

Activity 12: Sunscreen/skin product testing

Aims

- To increase students' understanding of the need to use sunscreens and how they work.
- To teach students how to 'read' labels and critically evaluate products such as fake tanning lotions.
- To help students become more discerning consumers of sun protection products.

Assessment outcomes English 4.3; H&PE 4.6; Science 4.7; S&E 4.11

Reference fact sheet Fact sheet 7: Sunscreens

Worksheet Worksheet 12: Product testing

Requirements

Bring in five different skin products, such as SPF 30+ broad spectrum, water resistant sunscreen, SPF 8 sunscreen, suntan oil, after sun moisturisers or fake tan.

Teacher guidelines

- Photocopy or discuss the information in Fact sheet 7: Sunscreens.
- Place each product on a different table around the room.
- Ask students to form groups.
- Photocopy Worksheet 12: Product testing, and distribute to each group.
- Ask group to 'test' each product and fill out the worksheet.

Extension activity

Make your own zinc cream

Note: this activity is best completed in a science laboratory as care should to be taken when heating paraffin and wax to high temperatures.

Materials

50 mL light liquid paraffin
10 g soft microwax
20 g zinc oxide
large beaker
thermometer
burner
tripod
heatproof mat
closed container (lid)

Method

- Melt the light liquid paraffin and soft microwax in the beaker. Do not heat above 80°C.
- Turn off the burner and, stirring vigorously, pour the zinc oxide into the mixture.
- Keep stirring until cool.
- Store in a closed container.
- Colouring could be added by using food dyes.

Worksheet 12: Product testing

Explanation of terms

Intended purpose	Is the product designed for a particular purpose or type of consumer? Explain.
Appearance	What does it look and feel like? What colour is it?
Consistency	Is it thick and creamy, a clear liquid or like milk? What is the base – oils, water or alcohol? How easily does it spread onto skin? Does it soak in or feel sticky?
Dispenser	Is it in a tube, bottle or stick? How does the sunscreen come out – flip-top, pump pack or squeeze tube? How easy is it to use?
Directions for use	Are they clear? Do they contain any other sun protection advice (eg wear a hat and protective clothing, avoid the summer sun between 10 am and 3 pm DST, or the importance of using shade)?
Fragrance	Describe the fragrance or smell.
Water-resistant	If so, for how long?
Use-by date	Is a 'Use by' date provided by the manufacturers?
Cost/volume	\$__./___ mls, = \$ __./100ml. Does there appear to be a better value product?

Testing the skin products

- 1 Smell or feel the product and read the label for directions and properties.
- 2 Discuss each product in your group and complete the table below according to your findings.
- 3 Continue until the group has tested all samples.

Name of product					
Intended purpose					
Appearance					
Consistency					
Type of dispenser					
Directions for use					
Fragrance					
What does it feel like?					
Use by date provided					
Is it water resistant?					
Does it protect from UV radiation?					
Cost/volume					

Worksheet 12: Product testing (cont.)

- 1 What are the common ingredients? Refer to Fact Sheet 7 to determine the functions of some of the ingredients.

- 2 Consider the directions given on the package. Is there enough information? Are the directions easy to understand?

- 3 Do you believe consumers should be given additional information, such as other sun protection methods e.g. to wear a hat?

- 4 Think of factors which would influence the effectiveness of sunscreens e.g. perspiration.

- 5 Which sunscreen do you personally believe to be ideal? Explain which features were important in your choice.

- 6 What other factors would effect consumer choice e.g. media, availability, peers, family, additives.

- 7 Write an article for a magazine like *Dolly* or *Fisherman's World* examining sunscreens. In your article, explain:

- the importance of using sunscreen
- when to use sunscreen
- type of sunscreen
- active ingredients
- directions for application
- discuss long term effects of using sunscreens properly
- the importance of using other sun protection methods.



Fact sheet 7: Sunscreens

What are sunscreens?

Sunscreens are products which protect the skin against the damaging effects of the sun's ultraviolet radiation (UVR).

They contain chemicals which either absorb or reflect the UV rays which would otherwise burn and damage the skin.

Ultraviolet radiation and skin damage

There are three types of UV radiation - UVA, UVB and UVC.

Naturally occurring UVC does not reach the earth's surface as it is absorbed or scattered in the atmosphere.

