teaching manual

the journey of oilseeds

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the journey of oilseeds

Foreword

This resource is designed for students aged 8-10 years, Essential Learning Standard 3 (Years 3 and 4) and has been designed to meet outcomes in the Tasmanian Essential Learnings.

The resource aims to encourage and promote healthy behaviours in young people and an appreciation of the environment. It includes a wide range of activities for teachers to choose from in developing their own programs. The resource can be used as a focus of activity for 1-2 weeks or as an ongoing project over a few months.

Since visits to food production facilities are usually inappropriate as school excursions, this resource provides information on the production of a healthy, natural food in the Australian diet.

Within this updated version, the term 'margarine' is now referred to as 'spread.' The reason for this change in terminology is due to the codex and labelling laws for food margarine. Any fat based product with a fat content level less than 80% cannot be called 'margarine'. As a result, the term 'spread' was developed and refers to any yellow fat products under 80% fat content, with the majority of the product originating from oilseeds.

Contents

This resource includes:

1. Big book
2. Teaching manual
- Teacher's notes and background information
- State based lessons/activity plans
- Student worksheets accompanying the lesson/activity plans which can be photocopied to make class sets.
3. Poster displaying sequence of production of spreads and Australian oilseed plants.
4. Packet of sunflower seeds for class activities.

All the above resources (minus the sunflower seeds) are available online at www.australianoilseeds.com

Please note: Sunflower seeds will need to be replenished after the first use of the kit. They can be purchased at local nurseries or garden centres. Allow 2-3 seeds per student to cover all the class activities in the resource.

For further information on The Journey of Oilseeds or for additional kits please contact:

Australian Oilseeds Federation
P.O. Box R1826 ROYAL EXCHANGE NSW 1225
Tel: +61 2 9427 6999
E-mail: aof@australianoilseeds.com
www.australianoilseeds.com

NATURAL OILSEEDS

NATURES FINEST

Acknowledgments

Thank you to Goodman Fielder, Peerless Foods and Unilever Australasia for their support throughout the development of this education kit and to Pacific Seeds for the donation of the sunflower seeds.

This resource has been produced with the cooperation of the Curriculum Directorate K-12 of the NSW Department of Education and Training.

Worksheet 11 Recipe supplied by Glenn Austin, Global Food Expert, www.xtremechef.com.au

contents

the journey of oilseeds

teacher's notes

Teacher's Notes

The vegetable oils used for the production of Australian spreads come from the seeds of a variety of plants. Some oils which are not available in Australia are imported.

Australia produces a range of natural oilseeds including canola, soybean, sunflower, safflower, cottonseed, sesame and peanut. Oilseeds have been an alternative crop for farmers for many years. The introduction of canola and the expansion of cotton has led to rapid growth in the oilseeds industry. The industry is a major contributor to the Australian economy through seed exports and value-added products. Oilseeds also play an important role in the sustainability of Australian farmers.

Where do vegetable oils come from?

Vegetable oils are obtained by pressing oil from plants and then removing the unwanted components. Sunflower, canola, cotton and safflower oils are obtained from seeds. Peanut oil is obtained from nuts, while olive oil comes from fruit and soybean oil comes from beans.

How are vegetable oils processed?

Processing seeds and oils makes it possible to obtain vegetable oils that are ready for use in the food manufacturing industry. Processing also ensures that the quality is retained throughout storage and transport to food manufacturers.

There are two stages in the processing of oils:

Stage 1 Extraction
Stage 2 Refining

The oil extraction processes involve crushing the seeds to produce crude vegetable oils. These crude oils are then transported to refineries, where they are purified to produce edible oils which can be bottled or used in spread manufacture.

main sources of vegetable oils

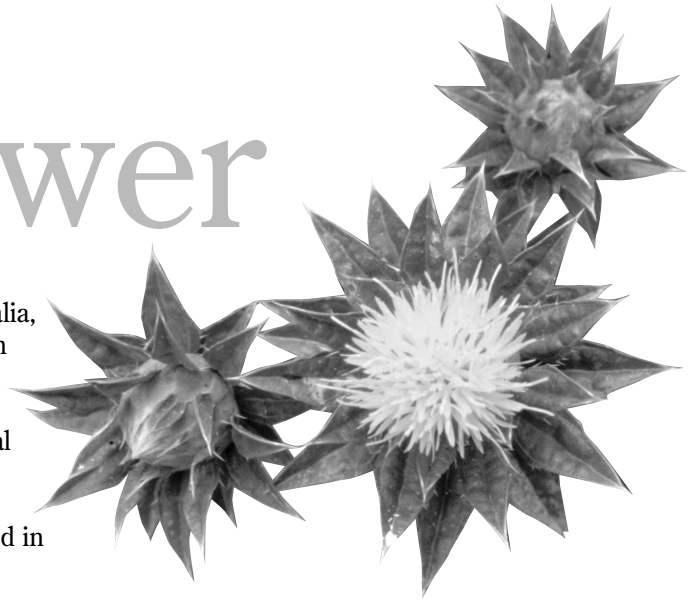
sunflower

A native of Central America, but today grown in Russia, China, South America, Europe, India and Australia. Sunflower seeds contain 40- 45% polyunsaturated vegetable oil and provide the major polyunsaturated oil used in spreads. The third major oilseed crop grown in Australia, sunflowers are a summer crop, grown in central and southern Queensland and northern NSW. As graceful perennials, sunflowers can grow to heights of over two metres. Sunflowers produce a light oil with a delicate flavour, ideal for use in salad dressings and in the production of spreads. A new variant of sunflower produces monounsaturated oil.

canola

Canola is an oil that has recently become popular because of its high level of monounsaturates and low level of saturated fat. Canola is grown mainly in cooler climates and is the largest oilseed crop grown in Australia. It is grown in winter in the wheat areas of central and southern NSW, Victoria, South Australia and Western Australia. It is harvested in November/December. Canola oil is used in spreads, cooking and salad oils.

safflower



Safflower was known to be cultivated by ancient civilisations along the Nile and into Ethiopia. In Australia, safflower is grown in areas of NSW, Victoria and South Australia. It is sown from June through October, then harvested between November and February. The safflower grows up to one metre high and in traditional types, its oil has the highest content of linoleic acid, a polyunsaturated fatty acid that is essential for proper nutrition. Safflower oil is used in salad oils, spreads and in high quality cooking oil. Today, high oleic or monounsaturated variants are also grown.

soybean

Teacher's Notes

Although soybeans were originally cultivated in Central and South-East Asia as a nutritious staple food and today are still widely grown in China, Japan, Manchuria and Korea, the US, Brazil and Argentina are the major producers. Australia also produces soybeans. They have a relatively low oil content (20%), but are high in protein, which is a valuable by-product of oil production. Soybean seeds vary in size and colour, ranging in yellow, green, brown or black. The seeds are enclosed in hairy pods; usually 2-3 seeds are found in each pod. Soybeans have a high content of polyunsaturated oil, which are used in spreads manufacture. Soybeans are also in a range of foods such as soy milk, tofu, bread and a range of Asian foods.

cottonseed

Cottonseed is essentially a by-product of cotton growing. It was only after several thousand years of growing cotton that oil value of the seed was realised. Cotton is grown in many countries around the world, including Russia, India, USA, and China. In Australia cottonseed is a major crop grown in NSW and Queensland. When mature, the plant produces round fluffy white seed capsules to which cotton fibres adhere. The fibres and seeds are mechanically separated and the oil extracted from the seed is used in the production of spreads and cooking oils.

