Activity sheet

Investigating the effect of CO_2 and exercise on breathing rate

Name:

Class:

What are the risks in doing this activity?	How can you manage these risks to stay safe?
This activity may adversely affect you if you have a respiratory or heart condition.	Do not undertake the treatment in this activity; instead allocate yourself to the task of recording results.

Thinking skill: POE (predict, observe, explain)

Part A

Predict how treatments 1–3 might affect your blood oxygen and carbon dioxide levels:

1 Holding the breath after a normal deep inhalation

2 Holding the breath after a hyperventilation (breathing rapidly in and out about 20 times before taking a breath to hold)

3 Holding the breath after breathing in and out of a paper bag for about 30 seconds

Observe

Check your predictions by working in pairs (one person undertaking the treatment and the other person recording the results). Consistently use the same person for experimental results and record how long the breath can be held in the following circumstances.

Treatment	Time (seconds)			
	Measurement 1	Measurement 2	Measurement 3	Average
1 Holding the breath after a normal deep inhalation				
2 Holding the breath after a hyperventilation (breathing rapidly in and out about 20 times before taking a breath to hold)				
3 Holding the breath after breathing in and out of a paper bag for about 30 seconds				

Explain

From your results, suggest ways in which gases present in the blood might control breathing rate.

Part B

Predict how treatments 4 and 5 might affect your breathing rate:

4 Sitting quietly

5 Immediately after vigorous exercise for 3 minutes (for example, skipping, push-ups, running up and down stairs)

Observe

Check your predictions by working in pairs (as above), using the same person for experimental results.

Treatment	**Measurement 1** **Number of breaths per minute**	**Measurement 2** **Type of breathing (deep, normal, shallow etc.)**
4 Sitting quietly		
5 Immediately after vigorous exercise for 3 minutes (for example, skipping, push-ups, running up and down stairs)		

Explain

From your results, suggest ways in which respiration changed in response to exercise. Compare your evidence in Part A and suggest how gases present in the blood might have been changed by exercise.