UVB is primarily responsible for sunburn, suntan and, after many years, premature ageing and skin cancer. UVB also depresses the immune response which is the body's system for fighting infection.

UVA causes skin damage contributing to premature ageing and skin cancer.

What protection do sunscreens give?

SPF 30+ sunscreens filter out about 97% of UVB rays. Sunscreens that are labelled BROAD SPECTRUM also filter out at least 90% of UVA.

Sunscreens are tested on human volunteers. Using a grid pattern, some patches of their skin are covered with sunscreen and some are left uncovered. They are then exposed to an artificial source of UVB in a laboratory. The Sun Protection Factor (SPF) is determined by comparing the time it takes for the patches of skin with sunscreen to show minimal redness with the time it takes to produce the same amount of skin redness without sunscreen.

The SPF on a sunscreen label should only be seen as a guide to the strength of the product. It should not be used to calculate the period of protection offered by the sunscreen.

As many things affect the time it takes for an individual to burn, it is impossible to calculate accurately a 'burn time'. Therefore the SPF rating on a sunscreen label should not be used to determine a 'safe time' before burning will occur.

Damage to the skin begins as soon as the skin is exposed to the sun. Sunburn is the extreme

level of this damage. It is a mistake to believe that damage only occurs if there is sunburn. The effects of the sun on the skin are cumulative so the damage is building up even without burning.

No sunscreen offers complete protection against UV radiation. Even if a sunscreen is reapplied regularly, a small amount of UV still reaches the skin. It is still possible for the skin to be sun damaged, even with sunscreen protection, if exposed to the sun repeatedly for prolonged periods.

What are the regulations regarding sunscreens?

Australia has had a standard for the testing and labelling of sunscreens since 1983 which has been revised regularly since then. Prior to March 1997 the maximum SPF allowed on a sunscreen label in Australia was 15+. Since then the maximum SPF that can be claimed for a sunscreen is 30+.

The current regulations for sunscreens are documented in the Australian/New Zealand Standard, AS/NZS 2604:1998 and apply to sunscreens produced and available in Australia. It specifies how sunscreens should be tested, the standard they must reach and how they should be labelled. The testing is done under strict laboratory conditions. The Australian Standard also refers to the water resistance of a sunscreen which relates to the product's ability to remain on the skin after immersion in water and still test at its SPF number.

'Protection times' shown on labels relate only to this water resistance. They do not relate to the degree of protection against sunburn offered by using the product, ie the SPF number.

In Australia sunscreens have to be listed on the Therapeutic Goods Administration's (TGA) Australian Register of Therapeutic Goods (ARTG). They can only be listed on this register if they comply with the Australian/New Zealand Standard.

What is the correct way to use sunscreens?

Sunscreens should be applied to clean, dry skin twenty minutes before being exposed to the sun. It is not necessary to rub sunscreen creams into the skin until they vanish. The cream will be absorbed into the skin over the twenty minutes prior to exposure to sunlight.

Fact sheet 7: Sunscreens (cont.)

The amount of sunscreen applied should be enough to easily cover the exposed skin, eg one teaspoonful of cream for one arm. If it is difficult to spread the sunscreen over the area it is likely that not enough has been applied.

Sunscreen should be reapplied about every two hours. The reason for this is not because sunscreens lose their effectiveness after two hours, but because they may have been inadvertently removed during normal activity such as nose-blowing, sweating or brushing up against something. It is not uncommon for areas of skin to be missed or inadequately covered during the first application of sunscreens. Reapplication will reduce the risk of inadequate protection.

How effective are roll-ons?

The testing of sunscreens as set out in the Australian Standard does not include testing the method of application. As it is difficult to judge how much sunscreen has been applied when using a roll-on, it is recommended that an ordinary sunscreen cream or lotion be used for the first application and roll-ons used for top-up reapplications.

What are the costs and benefits of using sunscreens?

It has been clearly shown that sunscreens reduce the risk of sunburn. As sunburn is a risk factor for all types of skin cancer, the recommendation to use sunscreens has been based on the assumption that preventing sunburn should reduce the risk of skin cancer.

Sunscreens should not be the only approach to preventing skin damage. They should be used in conjunction with clothing, hats and where possible, avoiding the direct sun in the middle of the day. Sunscreens are not a substitute for these other forms of protection.