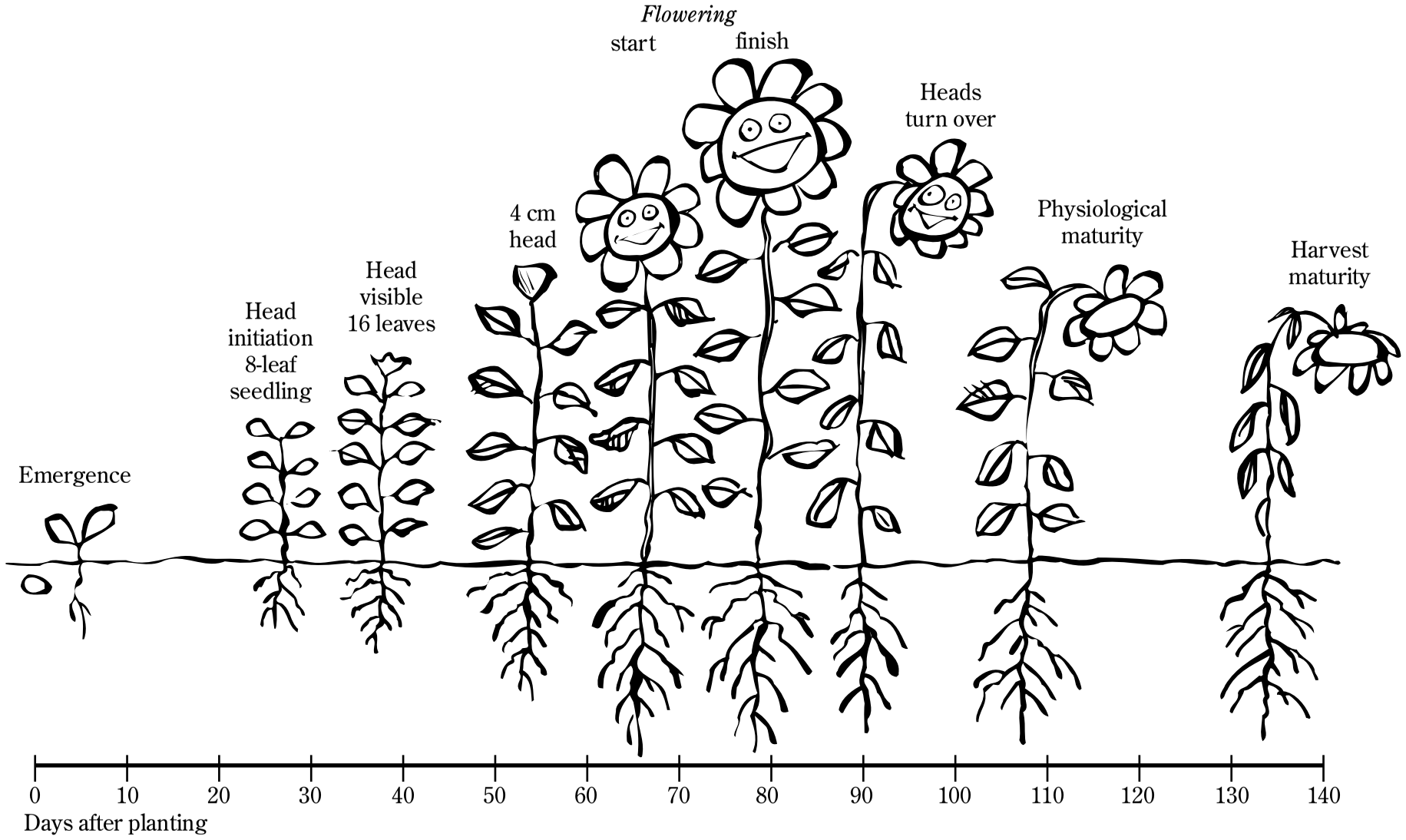
olive

Olives, for both oil and table, are grown predominantly in Spain, Italy, Greece and Tunisia. Australian production of olive oil is relatively small, but is growing because of demand locally and in Asian markets. The health benefits of olive oil and the interest in Mediterranean cuisine ensure that it is a popular choice for consumers across the world. Olive trees grow well in areas of Australia with cool, wet winters and warm, dry summers. Olives are harvested from the trees and then crushed to extract the oil, which is used in the manufacture of spreads as well as other products.

Olive branch photograph supplied by Damian Conlan.

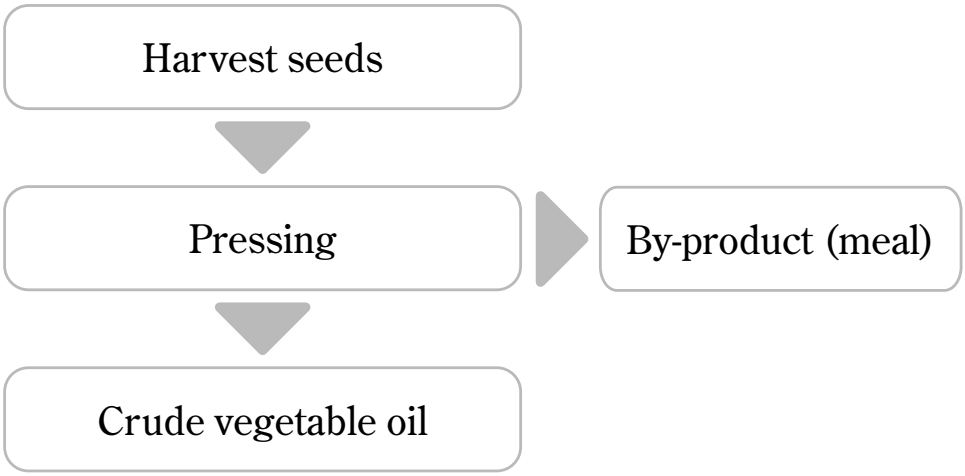
growth stages of sunflowers

Teacher's Notes



stage 1
oil extraction

Teacher's Notes



Harvest of seeds

When the oilseed crops are ready, large machines harvest the plants. The seeds are separated from the plants and the seeds are then transported to the crushing mill.

Pressing

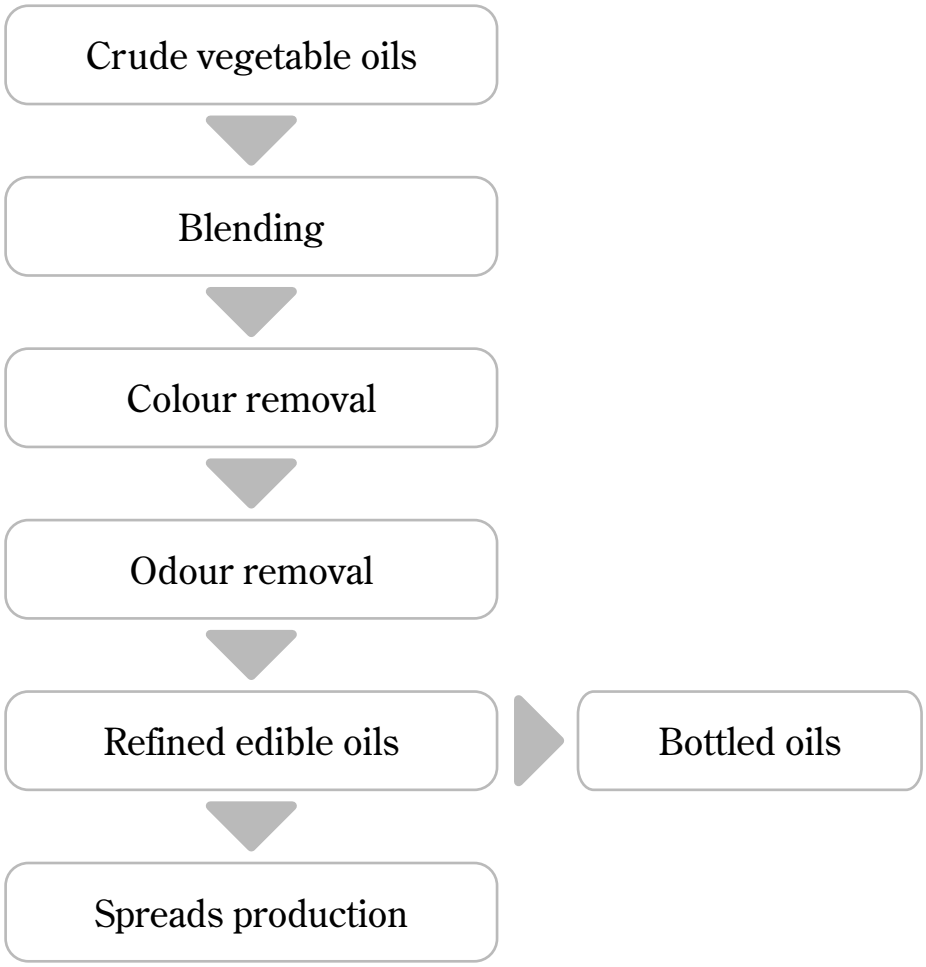
The seeds are pressed to extract oil from them. The small particles of crushed seeds (called cake or meal) are filtered out of the oil. This is used to mix in with animal feed, as it is a good source of protein.

Cold Pressed Oils

Some soft oil bearing fruits and seeds, like olives and sesame seeds, yield most of their oil without the use of further processing and are called cold-pressed oils. These tend to have strong flavours and colours compared with refined oils, which consumers wanting more neutral flavours and lighter colours prefer to use. Crude vegetable oil, such as sunflower, is a deep, golden-yellow colour.

stage 2
oil refining

Teacher's Notes



In the majority of cases the crude oils contain foreign matter, i.e. solid particles. Refining the oil removes unwanted impurities.

