Skin – Our Protection from the World
Suggested Year: 9 or 10

This unit introduces the skin as the largest sense organ in the body. Pupils research the structure and function of the skin, linking it to common skin disorders and general health. Pupils research skincare products that we use and there is an opportunity to debate the role of animal testing. At the end of the unit, pupils discuss the new facts they have learned.

Statutory topic covered in this unit

» Organisms and Health

Unit links to the Big Picture

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Attitudes and Dispositions

» Personal responsibility
» Concern for others
» Respect

Classroom Activities

Activity 1: Investigating the Structure of the Skin
Activity 2: Exploring the Functions of the Skin
Activity 3: Investigating Common Skin Disorders
Activity 4: Investigating Skincare Products
Activity 5: Evaluation
Activity 1:
Investigating the Structure of the Skin

Learning Intentions
Pupils are learning to:
» think more deeply about what we can tell about someone from their skin; and
» understand and describe the structure of the skin.

Suggested Activities
To find out what information a person’s skin gives, ask pupils to think about what happens to our skin if we are:
» hot or cold;
» embarrassed;
» tired or wide awake;
» healthy or ill; and
» older or younger.

In groups, pupils carry out a Know – Want to Know – Learned (KWL) exercise (outlined in the Active Learning and Teaching Methods booklet) to identify what they already know about the skin and what they want to find out. They will complete the Learned section with information they have learned at the end of the activity.

The following activities involve the pupils looking more closely at skin, particularly their own. You may choose and adapt as appropriate for your class. Groups in the class could do different activities and report their findings back to the class.

Pupils examine their skin using a magnifying glass. The aim of this activity is to encourage them to look more closely at something they take for granted and feel that they know about already.

Ask them to sketch and/or discuss what they see. Look at and sketch hairs and freckles, and if present, any moles, blackheads, pimples, scars, birthmarks. Ask them to look at where their skin is thickest or thinnest.
Skin Prints

Skin prints are like fingerprints but they are taken from other parts of the body, such as the wrist, elbow, palm, knuckle or knee.

The following steps show one method of taking a skin print.

» Make a pencil smudge by rubbing a pencil back and forth on paper. Rub, for example, the wrist in the pencil smudge until it is black.
» Place some tape on the wrist and then lift off gently.
» The tape will have a skin print.
» Tape it to a piece of paper and label.
» Then wash skin with soap and water.

Pupils can compare their skin prints and describe similarities and differences. Alternatively, they could use an ink pad for this activity but it might be messier to carry out and to clean up afterwards.

Ask the pupils to discuss their observations of the skin surface. Pupils can list these on the board and put similar observations into groups.

Now that pupils have investigated the surface of the skin, they can move on to investigate the deep structure. Give pupils a labelled diagram of the skin showing the dermis, epidermis and subcutaneous layer. The labelled skin diagram from www.easyscienceforkids.com might be useful for this activity.

Using this diagram or a similar one, ask the pupils to choose one label or part and research its function. The research could be a homework exercise. The pupils then read out their facts to the class.

Using this information as a base, describe the functions of the main parts of the skin to the pupils.
The following websites include information and resources that you might find useful for this lesson.

» Skin – Structure and Functions available at www.easyscienceforkids.com
» Your Skin available at www.kidshealth.org
» Skin Facts available at www.sciencekids.co.nz

In groups, ask the pupils to find out the reasons behind the earlier observations of skin changes. For example, when we are too hot, the blood vessels near the surface dilate, allowing more blood to carry heat to the surface so that the heat can leave the body. This means our skin appears red.

Each pupil should find an interesting fact about the skin and how it works. Pupils then trace their hand outline on a piece of paper, write their fact on it and cut it out. Staple all the hands to the noticeboard.

To review the new words, pupils could complete:

» a word search such as the one available at www.kidshealth.org or
» a quiz such as the one available at www.kidshealth.org

In pairs, check the pupils understand key words. One pupil explains a key word using as few words as possible and the other has to guess the word. Pupils can then return to the KWL exercise from the start of the activity and complete the Learned section.
Activity 2: Exploring the Functions of the Skin

Learning Intentions
Pupils are learning to:
» identify and explain the functions of the skin.

Suggested Activities
Pupils can do a carousel activity (outlined in the Active Learning and Teaching Methods booklet) to collectively gather information about the following functions of the skin:
» protection;
» controlling body temperature; and
» as a sense organ.

Summarise pupil input on each sheet of the carousel, correcting pupil input where necessary. You might choose to give pupils further information about the functions of the skin.

Protection
Ask pupils the key question: What, if anything, does our skin protect? To encourage pupils to think about this question, ask them to imagine a day without their skin. Ask them, for example, if you woke up tomorrow without your skin, apart from looking awful, what impact would it have on your day?

Controlling body temperature
Pupils investigate the role of sweating and blood vessel dilation and constriction in regulating body temperature. The following websites include information and resources that you might find useful for this lesson.
» The Skin available at www.ducksters.com
» Thermoregulation available at www.bbc.co.uk/schools/gcsebitesize
As a sense organ

The following activities will help pupils think about how the skin functions as a sense organ. Pupils explore temperature perception and then they explore how sensitive different areas of the skin are to touch.

