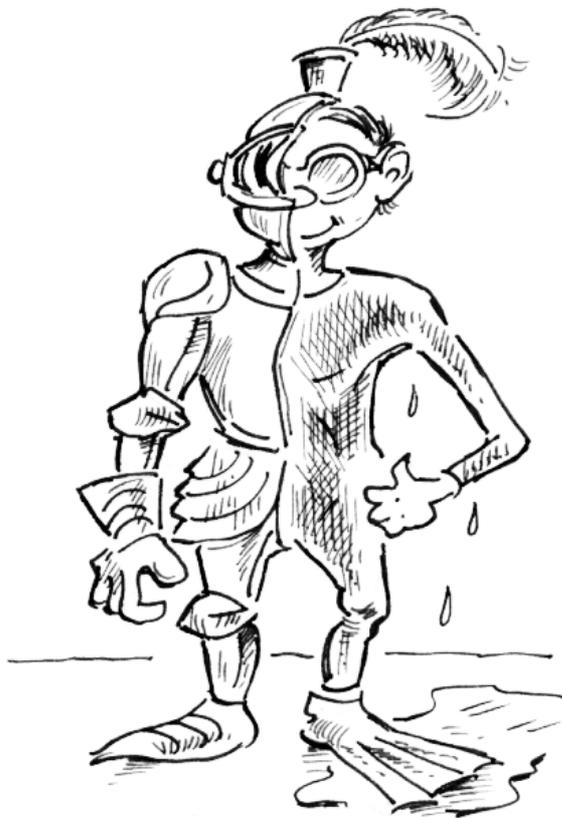


Just skin deep



UNIT A8

This unit looks at the defensive functions of the skin - in fighting the invasion of bacteria, adapting to extremes of temperature, and providing protection from the harmful rays of the sun. It takes a deeper look at what causes skin colour, its effects on the protective function and the 'protection' it does not afford against those who judge by outward appearance.



Links with KS3 programme of study

- ◆ The benefits and drawbacks of scientific and technological developments, including those related to the environment, health and quality of life (breadth of study).
- ◆ Animal and plant cells and the ways in which some cells are adapted to their functions (Sc2 life processes and living things).
- ◆ How the growth and reproduction of bacteria and viruses can affect health (Sc2 life processes and living things).
- ◆ How some organisms are adapted to survive daily and seasonal changes in their habitats (Sc2 life processes and living things).

Moral and spiritual aims

In looking at the scientific facts about differences in skin colour, and touching on the deeper issues of the importance of image and outward appearance in modern society, this unit seeks to encourage pupils to think about the origin and validity of their own ideas about skin colour and to question the notion that image is everything.

Answers

Activity 1: Protection from invasion of bacteria

- (a) Bacteria - invade the skin
- (b) T-cells - fight the bacteria
- (c) B-cells - throw antibodies at the bacteria to weaken them
- (d) Macrophages - carry off dead cells

Activity 2: Protection from temperature extremes

	How skin keeps heat			How skin loses heat	
1	Upright hair traps air	B	6	Thin layer of fat	K
2	Blood vessels go thin and tight	D	7	Sweat evaporates and cools skin	I
3	Lots of fat	E	8	Hair muscle relaxes	F
4	No sweat	C	9	Sweat gland produces sweat	H
5	Hair muscle pulls	A	10	Flat hair allows air to move	G
			11	Blood vessels get larger	J

Activity 3: Protection from the Sun

	Suntan Facts	
1	Sunshine can be bad for you.	T
2	The ozone hole itself is the cause of cancer.	F
3	The skin tans because of the infrared rays in sunlight.	F
4	There is only one pigment in human skin called melanin.	T
5	When skin is exposed to sunlight the number of pigment cells increase.	F
6	The difference between white skin and black skin is the number of pigment cells.	T
7	It is better to tan slowly than quickly.	T
8	Sun barrier cream Factor 8 is stronger than Factor 4.	T
9	Tanning on a sun-bed is safer than in natural sunlight.	F
10	A suntan gradually disappears because the colour fades in the sun.	F

Activity 4: Not our skin-colour but the sort of people we are!

Questions are for discussion.

Just skin deep



UNIT A8

Our skin is very important in protecting our soft insides from all kinds of dangers. It also gives us a distinctive appearance, making us all look different. How important is what we look like? What kind of image do you like to project and is it spoiled when your skin lets you down and you get a spot!

The skin's main job is protection.