Blending

Different oils can also be blended with a small proportion of solid fat. The composition of the blend depends on the end use of the product e.g. a soft table spread will contain a large proportion of liquid vegetable oil, while a firmer pastry spread would require a higher proportion of hard oils e.g. from palm or coconut oil. Oils are also blended to contain various nutritional properties such as a low level of saturated fatty acids and a high level of polyunsaturates or monounsaturates.

Colour removal

Special clay-based earths that possess absorbent qualities are mixed with the oil to remove colouring substances such as chlorophyll. The colouring materials are absorbed by the activated clay and the oil is cooled and filtered to remove the spent earth. At the end of this process the oil is either colourless or a pale golden colour.

Refined edible oils

Following the colour removal step the oil still contains flavour and odour components which need to be removed to produce a neutral tasting oil. Jets of superheated steam are passed through the oil which has been heated under vacuum, so that the volatile odours boil off before the oil itself boils. The oil is cooled and transferred to storage tanks where it is then ready for use in various products. The oil produced is a sparkling golden colour, has a neutral taste and odour and can be packed in bottles as vegetable oil or used for the production of spreads.

stage 3 spread production

Teacher's Notes

Oil Phase

Vitamins
Colours
Refined oils
Flavours
Lecithin

Water Phase

Water
Salt
Whey
Skim milk powders

Mixing

Pasteurisation

Chilling

Packaging and
Cold storage

Water phase

The water phase in spread production consists of water plus ingredients that will dissolve in water, such as skim milk and other dairy ingredients to give flavour (e.g. whey powder from cheese manufacture), and salt (as brine). If a milk-free spread is required for dietary or religious reasons, water alone is used instead of skim milk. The salt content can be varied to produce reduced salt spreads.

Oil phase

The oil phase usually consists of the refined and deodorised oil blend, together with other ingredients including Vitamins A and D, synthetic and natural butter flavours, colours (e.g. beta-carotene) and small amounts of preservatives to ensure visual appeal, smooth texture and freshness. As oil and water do not normally mix, emulsifiers, such as soybean lecithin, are added to keep the mixture stable.

Emulsion

The oil and water phases are then blended together in large tanks, evenly distributing the ingredients.

Pasteurisation and chilling

The creamy emulsion is then pasteurised to kill microbes (germs). This is done by rapidly heating the mixture to 85°C and then rapidly cooling it.

Packaging/cold storage

The emulsion then flows through refrigerated tubes fitted with rotating blades which help produce a soft, smooth texture. The resultant mixture is packed into tubs (or other container, depending on the use of the product), date stamped, packed into cartons stacked on pallets and placed into cold storage at 5°C. The spreads are then delivered directly to the refrigerated warehouse of a supermarket chain and usually reaches the consumer within a few weeks of being produced. It is also exported.

Manufacturers utilise high quality control procedures, testing the oil blends and products throughout the process to ensure proper fat content, correct weight, flavour, colour and texture in the finished products. The attributes of a good spread product include pleasant flavour, spreadability, uniform colour and freshness.

the role of oils & fats in healthy eating

Teacher's Notes

Healthy eating

Healthy eating is all about eating a variety of foods everyday. In Australia we have a wide range of foods available all year round. With influences from many different cultures, our supermarkets, greengrocers, butchers and restaurants provide us with an ever increasing array of delicious and high quality foods.

Despite this abundance, health authorities advise that many health problems common in Australia are the result of poor eating habits. The risk of heart disease, overweight and high blood pressure can be greatly reduced by making healthier food choices.

Good nutrition means getting the right balance: eating more of some foods and less of others. For example, if we eat plenty of fruit, vegetables, breads and cereal foods, our diet will be rich in carbohydrates and fibre. Only moderate amounts of lean meats, chicken, fish, and eggs are needed to supply enough good quality protein. Small amounts of oils and spreads provide essential fats and complete a nutritionally well-balanced diet.

The Australian Government Department of Health and Aging recommends the following healthy eating guidelines:

Enjoy a wide variety of nutritious foods

- Eat plenty of vegetables, legumes and fruits
- Eat plenty of cereals (including breads, rice, pasta and noodles), preferably wholegrain
- Include lean meat, fish, poultry and / or alternatives
- Include milk, yogurts, cheeses and / or alternatives. Reduced-fat varieties should be chosen, where possible
- Drink plenty of water

and take care to:

- Limit saturated fat and moderate total fat intake
- Choose foods low in salt
- Consume only moderate amounts of sugars and foods containing added sugars

Fats and oils

Just about everything we eat contains fats and oils. Fats are solid at room temperature, whereas oils are liquid at room temperature. Meats, dairy products, nuts, avocados, bread and even oats, all contain some fat. In the past, some animal fats, such as lard, dripping and butter, were popular for cooking and spreading. Over the last 35 years vegetable oils and spreads have increasingly filled this role. Vegetable oils come from seeds (for example, sunflower and canola seeds), some fruits (such as olives) and from nuts (peanuts, walnuts) and are used as cooking/salad oils and to make spreads.

Fats and oils are used as a cooking medium in stir-fries, deep frying and sauteing. They can also be added as an ingredient in the home and by food manufacturers.

The Nutrient Reference Values for Australia and New Zealand recommend that a healthy diet can contain between 25 and 35% of energy (kilojoules) as fat. Australians are estimated to eat a little over 30% of their daily kilojoules as fat.

The essential role of fats

Fat is a major source of energy. It contains 37 kilojoules (9 calories) per gram, more than any other nutrient. The need for fat is relatively high during infancy and childhood, when increased energy is required for growth and development. Moderate fat intakes are recommended for adults, especially for those who need to limit their energy intake to control or maintain body weight.

Some polyunsaturated fats like the omega-3 and omega-6 fatty acids, are essential in our diet as they cannot be made by the body, yet crucial for good health and vitality. Vegetable oils and spreads are major sources of these essential fatty acids.

Fats and oils are important sources of the vitamins A, D and E and help in their absorption into the body. These “fat soluble” vitamins play many important roles. Vitamin A is needed for clear vision, particularly at night. Vitamin D helps to build strong bones. Vitamin E is a natural antioxidant which may play a role in the prevention of disease. Table spreads are fortified with vitamin A and D and vegetable oils are excellent sources of vitamin E.

As well as fuelling and nourishing the body, the fat in foods contributes to our enjoyment of eating by adding flavour and texture.

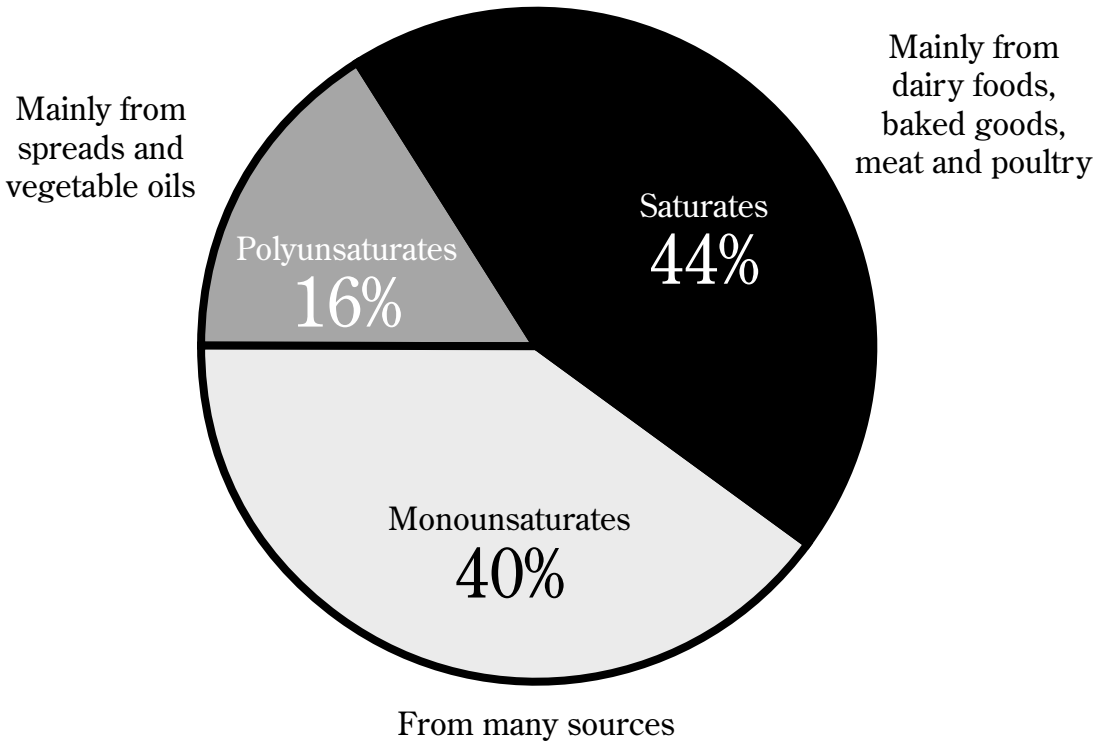
Different types of fats

Fats and oils are made up of basic building blocks called fatty acids. The main families of fatty acids are saturates, monounsaturates and polyunsaturates. All fats contain some of each type but usually one will dominate. For example, olive and canola oils are high in monounsaturates; butterfat is high is saturates and sunflower and soybean are high in polyunsaturates. The different types of fatty acids affect our health in different ways.

