Mind Games

Commentary

There are two key messages to get across to students in this lesson. One is that there are things you can do to keep your body healthy and working well. There's a lot of evidence in support of these measures (which raises their status significantly) and they're actually quite well known. Namely, you should get regular sleep, avoid smoking, go easy on the alcohol and make sure your diet includes plenty of fresh fruit and vegetables. Taking exercise is also good. You can't really sell this advice as it's largely common knowledge. Some commercial organisations, however, invent 'bad science' to make their proprietary ideas seem somehow 'more scientific'.

The second key thing is that many KS4 students already know enough good science to spot the bad science. What they need is the prompting to critically evaluate these ideas.

Before this lesson students should have knowledge of the role of water in the body; basic anatomy; electrical circuits; and oxidation.

This lesson could lead to more work on cell biology and body systems. It could also be followed up by more work on scientific claims (e.g. other Bad Science *activities).*

Resources

bs_mind_worksheet_01 'Eat carrots to see in the dark' • bs_mind_worksheet_02 'Bright ideas for the brain' • bs_mind_worksheet_03 'Mind Games' • bs_mind_worksheet_04 'Better explanations' • access to resources on basic anatomy and physiology (not supplied) • access to internet (optional)

Learning objectives

- To apply concepts of cell biology and body systems to evaluate advice on appropriate conditions for focusing on mental activities
- To examine scientific claims of accuracy and reliability

Learning outcomes

By the end of the lesson students will have:

- used their knowledge and understanding of the human body to evaluate claims
- accessed other information about anatomy such as diagrams and other images to evaluate claims
- produced a considered and evidenced evaluation of claims
- worked effectively and collaboratively as a group to critically examine evidence and construct explanations

Key vocabulary

accuracy • reliability • oxidation • conduction • circuits • artery

Obstacles to learning

Students may hold misconceptions relating to:

- how water is absorbed into the body
- how oxygen is absorbed into the body
- the difference between oxidation and oxygenation
- conditions necessary for a circuit to conduct

Starter

While the students are arriving and settling, ask them to look at the 'Eat carrots to see in the dark' sheet (bs_mind_worksheet_01). Explain that this was circulated in Britain in World War Two. Ask them whether they think it is likely to be true.

Ask students to consider what they might do to get their bodies to function well in an exam. They could:

- list some ideas / write on cards
- rank order
- compare with other groups
- offer a scientific justification for the ones they think are most important
- compare with ideas from the ‘Bright ideas for the brain’ sheet (bs_mind_worksheet_02)

Note that the ideas here are intended as a ‘mixed bag’ of notions. Some are fairly credible and others are more ludicrous. The purpose is to challenge students to discriminate between the one and the other.

Main activity

Tell students that they will be working in small groups to investigate claims from the ‘Mind Games’ programme and to prepare guidance for schools. Each group will be investigating one of the ‘Mind Games’ activities and preparing guidance on the quality of the advice (bs_mind_worksheet_03). The outcome will be a presentation of the key points to the rest of the class and a short written report. Each group should produce a brief but justified decision as to whether to advise the adoption of the strategy they have investigated.

Ask students to work in small groups and order the ‘Better explanations’ cards (bs_mind_worksheet_04) according to how good a scientific explanation each of them is.

Initiate further discussion around the questions:

- What makes these pieces of advice sound convincing?
- Why are sound claims wrapped in dubious science?

