**Food for energy – unit plan**

**Overview**

Students develop their knowledge of food and product development to produce a snack bar for a specific target market.

**Purpose**

* To consider what factors influence our food choices.
* To understand why we need to eat and the different nutrients that are available in foods.
* To understand why it is important to match the amount of energy in the food we eat with our energy requirements.

**Background**

***Suggestions for a scenario***

The school has been asked to design and make a new snack bar for its students. Some of the students are fussy eaters, so you need to find out what tastes, textures and colours of snack bar students like best. The snack bar must be tasty and appealing and contain different amounts of food energy.

***Where's the biotechnology?***

In New Zealand, biotechnology research is using material from plants, like vegetables and cereals to make foods with varying amounts of energy. In order to make new foods, it’s important to understand how the structure and composition of plant material can affect the amount and speed of energy release. It is also important to find out what people like and dislike when making new foods for consumers.

**Curriculum focus**

***Technology***

* Technological practice.
* Planning for practice: identify the key stages and resources required to develop a low-energy or high-energy snack bar.
* Brief development: explain how food energy should be linked to lifestyle needs.
* Outcome development and evaluation: trial a snack bar recipe for taste, ease of production and suitability for energy requirements.
* Nature of technology: understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.

***Science***

* Life processes.
* Chemistry and society.

***Science focus***

* Knowledge of the relationship between food and energy.
* Understanding how food energy input is measured.
* Understanding how we can use this knowledge to match the food we eat (energy input) to our lifestyle (energy output).
* Understanding that food components can be manipulated to change their energy input.

***Technology focus***

* Understanding that we can use our science knowledge to produce food ingredients that can be matched to energy requirements.
* In our technology practice we are changing a food’s composition to produce a nutritious snack food for students of our school, while considering their energy needs.
* The food item will be labelled with an approximate Health Star Rating.

**Health and safety**

Health and safety need to be considered when preparing food. Preparation areas should be clean. Students need to wash their hands. Consideration needs to be given to utensils (the use of knives or managing food processors – younger students may need help) and cooking arrangements.

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| **UNIT PLAN: FOOD FOR ENERGY** |
| **Suggested learning intentions** | **Suggested learning experiences***The following learning experiences will provide you with starting points for an exploration of this topic. You may decide to narrow your focus to one component or include most of the ideas in a unit that incorporates science and/or technology themes.*  | **Possible teaching/assessment activities** |
| Understand that people will eat food because of the way it tastes and the texture of the food more than for its nutritional value. Identify the reasons why we need food and how it helps us to survive.Understand the main nutrient groups in food and why they are important to us (growth, energy and wellbeing).Identify the link between energy content of food, activity levels and obesity.   | **Introduce the scenario*** Students choose a favourite food from a selection of sweet and savoury items. Conduct a class survey on preferences. Graph and discuss results.
* Brainstorm what sort of foods students like to eat.
* Discuss why they like them. Is it taste (sweet, sour, spicy, salty), texture (chewy, crunchy, hard, soft, smooth), colour (chocolate brown, green, red), smell (freshly baked or fried) or something else (cold, warm)?
* How do food manufacturers make sure their foods taste good?
* Use the activity [Sorting food into groups](https://www.sciencelearn.org.nz/resources/2482-sorting-food-into-groups) to identify food groups and the role they have in nutrition.
* Discuss nutrients in food. Talk about the main food groups and the roles they have, for example, carbohydrates for energy, proteins for growing, fats for energy and growth, and vitamins and minerals for our wellbeing.
* Explore the idea that different foods have different amounts of carbohydrate, protein and fat. Therefore, they would deliver differing amounts of energy.
* Discuss the idea of our activities using up energy from food in our bodies. What would happen if you took in more energy than you needed for your activities?
 | See [Developing healthy food products – an introduction](https://www.sciencelearn.org.nz/resources/2481-developing-healthy-food-products-an-introduction) for an overview of some of the food research in New Zealand.Read about nutrients and food energy in these articles:[Macronutrients](https://www.sciencelearn.org.nz/resources/534-macronutrients)[Micronutrients](https://www.sciencelearn.org.nz/resources/535-micronutrients)[Carbohydrates](https://www.sciencelearn.org.nz/resources/559-carbohydrates)[Proteins](https://www.sciencelearn.org.nz/resources/561-proteins)[Lipids](https://www.sciencelearn.org.nz/resources/560-lipids)[Unlocking the energy in foods](https://www.sciencelearn.org.nz/resources/1833-unlocking-the-energy-in-foods)[Energy requirements of the body](https://www.sciencelearn.org.nz/resources/1835-energy-requirements-of-the-body)Read about how we sense food in the article [Sensing food](https://www.sciencelearn.org.nz/resources/1858-sensing-food).Watch [Factors that cause obesity](https://www.sciencelearn.org.nz/videos/65-factors-that-cause-obesity).Identify food groups and the role they have in nutrition. Use the activity [Sorting food into groups](https://www.sciencelearn.org.nz/resources/2482-sorting-food-into-groups) (a silent card shuffle).For information on food nutrients, see [www.nutritionvalue.org](http://www.nutritionvalue.org/) How will we develop or choose heathy foods? Use the following resources: Article: [Guiding food choices](https://www.sciencelearn.org.nz/resources/2477-guiding-food-choices)Video clip: [Testing food taste](https://www.sciencelearn.org.nz/videos/1100-testing-food-taste)Students eat a barley sugar and go for a run. Discuss sensations and the concept of ‘energy in, energy out’. |
| Understand that different foods have different amounts of energy that is released into our bodies at different rates. Find out what labelling can tell us about the energy content of a food. | **Developing expertise*** Discuss the idea that different foods deliver energy over differing lengths of time. Some foods will last you a long time (porridge), and some will just give you a quick energy burst (lollies). The reason for this is the structure and composition of a food.
* Research food labelling. In particular, focus on the Health Star Rating and the Heart Foundation Tick. Both options allow people to compare similar packaged foods.
* Understand that food labels can be used to help choose foods that match our energy needs.
 | Find out more about the energy release from food. Video clip: [Testing foods in people](https://www.sciencelearn.org.nz/videos/1728-testing-foods-in-people).Discuss food labelling. Use the activity [What’s on a label?](https://www.sciencelearn.org.nz/resources/1307-what-s-on-a-label)Let the students see if they can use the Health Star Rating and the Heart Foundation Tick to help them choose the right foods for their activities. |
|  | **Plan of action*** Look at the ingredients you can include in a snack bar.
* Assess the amount of carbohydrates, proteins and fats in each ingredient.
* Design a snack bar for a particular activity, for example, a high energy bar for sporty students, a medium energy bar for active students and a low energy bar for couch potatoes.

**Making*** Make the snack bar.
* Taste test the snack bar and consider the importance of consumer research and sensory testing when you are making new foods for people.
 | Get the students to look at the nutritional content of a list of ingredients for snack bars. Learn about sensory science with these articles: [Sensory scientists](https://www.sciencelearn.org.nz/resources/1884-sensory-scientists)[Consumer testing of functional foods](https://www.sciencelearn.org.nz/resources/1071-consumer-testing-of-functional-foods)Adapt a basic snack bar recipe to suit a particular activity. Use the activity: [Make a snack bar](https://www.sciencelearn.org.nz/resources/2483-make-a-snack-bar).**Assessment**Explain why you chose the ingredients used to make the snack bar.* Predict or determine what Health Star Rating your snack bar would have.
* Present a report to the class on the type of person your snack bar would be good for and explain why.
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