? The aim of the task is to understand that the longest row means the fastest heartbeat. The pupils compare their results. Finally the teacher asks them the questions: Why do the heartbeat increase after fast squats, what do you think? Why is the difference not so high after slow squats? The goal is to map

pupils' ideas about inquired phenomenon and their ability to use evidence for drawing the conclusion. The pupils should to think that the teacher is interested in their ideas and explaining and they have found something new. Finally the teacher generalizes results and highlights that the air is necessary for live and if physical activity increases we need more air (it is signified by faster breathing). More amount of air is transported through body which causes faster heartbeat. At the end of activity the pupils find out information about heart and its activity in encyclopedias. The instruction has to be concrete – to find out size of heart, shape of heart, placed of heart – it teaches them how to work with literature. The pupils do the third task from work sheets and present their findings.

Heart Matters

Worksheets

Task (1): Write down the names of all members of your group in to the first column. Mark as many commas (or just number) as you hear heartbeats while seated (per 10 seconds) in to the second column. Do 10 slow squats (after each squat wait 5 seconds). Count heartbeat and note it in the third column. Do 10 fast squats and mark it, as well.

	Careful sitting 	10 slow squats 	10 fast squats 
1			
2			
3			
4			
5			



Heart Matters

Task (3) - Find out the size, shape and position of heart, use an encyclopaedia. Draw a heart into the outline

