**ACTIVITY: Make a snack bar**

**Activity idea**

In this activity, students develop their knowledge of food and product development to produce a snack bar for a specific target market. The purpose is to make an appealing snack bar while understanding that energy from food components should match energy needs (energy in and energy out).

By the end of this activity, students should be able to:

* discuss how different foods have different amounts of energy that is released into the body at different rates
* discuss some of the terminology used in food labelling
* consider the role of consumer research and sensory testing when making a new food
* design a label for their snack bar.

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**Background information for teachers**

One of the main reasons we eat food is for energy. Different foods give us different amounts of energy. In order to be healthy and feel good, we need to eat foods that will best suit our energy needs and lifestyle.

Carbohydrates, in the form of starches and sugars, are the macronutrients required in the largest amounts. When eaten and broken down, carbohydrates provide the major source of energy to fuel our daily activities. It is recommended that carbohydrates should supply 45–65% of our total daily energy needs. The rate at which energy is released from a particular carbohydrate is known as the glycaemic load – a measure of how quickly or slowly a food changes blood sugar levels. Simple carbohydrates like white flour and sugar are released more quickly than complex carbohydrates in whole oats or whole wheat.

Proteins are needed for growth and repair of tissues, making essential hormones and enzymes and supporting immune function. Proteins should make up about 15% of our total energy needs.

Fats should make up 20–35% of our daily energy needs. Some fat in the diet is essential for health and wellbeing. Unsaturated fats are preferred over saturated or trans fats.

The article [Macronutrients](https://www.sciencelearn.org.nz/resources/534-macronutrients) discusses the role of carbohydrates, proteins and fats in greater detail.

***Matching energy intake with activity level***

Although each of these macronutrients supplies the energy needed to run body functions, the amount of energy that each provides varies. Carbohydrates and proteins each provide 17 kJ/g, whereas fats provide 37 kJ/g.

When designing a snack bar, students should consider the ratio of carbohydrates/proteins and fats and whether they want the energy to be quick release, slow release or both. They should also consider if the bar is designed for a particular activity, for example, a snack bar for a cyclist out for a 30-minute sprint versus a cyclist out for a 3-hour ride or a snack bar for someone who spends most of their day sitting at a keyboard.

***The role of sensory science***

We often sense food before we even take a bite. The article [Sensing food](https://www.sciencelearn.org.nz/resources/1858-sensing-food) explains how we make impressions about food both before we try it and with the first bite. Sensory scientists are often part of new food development. Students will need to consider how their snack bar looks and smells as well as its nutritional profile.

***Marketing the product***

Students can create a brand and label for their product. The resources [What’s on a label?](https://www.sciencelearn.org.nz/resources/1307-what-s-on-a-label) and [Health claims and food products](https://www.sciencelearn.org.nz/resources/2285-health-claims-and-food-products) provide background information. Students can use nutritional information to obtain an estimated Health Star Rating using the online [Health Star Rating Calculator](https://www.mpi.govt.nz/food-business/labelling-composition-food-drinks/health-star-ratings-food-labelling/calculating-and-applying-health-star-ratings/) from the Ministry for Primary Industries’ website

***Making the activity workable in the classroom***

Ask students to bring ingredients from home. For example, ask students to bring a snack bar to share when investigating commercial products. When it is time for students to design and create their own snack bars, each group member can bring one or two of the ingredients. Groups can also provide their own baking tin.

If you do not have a school kitchen, consider if the students can plan the recipe, gather materials and then have a volunteer bake the bars at home. Alternatively, students can make uncooked, blissball-type bars. Do not use flour in unbaked products as it affects the flavour.

**Equipment list**

* Commercial snack bar products in their packaging
* Knives
* Small plates or serviettes
* Snack bar ingredients
* Mixing bowls and spoons for each group
* Kitchen scale to weigh/measure ingredients
* Baking tins
* Baking paper
* Oven or similar

**Teacher instructions**

1. 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 similar – younger students may need help) and cooking arrangements.
2. Use the [Student instructions](#3znysh7) to work through the activity. It is a Word document, so alter it to suit student needs and abilities. Some of the activity components are more suitable to intermediate and secondary students.
3. Use the [Nutritional information for sample ingredients](#tyjcwt) to determine nutritional values for the estimated Health Star Rating. Use the [Nutritionalvalue.org](https://www.nutritionvalue.org/) website to find values for foods not listed in the table. Alternatively, use the nutritional information on the ingredient packaging, if using almonds or cereal flakes, for example.

## Student instructions

***Part 1: Investigating commercial snack bars***

1. Look at the ingredients list on snack bar packaging. List some of the common ingredients.
2. Compare the nutritional information on each bar: 
* Are some bars higher in fat and saturated fat than others?
* Are some bars higher in sugar than others?
* Do some bars have more fibre than others?
1. Do you think there is a relationship between the type of ingredients and some of the nutritional factors? Write down two examples.

***Part 2: Sensory testing of commercial snack bars***

1. Cut the snack bars into bite-sized pieces.
2. Observe how they look. Are some bars more appealing than others? Write down one way a manufacturer has made the snack bar look attractive.
3. Taste a sample. Write down some words to describe the taste or the way the snack bar feels when you chew it and how it tastes, for example, chewy, crunchy, sweet, smooth, grainy, etc.

