

Food Analysis



Real World Energy
Learner Worksheet Answer Key
Grade Level: 9-12

Name:

Part 1: Background Questions

Read the food analysis backgrounder and answer the following questions.

1. Complete the following table.

Body Fuel Type	Role of Fuel in the Body	Examples of Foods that Provide the Fuel
Proteins	There are many different types of proteins and they play many different roles. Examples: strength to hair and nails, hormones, blood clots, assist chemical reactions, gives colour to hair and skin, and may be broken down into sugar if other supplies are lacking.	Meat (beef, chicken, pork, fish), dairy (milk, yogurt, cheese)
Carbohydrates	Provide quick energy to cells that need them.	Fruit, anything with glucose, rice, potatoes, beans, pasta, wheat
Fats	Supply energy, assist in brain and nervous system development, controlling body temperature, and the production of some hormones.	Fats are found in almost all of our food. Saturated fats are from animal fats (e.g., butter, bacon fat). Unsaturated fats are found in grains, nuts and seeds (e.g., vegetable oils, peanut oil, coconut oil, olive oil).

2. What fuel type is used as a source of energy when carbohydrates are depleted?

When carbohydrates are depleted, our body can convert amino acids from protein into glucose. Glucose is the energy supply for all of life's essential processes.

3. You are planning a long hike that is quite strenuous. List at least three food items that would be good to take on the hike for keeping up your energy supply.

Some food items that would be good to take on a long hike to supply energy would be: raisins, apples, dried fruit, nuts, and chocolate.

4. Provide a definition for "balanced diet." What does it mean and why is it important?

A balanced diet is a diet that ensures a balance between the different types of food. There would be a balance between the amount of protein, carbohydrates and fat. Fats contain more than twice the energy of carbohydrates and protein, so the amount of fat that would be required in a balanced diet is less than the amount of protein and carbohydrates. There are also a number of different types of foods in each food category, so ensuring a balance of the different types of foods in each category would also be part of a balanced diet (e.g., not getting all of your protein from meat but from meat and dairy.) Having adequate supplies of protein, carbohydrates and fats provides our bodies with the necessary requirements for maintaining a healthy lifestyle.

5. What is a calorie?

A calorie is a unit of measurement for food energy.

Part 2: Lab Investigation

Answers will vary depending on the food items used.

Observations Chart:

A (-) sign means that a certain molecule is not present in a food sample. A (+) sign means that a certain molecule is present in a food sample. Place a (-) sign if the food item does not contain sugars, starch, proteins or fats. Place a (+) sign if the food item contains sugars, starch, proteins or fats.

Food Item	Presence of sugars (colour turns green, yellow, orange, red-brown)	Presence of starch (colour changes from a red-brown to purple or blue-black colour)	Presence of proteins (colour changes to pink, violet or purple)	Presence of fats (can see through the paper, paper is translucent)

Questions:

1. List the food items that tested positive for more than one category.

Answers will depend on the findings from the observations.

2. In the table below, list other foods that you think would test positive for the various categories.

Food Category	List foods (other than the ones that you tested) that you think would test positive for the following
Sugars	chocolate, pop, fruit, fruit drinks
Starch	rice, potatoes, bread, flour, beans, corn, squash
Proteins	hamburger, steak, fish, milk, yogurt, cheese
Fats	nuts, oils (vegetable, olive, peanut, coconut), doughnut, sunflower seeds, bacon, butter, margarine

Answers should include other food items than the ones used in the lab investigation.

3. You are given food samples. One sample contains only glucose, one contains only starch, one contains both glucose and starch, and one contains both glucose and starch. How would you test these samples to determine which nutrients are present? What test results would you expect?

Sample	Test	Result
Glucose only	Benedict's solution	Iodine Benedict's – colour change Iodine – no colour change
Starch only	Benedict's solution	Iodine Benedict's – no colour Iodine – colour change
No glucose or starch	Benedict's solution	Iodine Benedict's – no colour change Iodine – no colour change
Both glucose and starch	Benedict's solution	Iodine Benedict's – colour change Iodine – colour change

Part 3: Lab Demonstration

Lab demonstration chart will vary depending on the foods that are tested.

Calorimetry Observations:

Food Tested	Mass of Food (g)	Initial Temp. of Water (°C)	Final Temp. of Water (°C)	Change in Temp. of Water (°C)

To compare the amount of heat given off by different foods, you need to find the amount of heat produced per gram of food. To find this, divide the temperature change of the water by the mass of food that was burned.

$$\text{Heat produced per gram of food} = \frac{\text{Heat gained by water (change in temperature)}}{\text{Mass of food burned}}$$

Questions:

1. Which food increased the water temperature the most?

Answers will vary.

2. Which food contained the most energy?

Answers will vary.

3. Where do you find information about calories in daily life?

In daily life, you find information about calories on food labels.

4. Calculate the amount of calories present in a sample food item based on the experiment below.

Answers will vary.