Polyunsaturates and monounsaturates are often referred to as “good” fats. When eaten in moderation they fulfil the essential role that fats play in nutrition. About half the fat Australians eat is “good” fat.

Diets high in saturated fats tend to increase the risk of heart disease. Saturates increase the level of cholesterol in the blood and may adversely affect blood clotting and the heart’s rhythm. These “bad” fats make up a little less than half of the fat we eat, which is well above the recommended amount. Most of the saturated fat comes from dairy foods, meats, baked products and some fried foods. Replacing foods high in the “bad” fats with foods containing “good” fats may help reduce the risk of heart disease.

Fats in the Australian diet



Omega-3 and Omega-6 fats

Omega-3 and Omega-6 fats are different types of polyunsaturated fats and are essential to health. Omega-6 fats are found in abundance in sunflower, safflower and soybean oils. Omega-6 polyunsaturated fats tend to lower blood cholesterol. There are two types of Omega-3 fats. One is plant Omega-3 found in canola and soybean oils and some nuts. The other is marine Omega-3 found in fish and seafood. Australians tend to eat less than ideal amounts of Omega-3 fats. The marine Omega-3 fats help to control blood clotting and help regulate the heart's rhythym. Nutritionists and dietitians recommend that Australians should eat more Omega-3 fats.

Preventing heart disease

The National Heart Foundation says for good heart health, enjoy healthy eating, be active every day, be smoke free and achieve and maintain a healthy body weight. It is also important to enjoy a wide variety of foods. Mainly plant based foods - vegetables, fruit and legumes (dried peas, dried beans and lentils) and grain based foods (preferably wholegrain) such as bread, pasta, noodles and rice. Moderate amounts of lean meats, skinless poultry, fish and reduced fat dairy products, and moderate amounts of polyunsaturated or monounsaturated oils and fats.

The Heart Foundation recommends we Enjoy Healthy Eating in the following ways:

- Use margarine spreads instead of butter or dairy blends.
- Use a variety of oils for cooking – some suitable choices include canola, sunflower, soybean, olive and peanut oils.
- Use salad dressings and mayonnaise made from oils such as canola, sunflower, soybean and olive oils.
- Choose low or reduced fat milk and yoghurt or ‘added calcium’ soy beverages. Try to limit cheese and ice-cream to twice a week.
- Have fish (any type of fresh or canned) at least twice a week.
- Select lean meat (meat trimmed of fat and chicken without skin). Try to limit fatty meats, including sausages and delicatessen meats such as salami.
- Snack on plain, unsalted nuts and fresh fruit.
- Incorporate dried peas (e.g split peas), dried beans (e.g haricot beans, kidney beans), canned beans (eg. baked beans, three bean mix) or lentils into two meals a week.
- Make vegetables, and grained based foods such as bread, pasta and noodles and rice the main part of each meal.
- Try to limit take-away foods to once a week. Take-away foods include pastries, pies, pizza, hamburgers and creamy pasta dishes.
- Try to limit snack foods such as potato crisps and corn crisps to once a week.
- Try to limit cakes, pastries and chocolate or creamy biscuits to once a week.
- Try to limit cholesterol-rich foods such as egg yolks and offal. Eg. liver, kidney and brains.

Contact Heartline, the Heart Foundation's national telephone information service, to speak to a trained health professional on heart health issues including healthy eating. Heartline can also provide information on the Heart Foundation's cookbooks. Call 1300 36 27 87 (local call cost) or email heartline@heartfoundation.com.au.

the journey of oilseeds

lesson activity plans

lesson/activity plan 1

grow sunflower plants

HSIE Student Activities 1

Task: To record the growth of an oilseed plant

Materials required:

- Chart paper and pens
- Big book, The Journey of Oilseeds
- Student worksheet 1
- List of materials on student worksheet 1.

Teaching and learning activities

Brainstorm:

(a) What I know about spreads.
(b) What we would like to know about spreads.
Record this information on charts and place them on the wall for the duration of the unit. The second chart will be used at the conclusion of the unit.

Read the big book to the class.

Possible discussion points:
Where do spreads come from?
Describe how a farmer grows the plants that produce oilseeds.
Sequence the steps in the production of spreads.
Discuss how spreads are different to butter.
Retell the story of the big book orally.

Ask the question: "What is a seed?"

Suggested prompts:
Why do we have seeds?
What do seeds grow into?
What is inside a seed?
Where do we get seeds?

Display OHT of student worksheet 1 and demonstrate steps involved in preparing the seeds for growth.
Distribute student worksheet 1 and materials required to students.
Instruct students in each step of the activity.
Several methods (or combinations of methods) could be used to record student observations.
(a) Illustrate at time intervals (see Teacher's notes for stages of sunflower growth on page 12).
(b) Measurement
(c) Diary of a seed
(d) Timeline

Students consult reference sources to assist with naming of plant parts.

Evaluate individual results, paying particular attention to various growth rates.
Display student results using digital images or photographs and illustrations.
Discuss growth variations and the effects of the weather on farmers growing oil-producing plants.
Review the map of Australia on page 5 of the big book and discuss the places in Australia where canola is grown. Consider the locations in regard to temperature and rainfall.

Evidence of Achievement

World futures
Investigates the natural and constructed world
Understands how to pose questions, actively investigates them, and evaluates findings against the explanations and observations of others.

- *constructs a record of growth of a plant from a seed*
- *compares growth rates of seeds and develops an hypothesis on the variations*
- *examines a natural system that is used to contribute to a manufacturing process*
- *discusses the effects of climate and conditions on the production of oil producing plants.*

Understanding systems
Understands causal relationships in systems, including some of their effects on Tasmanian people and their environment.

- *identifies conditions that could affect the availability of spreads to the community and suggests ways in which the conditions could be controlled*
- *discusses the importance of the role of the farmer in the production of oilseeds.*

Additional reference: *Plants in action, stage 2, Life and Living, Primary connections, DEST.*

lesson/activity plan 2

origins of natural oil

HSIE Student Activities 2

Task: To identify the origins of natural oil

Materials required:

- Sunflower seeds
- Paper towel, rolling pin
- Art paper, pencils, felt pens for student use
- Student copies of world map
- Resources for research on origin of plants.

Teaching and learning activities

Discuss extraction

Ask if any student knows the meaning of the term "extraction" or "extract" (to take out, especially by force, pressure). Suggest fruit juice is extracted from fruit; cream is extracted from milk.

Distribute sunflower seeds to students. Ask students to describe the seed. Sketch the seed. Teacher demonstrates the removal of the husk from the seed.
Students carefully remove the husk from the sunflower seed and sketch the seed again.

Discuss the seed

Suggested prompts:
What is the outside of the seed called?
What is on the inside of the seed?
Do we know what type of seed this is?
If we squash the seed, what will come out of it?

Collect the kernel(s) and place between two pieces of paper towel and roll firmly with a rolling pin (firm finger pressure will also work but is less effective).

Discuss what happens. Point out that this is natural oil and it has been "extracted".
Review the different types of oilseeds that are grown in Australia on pages 2 and 3 of the big book. List oilseed plants. Refer to pages 10 to 11 for background information on the different oilseed plants.

With teacher's notes and resources, students use a map of the world, identifying the origins of oilseed producing plants. Use a colour key for ease of identification (e.g. red - sunflower, blue - canola).

Discuss the findings of the class.

Evidence of Achievement

World futures
Investigates the natural and constructed world
Understands how to pose questions, actively investigates them, and evaluates findings against the explanations and observations of others.