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| **Product name** | **How it feels when I chew and how it tastes** |
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***Part 3. Designing a snack bar recipe***

1. With your group, design a snack bar recipe using the table on the next page. Choose whether it will be a high, medium or lower-energy bar. Nutritional information for individual ingredients is in the Nutritional information for sample ingredients table below. Information from the table may help with your product design. You can also choose other ingredients not on the list. To find their nutritional information, use the [Nutritionalvalue.org](https://www.nutritionvalue.org/) website or check the product packaging.

Some things to consider when designing your recipe:

* Recipes work best with 1 cup of wet ingredients for every 5 cups of dried ingredients.
* Measure and weigh your ingredients so you can work out the nutritional values.
* It’s best to have a mix of fats and sugars for the wet ingredients.
* Dried fruits and nuts add flavour and texture.

**Nutritional information for sample ingredients**

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | EnergyCalories/kilojoules | Fat/100 g | Saturatedfat/100 g | Sugar/100 g | Sodium/mg | Protein/100 g | Fibre/100 g |
| **Wet ingredients** |
| Butter – salted | 717 cal3,000 kJ | 81 g | 51 g | <1 g | 643 mg | <1 g | 0 g |
| Margarine(hard, soybean) | 719 cal3,008 kJ | 81 g | 17 g | <1 g | 943 mg | <1 g | <1 g |
| Oil (canola) | 884 cal3,699 kJ | 100 g | 7 g | 0 g | 0 mg | 0 g | 0 g |
| White sugar | 387 cal1,619 kJ | 0 g | 0 g | 100 g | 1 mg | 0 g | 0 g |
| Brown sugar | 380 cal1,590 kJ | 0 g | 0 g | 97 g | 28 mg | <1 g | <1 g |
| Honey | 304 cal1,272 kJ | 0 g | 0 g | 82 g | 4 mg | <1 g | <1 g |
| Peanut butter – smooth with salt | 598 cal2,502 kJ | 51 g | 10 g | 10 g | 426 mg | 22 g | 5 g |
| Chocolate spread | 541 cal2,264 kJ | 30 g | 28 g | 54 g | 41 mg | 5 g | 5 g  |
| **Dry ingredients** |
| Rolled oats | 389 cal1,628 kJ | 7 g | 1 g | 0 g | 2 mg | 17 g | 11 g |
| Flour | 364 cal1,523 kJ | 1 g | <1 g | <1 g | 2 mg | 10 g | 3 g |
| Chocolate drops | 546 cal2,284 kJ | 31 g | 19 g | 48 g | 24 mg | 5 g | 7 g |
| Raisins | 299 cal1,251 kJ | <1 g | <1 g | 59 g | 11 mg | 3 g | 4 g |
| Dates | 277 cal1,159 kJ | <1 g | <1 g | 66 g | 1 mg | 2 g | 7 g |
| Peanuts – raw | 567 cal2,372 kJ | 49 g | 6.3 g | 5 g | 18 mg | 26 g | 9 g |
| Dried apricots | 85 cal356 kJ | <1 g | <1 g | 20 g | 4 mg | 1 g | 3 g |
| Grated apple | 52 cal218 kJ | <1 g | <1 g | 10 g | 1 mg | <1 g | 3 g |
| Grated carrot | 41 cal172 kJ | <1 g | <1 g | 5 g | 69 mg | 1 g | 3 g |
| Shredded coconut | 501 cal2,096 kJ | 35 g | 31 g | 43 g | 262 mg | 3 g | 5 g |
| Sunflower seeds | 584 cal2,443 kJ | 51 g | 5 g | 3 g | 9 mg | 21 g | 9 g |
| Pumpkin seeds | 559 cal2,339 kJ | 49 g | 9 g | 1 g | 7 mg | 30 g | 6 g |

Nutritional information is from [Nutritionalvalue.org](https://www.nutritionvalue.org/). Values have been rounded.

We are making a high/medium/low-energy bar (circle your option).

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| **Wet ingredients** | **Amount in grams** | **Nutritional information (optional)** |
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| **Dry ingredients** | **Amount in grams** | **Nutritional information (optional)** |
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***Part 4. Making the snack bar***

1. Cooking instructions:
* Wash your hands.
* Preheat the oven to 160°C. Line the tin with baking paper so the snack bar mix doesn’t stick.
* Gently warm your selected wet ingredients until they are dissolved and runny.
* Place your selected dry ingredients in a large bowl.
* Add the wet ingredients to the dry ingredients.
* Press into the tin.
* Bake at 160°C for about 40 minutes or until golden in colour.

***Part 5: Product marketing***

1. Use the space on the next page to design a label for your product. Consider including this information:
* Your brand
* Product name
* Product description – including its purpose (high, medium or low-energy product)
* Product image
* Approximate weight
* Ingredients list
* Nutritional information (optional)
* Health Star Rating prediction – use the [Health Star Rating Calculator](https://www.mpi.govt.nz/food-business/labelling-composition-food-drinks/health-star-ratings-food-labelling/calculating-and-applying-health-star-ratings/) on the Ministry for Primary Industries’ website (optional).

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