Video worksheet – Energy in food.

1. A protein bar is sold in a major supermarket chain. Each bar has the following label on its packaging.
   a. Calculate the energy, in kJ, that can be extracted from the protein component of each bar.

   b. What is the total energy, in kJ, available from the sugar content of each bar?

Nutrition Facts	
Serving Size 1 Bar Servings Per Package 1	
Amount Per Serving	
Calories 320	Calories from Fat 220 (69%)
	% Daily Value *
Total Fat 24g	37%
Saturated Fat 14g	70%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 40mg	2%
Total Carbohydrate 24g	8%
Dietary Fiber 7g	28%
Sugars 15g	
Protein 6g	12%
*Percent Daily Values are based on a 2,000 calorie diet.	

2. The table, below, contains the percentage composition by mass of the nutritional value of some common foods. A mass of 100 g of which food contains the most energy. Show your calculations to justify your choice.

Food	% Carbohydrates	% Fats and oils	% Protein
fish	0	8	29
bread	50	4	8
cheese	1	34	25
milk	5	4	3

3. The nutritional content of a chocolate bar was shown on the packaging, diagram 1
   a. What amount of energy, in kJ, is available to the consumer in the form of carbohydrates if a 300g chocolate bar is consumed?

	Per 100 g
Energy	1250 kJ
Protein	2.5 g
Fats and oils	20.5 g
Carbohydrates	30.5 g

Diagram 1

   b. A sample of chocolate with a mass of 12.5 grams was taken and burnt using the setup shown in diagram 1. Calculate the final temperature of the water in the beaker after the sample has burnt completely if the initial temperature of the water is 25.0 ^{o}C and assuming no energy is lost to the environment

4. The nutritional value of a brand of wholemeal bread is shown on the right.

	Per 100 g
Energy	1000 kJ
Protein	9.1 g
Fats and oils	2.5 g
Carbohydrates	41.5 g
Sugars	3.0 g
Fibre	6.4 g

a. A piece of this bread was cut and used to heat 200.0 grams of water using the apparatus shown below. What mass of bread is needed to raise the temperature of the water by 25.0 ^{o}C, assuming that all the heat energy released during the combustion reaction is absorbed by the water.

b. If 1.2 g of bread was needed to raise the temperature of the water by 8.0 °C using this apparatus, calculate the efficiency of the energy transfer in this combustion.

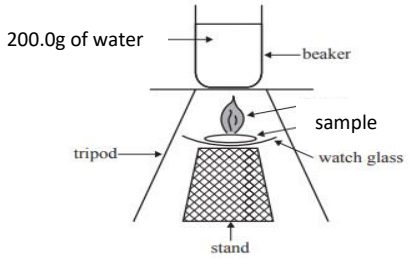

Diagram 2