



Face cream

Commentary

The important idea to get across in this lesson is that science is sometimes used to sell products of questionable value. Many middle-aged people would like to look younger, or at least have better-looking skin. Many products are sold with the suggestion that they can help; few actually do, at least to the extent that is implied. The 'science angle' is often built up with references to laboratories and tests. Paradoxically, very few of the products have had full-scale clinical trials that are able to substantiate the claims.

Students will need a basic knowledge of cells and tissues, and chain molecules and be able to use basic lab equipment to compete this lesson if the practical activity is included. This lesson could provide an introduction to more detailed cellular processes or homeostasis.

Resources

advert for anti-ageing cream (found from magazine) • bs_cream_worksheet_01 'Cross section of skin' • bs_cream_technician • pre-prepared sample of moisturising cream prepared using technician's notes • samples of proprietary moisturising cream, such as Diprobase™

Learning objectives

- To research the ways in which skin products work
- For students to relate their research to their understanding of various materials, including those with chain molecules
- To consider the psychology of cosmetic treatments

Learning outcomes

By the end of the lesson students will have:

- seen how moisturising and tensioning the skin may improve its appearance
- applied their knowledge of homemade cream to draw conclusions about the economics of cosmetics
- explored some of the psychology of cosmetics

Key vocabulary

corrosive • emulsify • homeostasis

Obstacles to learning

Some students may have the misconception that:

- skin treatments work by 'smoothing over the cracks' in the skin
- implied claims aren't allowed unless they're entirely valid

Starter

Display the advert(s) for anti-ageing creams and ask students to:

- Indicate on a scale of 1 to 5 whether they think it's possible for older people to look younger through the use of cosmetics.
- Suggest why anti-ageing creams represent a potentially lucrative market.

Distribute 'Cross section of skin' (bs_cream_worksheet_01) to the class. Ask students how old-looking skin is different to young-looking skin:

- Students work in pairs to examine the diagrams and suggest differences
- Students suggest how a skin treatment might affect the old skin
- Record and summarise ideas

Main activity

Explain that we shouldn't be surprised that there is a willing market for products to make older adults look younger. Add that there may be nothing wrong with cosmetics companies developing products but that consumers should be aware of the proven effectiveness of what they're buying.

It is also worthwhile exploring the psychology behind this; if people want to believe something they may be less critical.

Explain that one immediate gain from an anti-ageing cream is rehydration. This is relatively easy by using something like Diprobase™, or another cheap material. You could use this opportunity to circulate samples of Diprobase™ and even homemade cream prepared by the technician (details supplied in technician's sheet). Warn students not to put chemicals prepared in the laboratory on their skin. Even though students may not try them out they can see and smell them; and calculate the cost of ingredients from information supplied by the lab technician.

Note: Students could prepare the cream using the method detailed on the technician's sheet (bs_cream_technician). A risk assessment should be in place – essential oils are irritants and chemicals prepared in the laboratory should not be tried on skin. Nevertheless, the practical work can enhance the lesson, especially if students are questioned about why they are doing what they are doing: the heating uses a water bath; the wax changes state; the oil and the wax mix but the water makes it an emulsion.

Explain that something more than rehydration is needed to make someone look younger. There are three types of commonly used active ingredients:

- Alphahydroxy acids, derivatives of various vitamins. These were once thought to be a breakthrough but are now known to be skin irritants when in concentrations high enough to have an effect. They are now only included in low concentration.
- Vegetable proteins, which are long chain molecules, tightening across the skin as the cream dries and pulling it tight.
- Hydrogen peroxide which is a corrosive and gives a light burn.

Allow students the opportunity to explore and form opinions about why each of these ingredients might be included.

Higher demand. Explain that some manufacturers make claims that their products supply extra oxygen. However, the body monitors and compensates (e.g. temperature regulation) conditions very effectively. This may be a good opportunity to introduce or remind students of the term 'homeostasis'. Ask students to consider the following question:

- If a cream really did supply more oxygen to a particular area of tissue, such as part of the skin, what would the body's response be?

Ben Goldacre says "the research is often weak, consisting of private research papers that scientists are not allowed to read and claims such as 'eight-out-of-ten users said their skin was nicer', after being given a free sample. Nicer than what, though? No cream, or the cheapest moisturiser around?"

Ask students to think about what's poor about 'eight-out-of-ten' claims. There are a number of ways this could be done:

- Construct a list of, say, four pop singers. One should be fairly popular and the other three 'also rans'. Ask ten people to pick their favourite and announce it. Ask the class if that really means that singer is an all time favourite.
- Select a particular timeslot in the TV broadcasting schedules and pick out the programmes being broadcast by the five terrestrial channels. Choose a slot when, for teenagers, there will be one obvious choice and announce it as their favourite programme.
- Offer students a selection of newspaper titles and make it clear they have a 'no preference' option. Ask several students what their confirmed favourite is. It is likely that many will say they have no preference. Announce the title that is more popular as the clear winner.