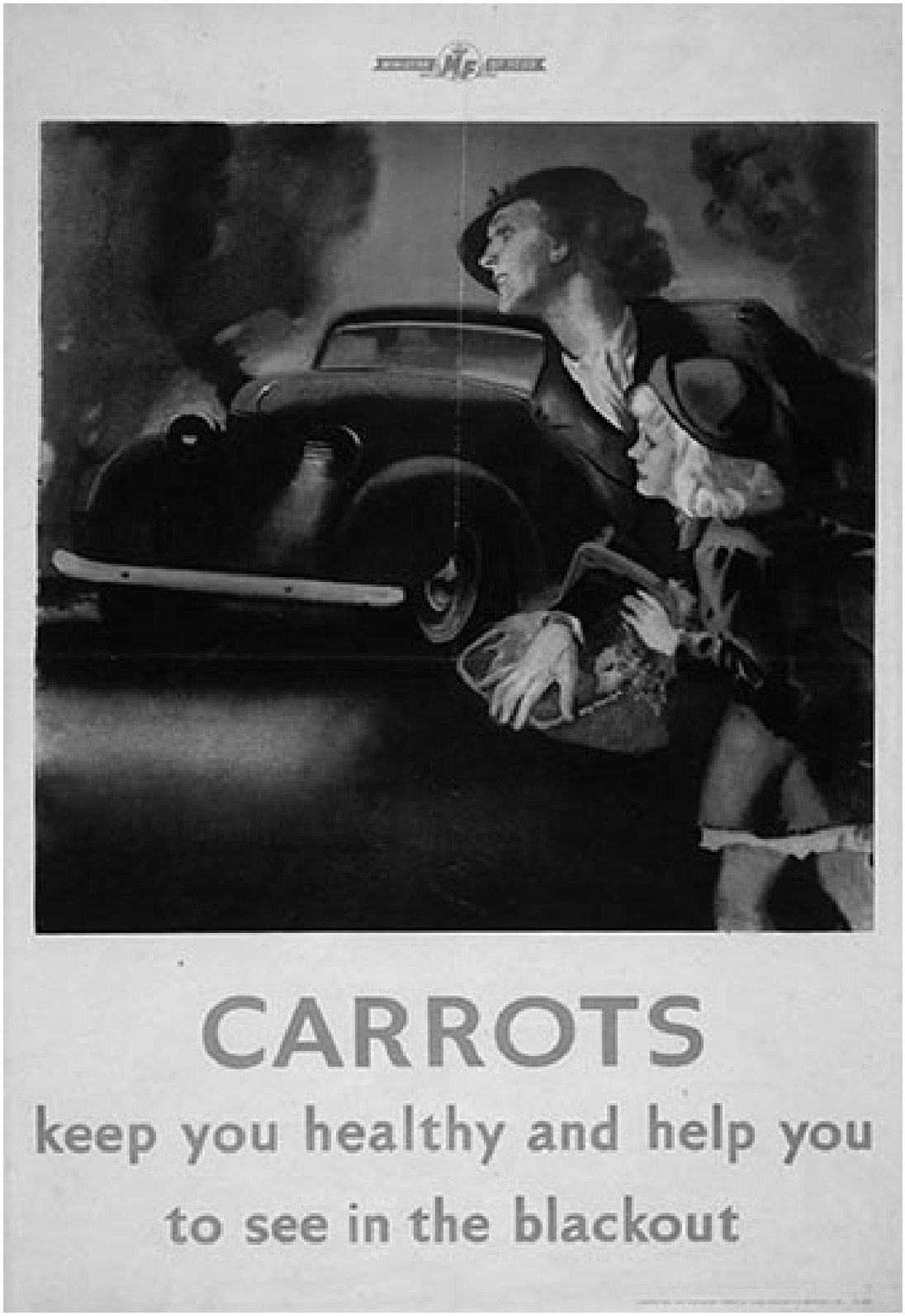
The students shouldn’t have any difficulty in identifying all three of these as highly questionable. The challenge at this stage is to explain why they think these are unfounded.

Plenary

Ask students what strategies they think they should adopt in preparation for a major exam.

Mind games worksheet 01

Eat carrots to see in the dark



Mind games worksheet 02

Bright Ideas for the brain

Before sitting an aural exam (for example a listening test in MFL), spin round three times clockwise and three times anticlockwise. This stimulates the semicircular canals which are located in the inner ear, thus priming the cochlea.
Before doing a written exam focus on one of your fingers (held about 30cm in front of your face); bring your finger closer to your face, still focusing on it, as close as you can. This will exercise the muscles in the eyeballs.
Before writing turn your hands palms outwards, interlock your fingers and flex your hands. This loosens up the joints.
Before doing a mental arithmetic test, repeatedly subtract seven from 1,000. i.e. 1,000, 993, 986, 979, etc., in your head. This gets your brain in shape to do lots of sums quickly.
Before doing an exam in the morning, make sure you have a good breakfast. Something like porridge is good as the energy is released slowly during the morning, making sure you don't get tired towards the end.
A drink with caffeine in it is a good idea as it acts as a stimulant and will cause your brain to work quicker.

Mind games worksheet 03

Mind games

Interlock the fingers of both your hands, holding your elbows out at the sides. This completes a circuit and allows positive energy to flow. Positive energy creates positive thoughts, stimulating the brain, stilling anxieties and clearing the way for a free flow of logical thought.
Water is a vital ingredient of blood and blood is essential to transport oxygen to the brain. For the brain to work well you have to ensure your blood is hydrated. This needs water, little and often. The best way of rehydrating the blood taking oxygen to the brain is to hold water in the mouth for up to half a minute, thus allowing direct absorption.
Your carotid arteries are vital to supplying your brain with richly oxygenated blood. Ensure their peak performance by pressing your brain buttons. These are on your upper chest, one on either side. Make ‘C’ shapes with forefinger and thumb to place over the brain buttons and gently massage.

Mind games worksheet 04

Better explanations

Put these explanations in order, according to how good a scientific explanation you think each is.

Respiration is a process which works because gases will always flow from areas of high concentration to areas of low concentration. Oxygen is more concentrated in the atmosphere than in the blood so it moves into the blood; carbon dioxide is more concentrated in the blood than in the atmosphere so it flows into the atmosphere from the blood.
Efficient respiration uses positive energy trends to transfer life-giving oxygen into the blood and discard poisonous carbon dioxide into the air to be disposed of. Each breath of air invigorates the lungs and energises the blood.
Life is personified by movement. We instinctively know when we are faced with a life force and we are stimulated by it: the rushing sea, the roaring of a fire and the beautiful movement of galloping horses. In the same way, we know, in the core of our souls, that the flow of cool clear air into our lungs brings with it life.

