




Components

	NAME	DESCRIPTION	AUDIENCE
	<i>pH control in the body</i> teachers guide	This guide shows how to engage student interest in the concept of buffering. It provides advice on the use of the video and suggests questions for group discussion.	teachers
	<i>Buffering systems in the human body</i> background sheet	This background sheet for teachers explains the science behind how blood acts as a buffer.	teachers
	<i>Buffers in the blood</i> video	This video examines chemical changes that take place in our bodies during exercise. It includes an interview with a scientist from The University of Western Australia who is conducting research into the use of food supplements to improve buffering in the body for athletes.	students

Purpose

To **Engage** students' interest in acid/base buffering by looking at chemical changes affecting pH in the human body during exercise.

Outcomes

Students:

- describe chemical changes that take place in our bodies when we exercise,
- understand that the body is a system in equilibrium,
- realise that equilibrium is affected when we exercise vigorously, and
- understand that a buffer is a chemical that helps to keep pH constant.

Activity summary

ACTIVITY	POSSIBLE STRATEGY
Students watch the video, <i>Buffers in the blood</i> .	whole class
WARNING! This video contains references to drug-taking in sport.	
Students answer a series of questions about the video.	Think, pair, share

Using the video

The video, *Buffers in the blood*, aims to engage students' interest in buffering. It provides an interesting example of buffering in our bodies and how buffering may be improved by taking food supplements. This will raise chemistry-related questions for students about how buffering works, as well as social questions about whether it is appropriate for athletes to take supplements to improve their performance.

Teachers may need to approach the latter topic sensitively, but it would make an interesting discussion about ethics in science.

Students may use the 'Think, pair, share approach' where they write individual answers to questions then discuss with a partner before a whole-class discussion.

Suggested questions include:

- What is a buffer?
- What is meant by 'the buffering ability of the body'?
- What happens when an athlete's body reaches its buffering capacity?
- Do you think it is right for athletes to take food supplements to improve their performance?
- It is illegal to give racehorses sodium bicarbonate but it is legal for human athletes to take it, even though it can affect the digestive system. Do you think that is right?

Technical requirements

The teachers guide and background sheet require Adobe Reader (version 5 or later), which is a free download from www.adobe.com.

The video, *Buffers in the body*, is provided in two formats: on a standard DVD-video disk and as a QuickTime movie. QuickTime version 7 or later is required to view the movie. This is a free download from www.apple.com/quicktime.

 The video contains closed captions.

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Associated SPICE resources

Buffers 1: pH control in the body may be used in conjunction with related SPICE resources to address buffering concepts.

DESCRIPTION	LEARNING PURPOSE
<i>Buffers</i> This learning pathway shows how a number of SPICE resources can be combined to teach the topic of buffering.	
<i>Buffers 1: pH control in the body</i> A video shows the important role played by blood in keeping a constant pH in the body. A sports scientist explains his research into the effect of food supplements on sporting performance.	Engage
<i>Buffers 2: Buffering ability of muscles</i> Students use a pH meter to measure the buffering capacity of different muscles of a chicken. This exploration leads students to question how buffering occurs.	Explore
<i>Buffers 3: Explaining buffers</i> An interactive learning object and associated worksheet explains what a buffer is, and how it works.	Explain
<i>Buffer 4: Buffering in the ocean</i> Students examine scientific data, read about the research of two scientists investigating ocean acidification and its possible consequences, then conduct an experiment to compare the buffering capacity of seawater and freshwater.	Elaborate