1. Sensing temperature

Use three beakers:

» Beaker one contains very hot (not boiling) water.
» Beaker two contains water at room temperature.
» Beaker three contains ice-cold water.

Ask the pupils to place one hand on beaker one and the other hand on beaker three for 60 seconds and then place both hands on beaker two. Then ask pupils the following questions.

» What do you notice?
» What does this tell you about how the skin senses temperature?
» Have you ever noticed this happening before?
» Is the skin a reliable way of telling the temperature?

2. Testing sensitivity of different areas of the skin

Tape two pencils together and ask the pupils to press them gently against their skin. Ask them where on their skin can they feel the touch as two separate points? Pupils could try this on the palm and back of their hand, fingertips, forearm, upper arm etc. Make sure that the pupils are careful during this activity and that the pencils are not too sharp. They must not test in the facial area.
Pupil conclusions about the skin

After completing one or both of these activities, ask the pupils to give conclusions on what they have learned about the skin. As a class, discuss what a conclusion is. Formulate success criteria for a conclusion, including what evidence you have for a conclusion and how reliable it is.

Extension Activity (covered in detail in the Brain and Learning unit)

Introduce the role of receptors in the skin and the reflex arc. Explain to the pupils that the skin has receptors that sense pressure, pain or temperature. Once stimulated, an electrical impulse travels along a neurone to the brain and spinal cord. A response then travels along another neurone to the muscle, causing it to move.

Key Stage 4 Link (Biology)

Pupils can observe the reflex arc in action by tapping under their kneecap when their legs are crossed.

The following websites include details about this and other simple reflexes.

» Reflexes available at faculty.washington.edu/chudler/neurok.html
» What are Reflexes? available at www.kidshealth.org

Reflex actions and the nervous system are further investigated in the Brain and Learning unit.
Activity 3:
Investigating Common Skin Disorders

Learning Intentions
Pupils are learning to:
» describe common skin disorders; and
» identify and extract key facts from a text.

Suggested Activities

Class Discussion
Discuss with the class how and why skin can become unhealthy. Then ask the pupils to list disorders that can affect the skin, for example acne, skin cancer, eczema, psoriasis, cold sores, ulcers, warts, hives and athlete’s foot.

You could start the following activity in class up to the point of deciding on a disease to become an expert in. Then a class trip to the library would allow pupils to carry out their research. Alternatively, you could prepare information corners on four or five disorders. These would contain books, newspapers and/or internet articles about the disorder.

Ask the pupils to arrange themselves into groups. Each member of the group chooses a skin disorder to research and become an expert in. The class then rearranges into the expert groups at each information corner (or at the library). The groups can then spend time finding out as much as they can about the disease.

The information in each corner will come from a number of sources. Ask the pupils to comment on the usefulness of the different pieces of information and attempt to identify the various sources. To become an expert, they must evaluate and synthesise information from different sources. They then return to their original groups to share information and answer questions on the disease they have become an expert in.

You should chair a class debriefing to complete this activity. The pupils might have further questions that need to be explored.
Activity 4:
Investigating Skincare Products

Learning Intentions
Pupils are learning to:
» think critically about information; and
» describe common skincare products and assess their usefulness.

Suggested Activities
Ask the pupils to think about the products we put on our skin. Discuss the following questions with them.
» Why do we use these products?
» How do we know that they work?
» How do we know that they are safe?

Ask the pupils to bring in some skincare products and look at the ingredients on the labels. Discuss the following questions with them.
» What are the different terms used on skincare products?
» What do they mean?
» What does the label tell us?
» What does it not tell us?
» What kind of language does the label use and why?
» How useful is the information on the label?

Pupils divide into groups to investigate one of the factors that can affect our skin, according to these products and their associated advertising. They can choose from:
» UV light;
» ageing; or
» smoking.
Ask each group to prepare a poster to explain the effect of their chosen factor on the skin.

The article *Four in five beauty claims cannot be substantiated*, available at www.telegraph.co.uk, could be a useful resource for exploring how adverts can be misleading. The article *The Pseudoscience of Beauty Products*, available at www.theatlantic.com, might be more suited to your background research.

**Challenge**

Ask the pupils to design a skincare label that makes claims about what the product does and convinces consumers to buy it. The pupils choose the success criteria based on the products they have brought in.
Activity 5:
Evaluation

Learning Intentions
Pupils are learning to:
» think critically about information;
» blend new information with existing knowledge; and
» communicate information concisely.

Suggested Activities
Pupils return to their KWL exercise from Activity 1 and read out each section to the class. The teacher or a nominated pupil presents a summary of Activities 2, 3 and 4.

Give each pupil a Post-it note and ask them to write down the most interesting new fact that they have learned from these activities.

Then place the Post-it notes on a large sheet of paper so the class can read the facts. Alternatively, you could draw a large triangle on the paper and arrange the Post-it notes according to popularity or interest, with the most popular or interesting at the top.

It is important to effectively manage the resulting discussion to make sure that every pupil gets to express their reasons. A stick debate (outlined in the Active Learning and Teaching Methods booklet) is useful here. Give each pupil two or three lollipop sticks. When they speak, they must hand in one stick. This method encourages pupils to listen and consider their response before speaking and using a stick.