- *describes ways in which people obtain oils to assist in the manufacture of spreads*
- *identifies the reasons why a farmer produces certain crops to assist in the manufacture of spreads.*

Understanding systems
Understands causal relationships in systems, including some of their effects on Tasmanian people and their environment.

- *describes the position of countries of the world and the relationship to crop growth*
- *describes some similarities and differences between communities in Australia and other places in the world*
- *identifies the origins of oil producing plants and explains the significance of these countries.*

lesson/activity plan 3

steps in the production of spreads

Task: To sequence the steps in the production of spreads

Materials required:

- Big book, The Journey of Oilseeds
- Chart paper and pens
- Student worksheet 2
- Spreads production poster
- Scissors, paper, paste for student use.

Teaching and learning activities

Reintroduce and read the big book to the class.

Focus on the section related to spreads production (pages 14 -17)
Reference the teacher's notes on pages 13 to 17 for background information.
Possible discussion points:
Recount the story in your own words.
List oil products that are used at home.
Offer suggestions to what pasteurisation might be and why it is important.
Orally sequence the steps in spreads production.

Divide class into small groups of 4 or 5.

Distribute student worksheet 2.
Students cut out pictures from worksheet.
Groups discuss the sequence of the steps and place in order.

Revisit relevant pages from the big book.
Groups check and alter sequence, if required.

Display and discuss the spreads production poster.
Students compare sequence with poster.

Paste pictures into correct sequence, label pictures and place arrows between the pictures to indicate flow of materials and processes.

Display.

Students write a statement about spreads production and display with the procedure.

Evidence of Achievement

World futures
Investigates the natural and constructed world
Understands how to pose questions, actively investigates them, and evaluates findings against the explanations and observations of others.

Understanding systems
Understands causal relationships in systems, including some of their effects on Tasmanian people and their environment.

- *identifies the components of a system that provides goods and services and how the components interlink*
- *examines the goods and services provided within the community to meet our needs*
- *identifies ways people cooperate and depend on one another for goods and services*
- *sequences the production of spreads from the farm to the table*
- *recounts the steps involved in the production of spreads*
- *demonstrates an understanding of the complex processes of the production of spreads*
- *recognises the importance of pasteurisation in the manufacture of spreads.*

lesson/activity plan 4

make spreads

Task: To make spreads

Materials required:

- Various examples of recipes
- Ingredients listed in recipe
- Student worksheets 3 and 4
- Refrigerator, electric mixmaster and a microwave oven.

Teaching and learning activities

Display a variety of recipes.

Students view recipes and as a class discuss the format of a recipe.

In groups, students will be given the procedure and the materials.

Demonstrate each step for students.

Discuss, as each new step is performed, its relationship to the flow charts studied on student worksheet 4. (See teacher's notes on pages 13 to 17 for background information).

Perform more difficult segments of activity (e.g. use electric beater, heat copha).

Students are to be given the opportunity to taste their spreads by spreading it on a cracker biscuit.

Invite comments from students and take digital photographs to record the steps in the activity.

Procedures, photographs and student comments written on coloured cards could be displayed in the classroom.

Evidence of Achievement

World futures
Understanding systems
Understands causal relationships in systems, including some of their effects on Tasmanian people and their environment.

Designing and evaluating technological solutions
Understands how to plan and carry out the steps of production processes, making safe and efficient use of resources. Explores the contribution of technology to cultures.

- *identifies the components of a system that provides goods and services and how the components need to interlink*
- *describes ways in which people cooperate with and depend on one another in their work*
- *describes how changes in technology provide people with their needs and wants*
- *compares and contrasts the steps in the recipe with the steps in the process of manufacturing spreads.*

lesson/activity plan 5

HSIE Student Activities 5

consumer survey

Task: To conduct a consumer survey and publish the results

Materials required:

- Survey sheet
- Computer.

Teaching and learning activities

Discuss with students the purpose of a survey.

Suggested prompts:
How can we find out the number of people who use spreads?
Why would we like to know?
Imagine that you are a canola or sunflower seed grower.
Would it be important to find out who uses spreads?
Why/why not?
Is it important to know how old the people are that you asked?
What about advertising the products?
What suggestions do you have as to the questions we should ask?
Who should be asked?
How will we set out our survey?
Should we all have the same survey? Why is this important?

Have students conduct a survey of their peers, family or friends to determine the use of spreads.
For example:
What do you mostly spread on your bread or biscuits?

Spread	Tally	Total
spreads		
butter		
oil		
other		

Convert the survey results

As a class or group convert the survey results to a table or spreadsheet.

Discuss the results

Is there a pattern or trend? What predictions can be made? What conclusions might be drawn from the data? Might the results be different if the survey was conducted in a different community? How? Why?

Evidence of Achievement

Communicating
Being information literate
Understands why information is useful and valuable and why it should be used responsibly. Locates, organises and synthesises information and uses technology tools to create a product which effectively communicates their understanding.

Being Numerate
Understands how to explore, refine and communicate more effective ways of thinking and acting mathematically in familiar situations.

- *examines the goods and services provided within the community and by community organisations to meet needs*
- *describes how changes in technology have affected lifestyles and the environment.*

- *identifies people's needs and attempts to predict the reasons for the changing needs of the community*
- *gathers information and explains the various lifestyles and experiences that different groups have within communities in Australia*
- *defines the reasons why some people have differing needs to others because of different belief systems.*

lesson/activity plan 6

health & nutrition

HSIE Student Activities 6

Task: To identify spreads as a natural and healthy choice

Materials required:

- Chart paper and pens
- Student worksheets 5, 6 and 7.

Teaching and learning activities

Refer to background information on pages 18 to 21.

Class brainstorms the topic:

Spreads are a natural, healthy choice.
Record responses on chart paper.

Display OHT of student worksheet 5.

Suggested discussion points:
What does "well-balanced" mean?
Can you suggest some symbols that could be used to show "well-balanced"?
What is a healthy, well-balanced diet?
How do spreads contribute to our enjoyment of food?

Distribute student worksheet 6.

Display OHT of student worksheet 6.
Suggested discussion points:
Do we need fat in our diet? Why?
Why do children need more fat than adults?
Explain why some fats are essential.
What foods give us essential fats?

Introduce the words "saturates", "polyunsaturates" and "monounsaturates".

Encourage research of the meanings and report back to class.
Students discuss meanings.
Display OHT of student worksheet 7.
Discuss.

Invite students to complete one of the following activities listed below:

- Create a natural and healthy food recipe that includes spreads. Explain the reason why the ingredients were chosen (e.g. natural).
- Design an advertisement that explains why spreads are a healthy choice.
- Draw, in a paper plate, healthy food choices for lunch. Spreads must be included as a choice.
- Develop a character who explains why spreads are a natural, healthy choice.

Display.

Evidence of Achievement

World futures
Understanding systems
Understands causal relationships in systems, including some of their effects on Tasmanian people and their environment.

Personal futures
Maintaining wellbeing
Understands some of the positive and negative consequences of personal choices on the wellbeing of self and others.

- *gives reasons why people choose certain lifestyles over others*
- *identifies choices to be made for a healthy lifestyle*
- *gives practical and creative suggestions to show how spreads are a healthy choice for everyone*
- *explains the different types of fats available and why they are important*
- *discusses trends in lifestyles and healthy eating and the effects these have on the environment*
- *designs artwork to indicate understanding of healthy, natural food choices*
- *demonstrates understanding of a healthy diet by participating in classroom discussions.*

lesson/activity plan 7

community planning

HSIE Student Activities 7

Task: To plan a community to demonstrate responsible interaction with the environment

Materials required:

- Chart paper and pens
- Student worksheets 8 and 9.

Teaching and learning activities

Explain to the class that farmers are contracted to produce oilseeds for use in the production of spreads.

A new site, called "Sunnyville", has been discovered.
It is perfect for the farming of canola and sunflowers.
Farmers are willing to grow the plants but there are no community services for them in this area.

Brainstorm the issues of setting up the area.

Some suggested prompts :
What services would be required in a community (e.g. hospital, schools, and police)?
What impact on the environment would this activity have (land clearing, garbage removal)?
Would the garbage dump be placed next to the creek?
What power sources would be required?

Encourage students to develop additional questions.

Distribute Student worksheet 8 to students.
Explain the use of a key in a map.
Students select services required and locate on their map from their planning. Complete the key for their map.
In groups, students present their maps of "Sunnyville".

Students identify possible environmental issues for "Sunnyville". Undertake a whole class discussion on environmental issues and some possible solutions.
Students suggest ways of resolving some environmental issues. Record student suggestions and display responses.