It is a bit like a cross between a suit of armour and a wet suit! It helps to provide protection from:

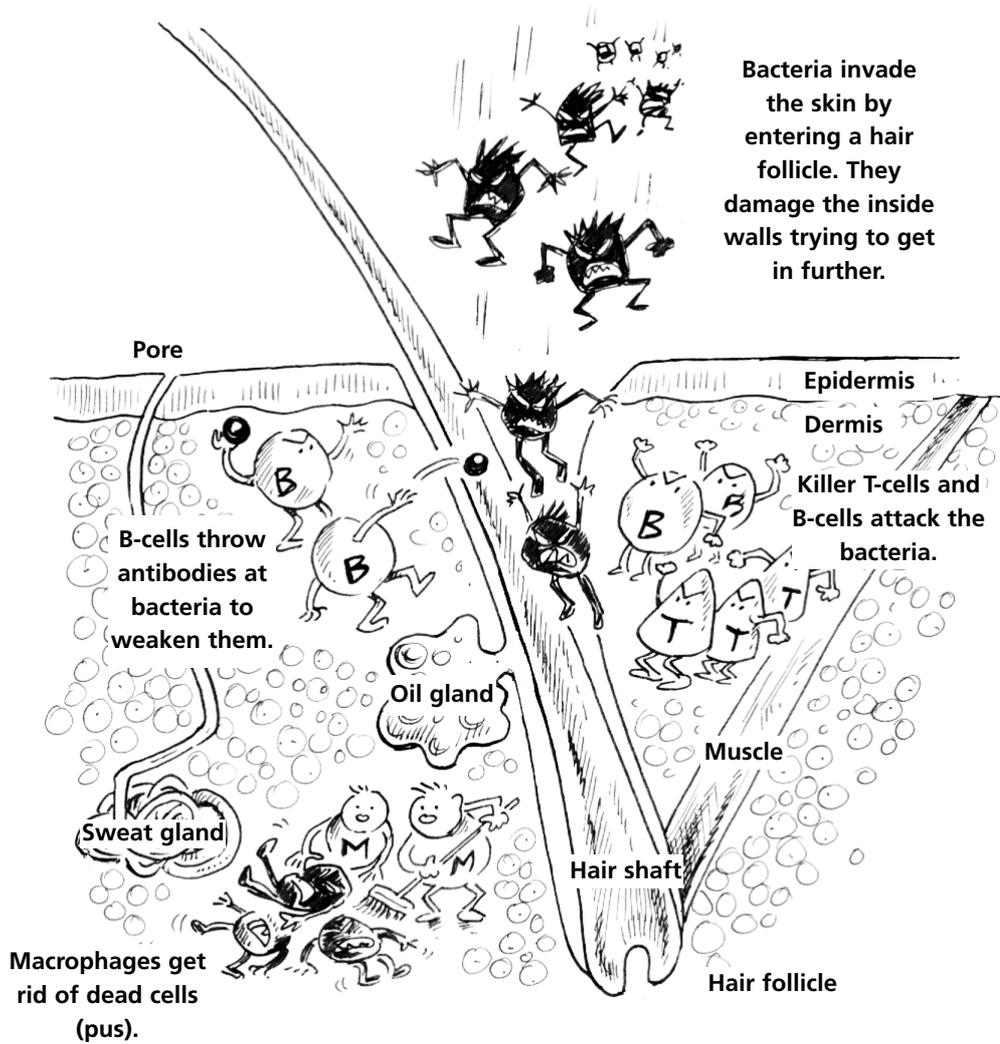
- invasion of bacteria;
- temperature extremes;
- harmful sunrays;
- too much water loss; and
- knocks and bangs.

We will look at the first three of these.



1 Protection from invasion of bacteria

Everyone gets a spot now and again, but it is not our skin letting us down - it is doing a vital job. While we try to get rid of the spot with face-wash on the outside, our body defences are waging war from the inside, against the *invaders*.

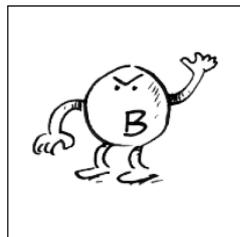


Space invaders battle for the spot

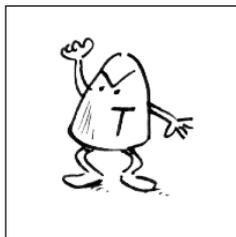
Here are the main players in the Battle of the Spot. Look at the cartoon to find out what they do in the battle. In your notebook, write a sentence for each one.