Short-term side effects from sunscreens may include skin irritation, and less commonly, skin allergy, blackheads and acne formation and dryness or oiliness of the skin depending on the type of sunscreen used. The likelihood of these reactions occurring depends on the sensitivity of the skin and the number and concentration of the chemicals in the sunscreen.

Although most people focus their concerns on the active suncreening chemicals in a product, there

are other chemicals in the sunscreen base which can cause problems.

In general, the incidence of true allergy to the chemicals in sunscreens is low. The more common side effect is skin irritation.

The long-term side effects of regular sunscreen use are unknown. Sunscreens have not been available for long enough or used by a sufficient number of people for an extended length of time for there to be any guarantees against long-term side effects. However to date there is no evidence to suggest that long-term side effects are likely.

Para amino benzoic acid (PABA), a chemical rarely used in currently available sunscreens, was linked to a higher risk of skin allergy. There was also some concern, in the past, about its carcinogenic effect but this has never been supported in laboratory testing.

Oxybenzone, which is also called Benzophenone-3, is a chemical which absorbs UVA rays. It is sometimes included in sunscreens. It has been used for about thirty years and has never been shown to be toxic to humans or animals.

Current information indicates that there is much more to be gained from using a sunscreen in conjunction with other forms of protection, than avoiding its use and risking sunburn, premature ageing and skin cancer.

How do I choose a good sunscreen?

There are many different brands of broad spectrum sunscreen available. They can be bought as creams, milks, gels and clear lotions.

Different brands use various combinations and proportions of chemicals. For this reason, one brand may suit your skin better than another.

Creams are thicker and tend to be more expensive per gram than lotions. Lotions can be milky or clear. Clear lotions and gels have an alcohol base and are less sticky but more drying than creams and milks which usually contain moisturisers.

Some manufacturers incorporate substances like Titanium Dioxide and/or Zinc Oxide in their sunscreen. These provide a thin film of micro-fine particles which reflect the UV rays. These products may leave a white film or sheen on the skin.

Chain stores and supermarkets often sell their

Fact sheet 7: Sunscreens (cont.)

own brands which are usually cheaper than others. Sunscreens produced by cosmetic companies are generally the most expensive.

What about sunscreens labelled for babies and toddlers?

These sunscreens contain the same suncreening chemicals as 'adult' products. Generally the only difference is that they use a gentler base and do not contain perfumes.

There is no evidence to suggest that the use of sunscreen on small areas of a baby's skin is associated with any long-term side effects. For a small proportion of babies, like adults, some sunscreens can cause minor skin irritation. In such cases it is recommended to try a product which is specially formulated for sensitive skin.

Babies must be protected against sunburn; the damage that begins in childhood can lead to skin cancer later in life.

The best protection for your baby is to avoid direct sunlight especially in the middle of the day during summer. When outdoors, babies and toddlers should be protected by hats, clothing and shade as much as possible. Sunscreen should be applied to those areas that cannot be protected by clothing.

Do sunscreens deteriorate after time?

Sunscreens have a shelf life of between two and three years. Sunscreen products have been required to carry an expiry (use-by) date since 1 September 1994.

Sunscreens can deteriorate if they are exposed to heat and/or air for long periods. Store sunscreens in a cool dry place and ensure the cap is replaced tightly after use.

Key points about sunscreens

- No sunscreen offers complete protection against the sun. Hats, clothing and shade should also be used.
- A thick coating of zinc cream does block out the UV totally. It works by reflecting the rays. However as it is thick and completely coats the skin it is only appropriate for small areas such as noses, ears and lips.
- All brands of broad spectrum sunscreen with a SPF 30+ which comply with the Australian/New Zealand Standard AS/NZS 2604 provide effective protection when applied correctly.
- Using a SPF 30+ rather than a SPF 15 sunscreen halves your risk of sunburn for the same length of time in the sun. SPF 30+ however should not be used to increase the amount of time you spend in the sun.
- Sunscreens should be applied to clean, dry skin twenty minutes before exposure to the sun. They should be applied liberally - e.g. about one teaspoonful of cream for one arm.
- Babies under one year old should not be exposed to the direct sun. When taking babies outdoors avoid doing so between 10 am and 3 pm if possible. Natural protection, that is hats, clothing and shade, is best. However small amounts of sunscreen can be applied to areas that cannot be protected by clothing.

Skin cancer rates are higher in Australia than anywhere else in the world, with skin cancers