Distribute student worksheet 9 (environmental issues).
Students complete worksheet.

Display student worksheets.

Evidence of Achievement

World futures
Understanding systems
Understands causal relationships in systems, including some of their effects on Tasmanian people and their environment.

- *identifies the components of a system that provides goods and services and how the components need to interlink*
- *examines a variety of systems that have been designed to meet needs in communities and identifies the advantages and disadvantages of their use, e.g. sewerage treatment works, postal system, electricity system*
- *identifies the goods and services provided within the community to meet needs, e.g. farm*
- *describes ways in which people cooperate with and depend on one another in their work*
- *describes ways in which people obtain goods and services in the local community.*

- *names natural and built features in the community and evaluates their significance*
- *gives reasons why particular activities may be associated with particular natural, built and heritage features and places, e.g. states why the railway station is where it is*
- *compares ways in which members of the community use features of the community to meet their needs*
- *uses geographical terminology to describe natural and built features in the community*
- *demonstrates an aesthetic awareness of environments, both natural and built.*

lesson/activity plan 8

evaluation

Task: To review the learning activities and conclude the unit on spreads

Materials required:

- Retrieval charts from Activity 1
- Pens
- Student worksheet 10 and 11
- Big book, The Journey of Oilseeds.

Teaching and learning activities

Refer to chart *What we know about spreads* from activity 1.

Students discuss the items listed in the section "What we would like to know".
Suggested discussion points:
What did we already know?
What did we learn from this list?
What did we learn that was not on the list?

Revise posters and briefly summarise the activities completed by the class. Student contributions to summary are invited.

Students complete student activity sheet 10.

Comment on individual activity sheets.

Evaluations placed in student folders or displayed.

Students may wish to use the evaluations and complete a survey of the favourite activities of the class.

Review the Grilled Australian Tomato and Mushroom Recipe included in the big book. Make this recipe at school if possible or copy Worksheet 11 and send home for students to make with adult supervision.

Evidence of Achievement

World futures
Understanding systems
Understands causal relationships in systems, including some of their effects on Tasmanian people and their environment.

- *demonstrates an understanding of the complex processes in the production of spreads*
- *describes how changes in technology have influenced lifestyle choices*
- *examines the goods and services provided within the community to meet our needs*
- *examines a natural system that is used to contribute to a manufacturing process.*

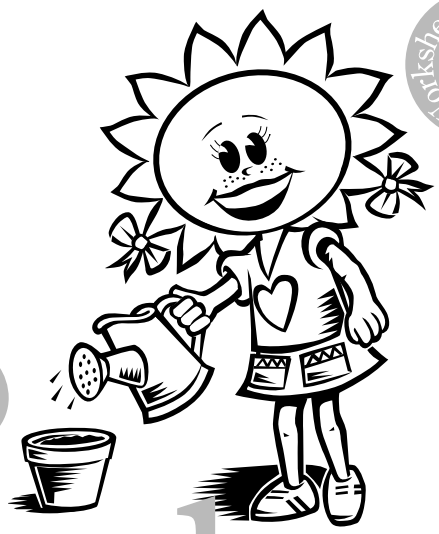
- *discusses changes in lifestyle and use of the environment brought about by the development of spreads.*

- *identifies the origin of oil producing plants and explains the significance of these countries and the contribution to Australian lifestyles*
- *describes the position of countries of the world and the relationship to crop growth and traditional farming methods.*

the journey of oilseeds

student worksheets

student worksheet 1



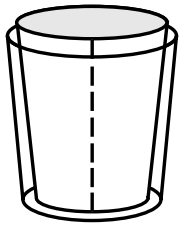
HSIE Student Worksheet 1

how to grow an oilseed plant

You will need:

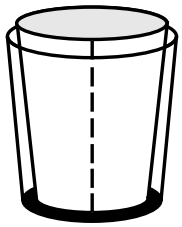
- plastic cup
- oilseeds
- paper towel
- cotton wool
- felt-tip pen
- water

Method:



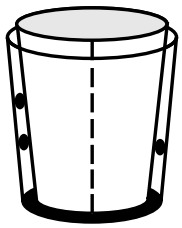
Step 1: Place name on cup.

Step 2: Make a cylinder with the paper towel and place it in the cup. Cut to correct size.



Step 3: Place cotton wool in the bottom of the cup.

Step 4: Wedge 2-3 oilseeds between the inside of the cup and the paper towel.



Step 5: Add 1-2cm of water.

Step 6: Place in a warm spot.

Results:

student worksheet 2

spreads

production process

HSIE Student Worksheet 2

These Australian plants produce seeds called oilseeds.

The oilseeds are harvested.

Trucks deliver the seeds to a crushing mill.

The oils are refined, cleaned and mixed.

Once chilled, the spread goes into the tubs

and packed into cartons.

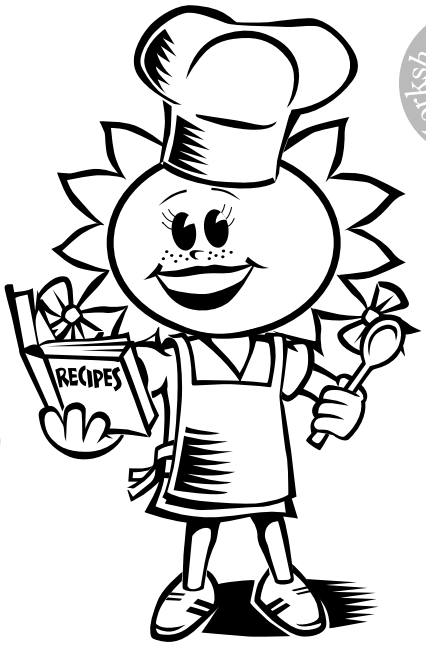
Trucks then deliver the spreads to the supermarket

to be enjoyed by you!

student worksheet 3

HSIE Student Worksheet 3

how to make spreads



You will need:

- 300 ml sunflower or canola oil
- yellow food colouring
- vanilla essence
- 100 ml skim milk
- 100 g Copha
- crushed ice
- 1 egg
- 1 teaspoon salt
- cracker biscuits

Directions:

Step 1: Mix sunflower oil or canola oil with melted copha.
Chill for 10 minutes.

Step 2: Place chilled mixture inside a bowl of crushed ice.

Step 3: Beat with electric mixmaster.

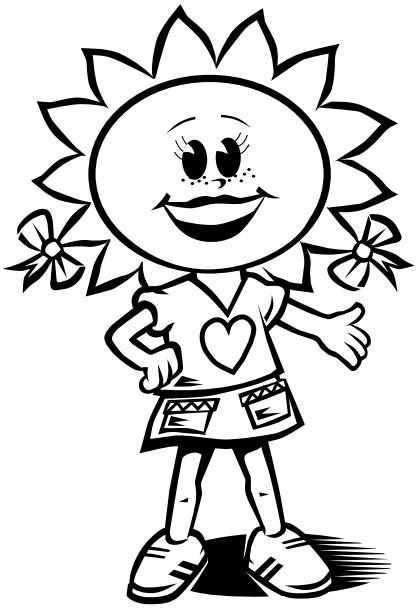
Step 4: Gradually add skim milk and continue beating until smooth and thick.

Step 5: Stir in salt, egg, three drops of vanilla essence and three drops of yellow food colouring.
Return to fridge for 10 minutes.

Step 6: Spread on cracker biscuits and enjoy!!