The aim of this is, of course, to make it clear that the 'eight out of ten' claim doesn't necessarily mean that there was a full and fair test.

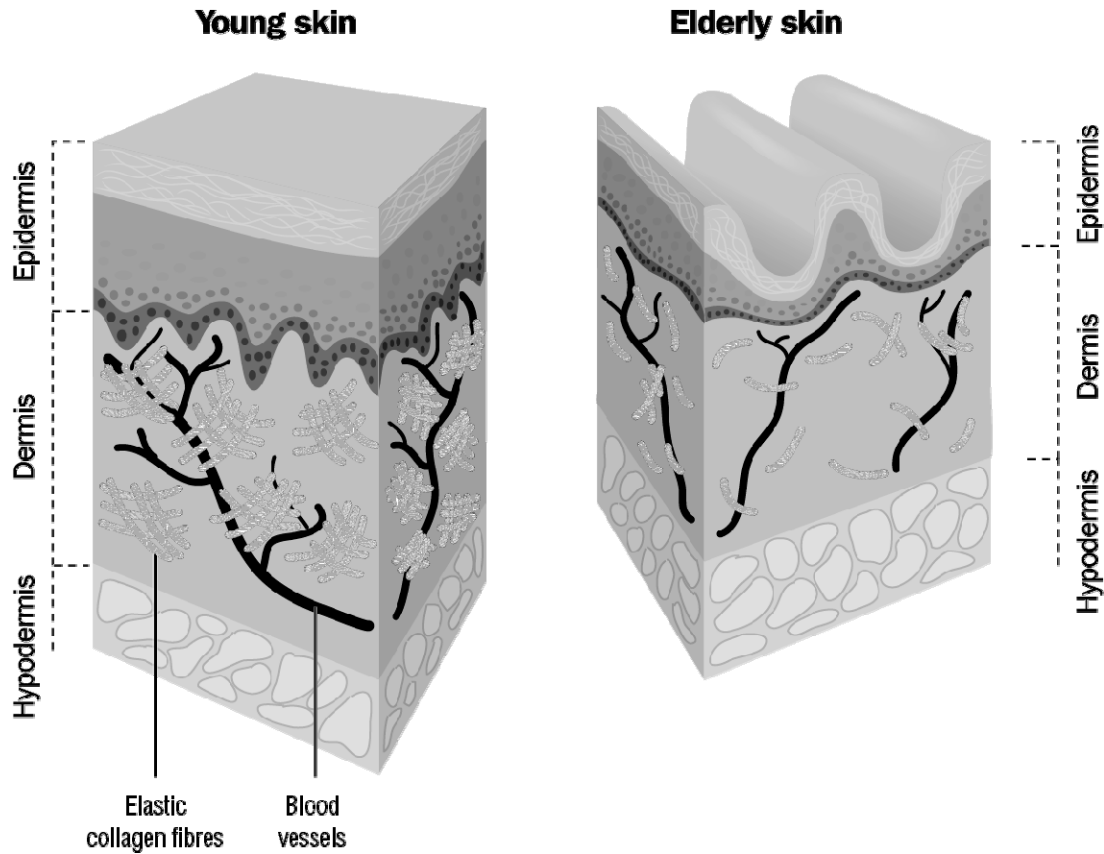
Plenary

There are a number of ideas that could be explored in the plenary: select and use as a basis for gathering feedback.

- Do students think that claims should be tested and the results of those tests published, just as they should be for a medicine? You could cite the example of the Boots anti-ageing cream which made the headlines in 2009 after transparent scientific testing – unusual and even unprecedented in the world of cosmetics – revealed the cream did work. You can search for more on this story online – try typing ‘boots anti-ageing story’ into the search engine. Emphasise that publishing this testing was unusual. Also note that it’s possible many companies have conducted similar tests, got negative results showing their cream was no good, and decided not to publish these results openly.
- Look at the price of the ingredients (supplied by the technician) – bearing in mind economies of scale – and ask what makes the price significantly higher.
- Discuss attitudes to anti-ageing creams and other anti-ageing products. If people want to pamper themselves do they need to worry about tests and trials?

Face cream worksheet 01

Cross section of skin



- What changes can you see?
- How does the surface change?
- What's happening to the thickness of layers?
- How has the blood supply changed?
- What has happened to the elastic collagen fibres?



Face cream technician sheet

Equipment and materials

- 100 ml almond oil (in fact any vegetable oil will do, including almond oil and red palm oil)
- 20 ml water
- 25 g beeswax
- 10 drops essential oil, such as lavender, orange or lemon
- Evaporating basin in water bath

Method

1. Melt wax and heat oil together in basin in boiling water.
2. Remove from heat and stir until it starts to thicken and loses its transparency.
3. Stir in the water to form an emulsion. You will find that excess water will stay around the edge and can be poured away.
4. Add the essential oil, observing the instructions provided and avoiding direct contact with the skin.
5. Transfer the cream to a storage container.