(a) Bacteria



(b) B-cells

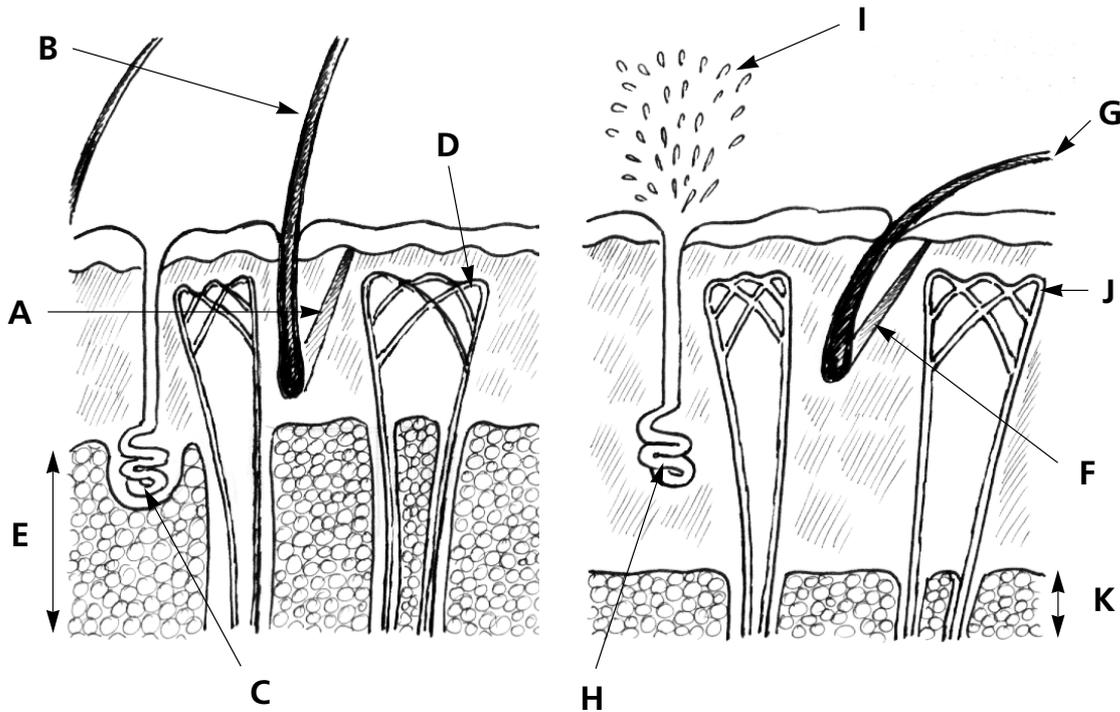


(c) T-cells



(d) Macrophages

2 Protection from temperature extremes



Look at these diagrams which show how the skin protects the body from over-heating and over-cooling. The letters on the diagrams belong with the statements in the list below - but which letter belongs with which statement?

Copy this table into your notebook and put a letter from the diagrams into each space beside the statement which describes it. (The first one has been done for you.)
The titles for the columns are not complete. Put in the word 'KEEPS' or 'LOSES' to complete them.

Put the letters in these columns.

	How skin heat		How skin heat	
1	Upright hair traps air	B	6	Thin layer of fat
2	Blood vessels go thin and tight		7	Sweat evaporates and cools skin
3	Lots of fat		8	Hair muscle relaxes
4	No sweat		9	Sweat glands produce sweat
5	Hair muscle pulls		10	Flat hair allows air to move
			11	Blood vessels get larger

3 Protection from the Sun

People think they look good with a suntan but how safe is it to sunbathe? With the thinning of the ozone layer, protection from harmful rays is becoming more important. How much do you know about getting a suntan?

Test your knowledge with this quiz.



Quiz on the facts about suntanning		
1	Sunshine can be bad for you.	True or False?
2	The ozone hole itself is the cause of cancer.	True or False?
3	The skin tans because of the infrared rays in sunlight.	True or False?
4	There is only one pigment in human skin called melanin.	True or False?
5	When skin is exposed to sunlight the number of pigment cells increase.	True or False?
6	The difference between white skin and black skin is the number of pigment cells.	True or False?
7	It is better to tan slowly than quickly.	True or False?
8	Sun barrier cream Factor 8 is stronger than Factor 4, if applied and left for the same length of time.	True or False?
9	Tanning on a sun-bed is safer than in natural sunlight.	True or False?
10	A suntan gradually disappears because the colour fades in the sun.	True or False?