Please note: More readily available ingredients are used in the actual production of spreads.

student worksheet 4



spreads production

Oil Phase

Vitamins
Colours
Refined oils
Flavours
Lecithin

Water Phase

Water
Salt
Whey
Skim milk powders

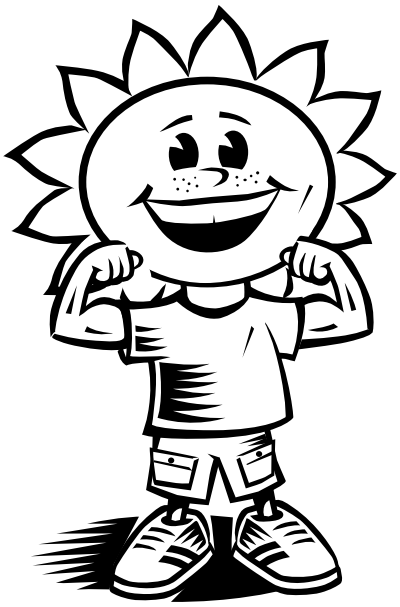
Mixing

Pasteurisation

Chilling

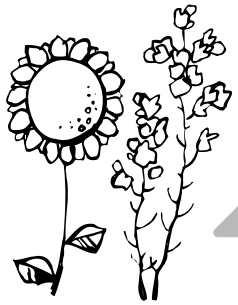
Packaging and
Cold storage

student worksheet 5

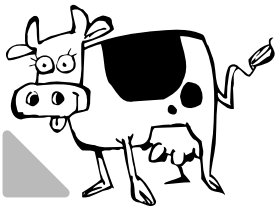


spreads
the healthy choice

Vitamins A & D
(less than 0.5%)



Oil from an Australian oilseed plant (81%)



Milk and water (16%)

Salt (1%-2%)

Natural beta-carotene for colour
(less than 0.5%)

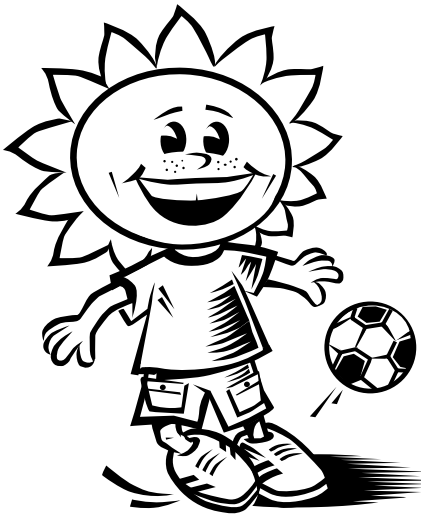
Soybean/lecithin
(less than 0.5%)

A healthy, well balanced diet means eating a wide variety of foods. We should eat plenty of breads, cereals, fruits and vegetables, moderate amounts of lean meat, chicken, fish and eggs and smaller amounts of fat, particularly saturated fat.

Spreads provide us with the essential fats as well as vitamins to complete a well-balanced diet. Most importantly, spreads also contribute to our enjoyment of food by adding great flavour and texture.

student worksheet 6

HSIE Student Worksheet 6

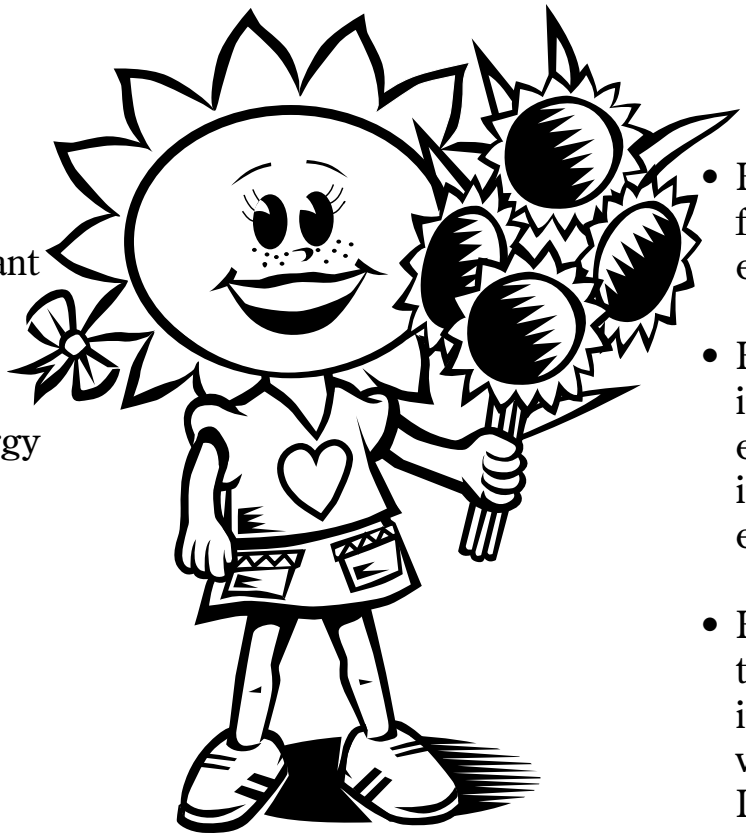


why do we need fat?

Our body needs energy to grow, function and play. Energy is stored in food in the form of proteins, carbohydrates and fats. Fat is a major source of energy. Increased energy is required for children for growth.

Some fats are essential as they cannot be made by the body, but every cell of the body needs them. Spreads made from oilseeds are a major source of this essential nutrient, as well as providing vitamins A, D, E and K.

- Fat protects inner organs
- Fat is important for insulation of the body
- Fat is an energy depot in the body

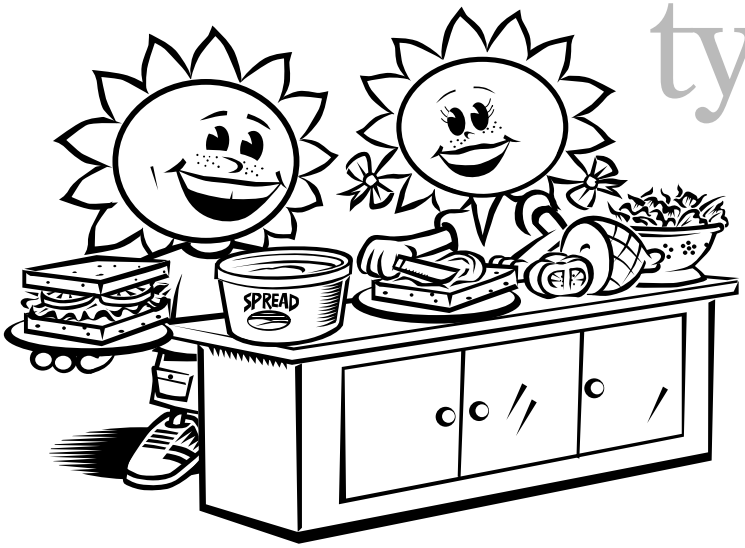


- Fat is needed for the body's energy supply
- Fat is needed in order to ensure our intake of essential fat.
- Fat is needed to ensure our intake of the vitamins A, D, E and K.

student worksheet 7

HSIE Student Worksheet 7

different types of fats



Polyunsaturated or monounsaturated

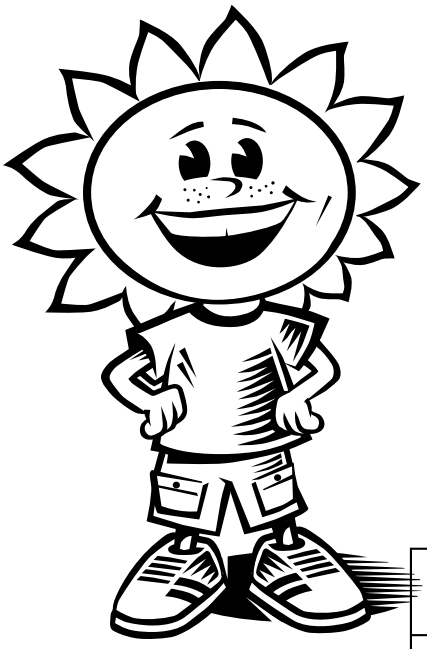
- Often referred to as “good fats”.
- They are mainly from vegetable or plants, such as oilseeds.

Saturated fat

- Often referred to as “bad fats”.
- May contribute to an increase in the level of cholesterol and the risk of heart disease.
- They are mainly from animal products and some commercial cakes, pastries and fast foods.