The answers to this quiz can be found in the information that follows below. Read it carefully and mark your own answers to see how much you knew about getting a suntan.

How your skin tans

The process of getting a suntan is very simple and works the same whether you tan indoors or outside.

One of the sun's rays you cannot see is called 'ultra violet radiation (UV)'. Part of it (UV-B) is stronger and more dangerous to skin than another part which is less harmful and is called UV-A. It is this UV radiation that starts the tanning process in the top layers of the skin. Some of the cells are special cells called melanocytes which, when exposed to UV-B radiation, produce melanin - a brown pigment.

The melanin is absorbed by the surrounding cells. All human beings have the same number of melanocytes in their bodies - no matter whether you are white-skinned or black-skinned.

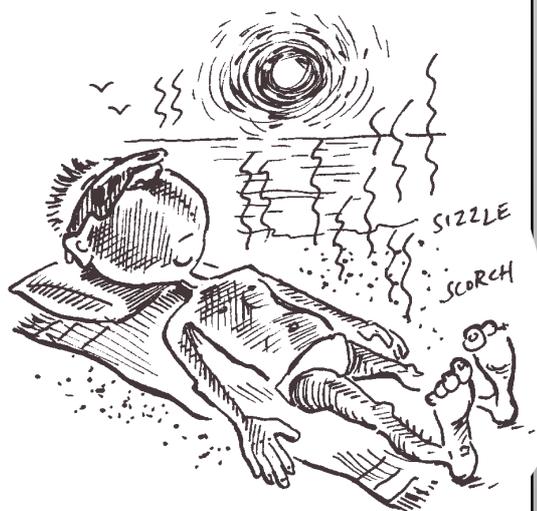
However, black-skinned people produce more melanin from their cells than white-skinned people do. The UV-A rays in sunlight darken the melanin, protecting the deeper tissues from UV-B rays which can damage skin cells.

It is best to tan slowly for this protection to develop so that you can avoid sunburn. Sunburn occurs when too much UV radiation reaches the skin and affects the blood vessels near the skin's surface. UV rays also cause the ageing of our skin and a thickening of the skin, which makes it more vulnerable to skin cancer.

At the present time, we need to be more worried about the dangers of exposure to strong sunlight on sunny days and especially when sunbathing. The ozone layer normally completely surrounds the Earth like a giant umbrella and it protects us and plants and animals from too much radiation. It has been damaged and has become very thin in places. This is sometimes called the 'ozone hole'.

It is sensible to play safe by wearing a hat and long sleeved-clothes and by using sun-block creams. These are rated according to how long they protect you. For example, a cream Factor 15 will allow you to be exposed to the sun 15 times longer than the time it would take your skin to burn without cream.

A suntan does not last forever - it wears off as dead cells at the surface get rubbed off and replaced by new cells from below and these have not yet produced melanin.



4 Not our skin-colour but the sort of people we are!

We have seen in the last section that black-skinned people produce more protective melanin from their cells than white-skinned people do.

This is a very small difference. It is only skin-deep! It has nothing to do with the kind of person someone is.

However, in spite of this, some people have treated black-skinned people differently from white-skinned people.

Martin Luther King campaigned peacefully for equal treatment for black people in America in the 1960's. In a famous speech he inspired hope in many black people:

"I have a dream that my four little children will one day live in a nation where they will not be judged by the colour of their skin, but by the sort of person they are. I have a dream that one day . . . all of God's children, black men, white men, Jews and Gentiles, Protestants and Catholics, will be able to join hands and sing in the words of the black peoples' old song: *Free at last, free at last, thank God Almighty, we are free at last!*"

In 1968, a white man called James Earl Ray shot Martin Luther King dead because Ray hated black people.



1. Martin Luther King was not a slave, so what was the freedom he was longing for?
2. From what you know about the way he died and all that has happened since, do you think Martin Luther King wasted his life?
3. The American Nation take a special holiday 'Martin Luther King Day' on 17th January. Why is he so celebrated?
4. "Man looks at the outward appearance but the LORD looks at the heart." (1 Samuel 16 verse 7) What do you think this verse in the Bible might mean?

In what ways might life in your school be different if Luther King's dream were to come true?

How far do you feel your community has come towards the fulfilment of his dream?

If you could choose one thing about yourself to change, what would it be? Did you choose something inside or outside? Which do you think is more important?