We should have more “good” fats and less “bad” fats.

student worksheet 8



sunnyville

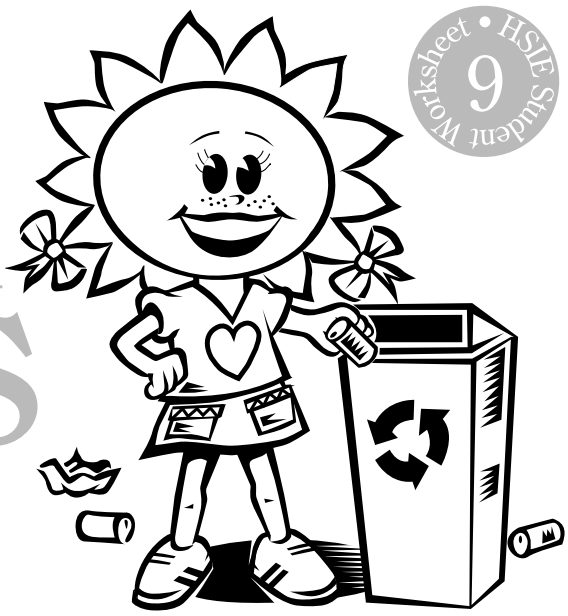
Canola Highway

Sunflower Creek

Map Key

Police Station	School	Hospital

student worksheet 9



HSIE Student Worksheet 9

• environmental issues

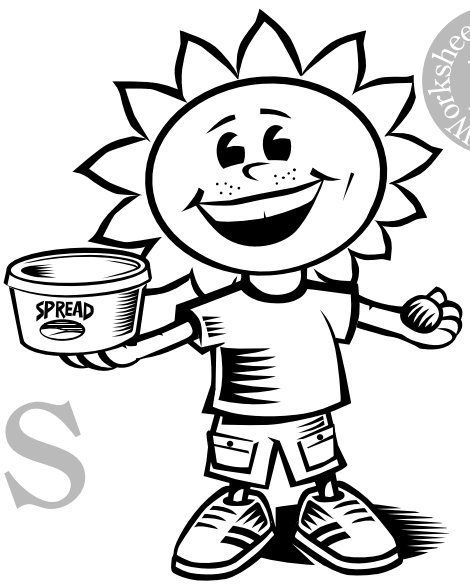
Problem: Land Clearing
Solutions:

Problem: Waste disposal
Solutions:

Problem: Power sources
Solutions:

Problem: _____
Solutions:

student worksheet 10



HSIE Student Worksheet 10

the journey of oilseeds

Name: _____

What I wanted to know:

What I learnt:

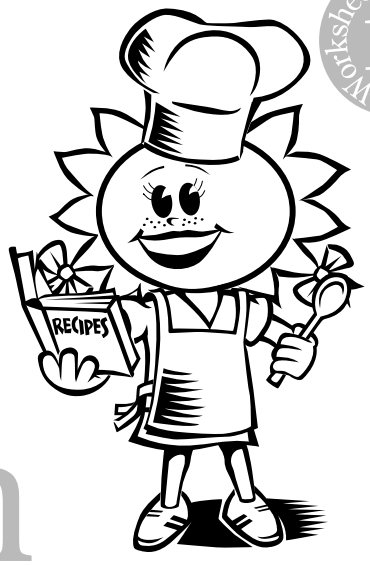
The most interesting activity was

because

I would like to know more about

Teacher's comment:

student worksheet 11



Impress Mum and Dad with this great after-school or weekend snack you can make by yourself! (Just be sure to ask Mum or Dad for help with the hot grill!)

grilled australian tomato and mushrooms

Serves 1

Ingredients:

4 Mushrooms
1 Tomato (or 5 cherry tomatoes)
40 grams Australian Spread (2 tablespoons)
1 Tsp minced Garlic
2 Tsp Chopped Chives
1 Tsp Chopped Coriander
1/4 Tsp Ground black Pepper
1/2 Tsp Sea Salt
1 Tsp Sugar

Method:

Step 1: Mix Garlic, Chives, Coriander, Salt and Pepper with your Australian Spread and evenly spread it over the mushrooms.

Step 2: Cut the Tomato in half and sprinkle it with sugar.

Step 3: Place underneath the griller for three to four minutes, then serve.

For a breakfast-in-bed treat for Mum and Dad, serve them with poached eggs on toast with Australian spread.

Or you can eat them on their own - they are just as yummy by themselves!

additional teachers notes for big book

the journey of oilseeds

Pages 2 and 3:

Additional information on the different types of oilseeds is available on pages 10 to 11 of the teacher's manual.

Which oil?

- Canola - Nutritionally an all-rounder being high in monounsaturates with a good dose of omega-3s. A neutral-tasting everyday oil which is versatile in the kitchen. An Australian success story, canola is widely grown here and features as an ingredient in canola spreads and a range of foods.
- Sunflower - High in polyunsaturates, sunflower oil is a versatile oil. Produced in Australia, it's often used to make polyunsaturated spreads. High in vitamin E.
- Monounsaturated sunflower -A variant of sunflower oil which is rich in monounsaturated fats rather than the usual polyunsaturated. Makes a good oil for frying and roasting, as it is very heat stable.
- Cottonseed - Light and neutral, cottonseed is a major oil in Australia (a by-product of cotton growing) and inexpensive. High in vitamin E.
- Safflower - Highest in polyunsaturates, safflower oil is often recommended for those wanting to lower their cholesterol. Interchangeable with sunflower and soybean in recipes, but is more expensive. High in vitamin E.
- Soybean - Light and pleasant tasting, this is an everyday kitchen oil suitable for frying, roasting and salad dressing. Adds some Omega-3s.

Page 5:

The map shows the distribution of canola crops. Canola is the largest oilseed crop grown in Australia.

Australia's climate varies across the continent. Oilseed crops need the right type of climate. Different types of oilseeds are grown as either a winter crop or as a summer crop. Winter oilseeds such as canola are grown over the winter months and harvested in November or December. Summer oilseeds such as soybeans, sunflowers and cottonseed are planted in the period from September to December and harvested from January to March.

Wide variation in climate occurs over the Australian continent with annual rainfall ranging from 325 mm to 700 mm in canola growing areas. The climate in Australia is predominantly continental with the inland areas relatively dry. During winter, southern Australia experiences cool, moist, westerly winds which cause rainy periods. Therefore the rainfall distribution peaks sharply in mid winter, with 65-75% of annual rainfall received between May and October. Most canola is sown in late autumn or early winter (April to June) with harvest in late spring and early summer (November and December). The growing season ranges from about 150 to 210 days, depending on latitude, rainfall and temperature and sowing date.

Summer crops are grown on irrigation and under dry land conditions i.e. where they rely solely on rainfall for moisture.

Pages 6, 7, 8, 9, 10 and 11:

Farmers need to prepare the soil for each new crop. Traditionally farmers cultivated the soil. This meant digging up or turning over the soil with a machine called a plough. This is done for weed control and to prepare the seed bed. Today many farmers use a new farming system called minimum tillage. This means the farmer has not cultivated the soil before sowing. The mulch from the plants in last season's crop is deliberately left spread on the ground. This is better for the soil and helps to retain moisture. The weeds that grow are controlled by spraying before sowing. Time is allowed before seeding for seedbed preparation, including mechanical cultivation of hard-setting soils and weed control prior to planting. With the development of herbicide resistant varieties of canola and minimum tillage systems of sowing, the period needed for seedbed preparation has been reduced, a significant factor in short season environments.

Rain-fed winter crops are sown usually after the first significant rains in April or May to provide soil moisture for germination and to sustain growth. The growth and yield of the crop is then determined by the amount of water available. Except for irrigated crops, the duration of crop growth (from 5 to 7 months) is determined by sowing date and the duration of the rainfall. The farmer needs to sow (plant the seed using a special machine) at the right time of year. The farmer has to control weeds, disease and pests that can affect the crop.

For canola, flowering is very important for crop yield and quality. Flowering generally occurs in August and September when temperatures are rising. The weather conditions during flowering will determine the amount and quality of the oilseeds. The canola pods form after flowering and the grains fill in October and November. If there are high temperatures and low rainfall at this time the crop will have low yields and oil content.

Page 12:

Harvesting occurs once the oilseed plants have grown, flowered, the seed pods have formed and the plant has died back. The diagram on page 12 of the manual shows the growth stages of sunflowers.

The canola crop is harvested in summer, under warm, dry conditions which produces seed of low moisture with good storage characteristics. These conditions also favour high quality seed low in chlorophyll and free fatty acids. The majority of the Australian crop is harvested to avoid seed losses through pod shatter. The harvesting process involves the plants being cut and left loosely piled in rows for about a week. The harvesting machine comes along and picks up the dry plants and separates the seeds from the chaff. Harvesting is commenced when 40-60% of seed in pods in the middle of the crop canopy have turned black or brown. This indicates a seed moisture of 30-40% and physiological maturity. Pick-up and threshing of the windrow commences when the seed moisture has fallen to less than 8-10%, about 7 to 10 days after harvesting.

Direct heading of crops is common for sunflowers and canola in low rainfall regions where crops are shorter and have lower yield potential. Canola crops are ready for direct harvesting when nearly all the pods are dry and rattle when shaken.

Page 13:

Seed often needs to be stored in silos before going to the crushing mill. Some of the oilseeds are also taken to shipping terminals for loading on to transport ships for shipment overseas to a range of export markets.

Pages 14, 15, 16 and 17:

Pages 13 to 17 of the teacher's manual provides details of the 3 different stages.

Pages 18, 19, and 20:

For further information on the health and nutrition of vegetable oils, please visit www.australianoilseeds.com.