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1. **What is sugar?**
 - a) a carbohydrate
 - b) sucrose
 - c) a product of photosynthesis
 - d) all of the above
2. **How many calories are in one teaspoon (4g) of sugar?**
 - a) 9
 - b) 16
 - c) 25
 - d) 40
3. **Low carbohydrate diets are more effective than other diets.**
 - a) True
 - b) False
 - c) It depends on many factors
4. **Which foods provide sources of carbohydrates and sugars?**
 - a) Grain Products
 - b) Milk Products
 - c) Fruits and Vegetables
 - d) all of the above
5. **What % of total calories do Canadians consume on average from sugars added to foods?**
 - a) 5%
 - b) 10%
 - c) 20%
 - d) 30%
6. **On the food label, the claim “no sugar added” must meet which of the following criteria:**
 - a) no sugars (e.g. sugar, honey, fruit juice) have been added to the product
 - b) no sweetener (e.g. aspartame, sugar alcohols) has been added to the product
 - c) no sugar is in the product
7. **Sugar is added to foods only to provide sweetness. True / False**
8. **What is the main source of energy normally used by the brain?**
 - a) Glucose
 - b) Fatty acids
 - c) Fructose
 - d) Ketones
 - e) I am not sure about the answer

9. The Glycemic Index ranks carbohydrate-containing foods by how much they raise our blood glucose levels. Which of the following has the highest glycemic index?

- a) White bread
- b) Table sugar
- c) Honey
- d) Apple juice
- e) Brown rice

10. Which of the following are considered sugars in the Nutrition Facts table on packaged foods? Please check ALL that you think is (are) CORRECT.

- a) Table sugar (sucrose)
- b) Lactose in milk and dairy products
- c) Fructose in honey
- d) Sucrose in maple syrup
- e) High fructose corn syrup
- f) Stevia (i.e. steviol glycoside)
- g) Fructose in apples and sweet peas

11. The naturally occurring sugars in fruits and vegetables include _____. Please check ALL that you think is (are) CORRECT.

- a) Glucose
- b) Fructose
- c) Sucrose
- d) Lactose

12. Added sugars consumption in Canada has been _____ over the past 20 years.

- a) Increasing
- b) Steady (neither increasing nor decreasing)
- c) Declining

13. Added sugars are more likely to contribute to weight gain than other carbohydrates in the diet.

- a) Agree
- b) Undecided
- c) Disagree

14. Sugars are addictive and make people crave more sugars-containing food, leading to overeating and weight gain.

- a) Agree
- b) Undecided
- c) Disagree

15. In addition to sugars, other fermentable carbohydrates (such as starches) also contribute to dental caries (tooth decay) formation.

- a) Agree
- b) Undecided
- c) Disagree

Answers:

1. **d) All of the above.** 'Sugar' refers to sucrose, a carbohydrate found naturally in fruits and vegetables. Sucrose is the major product of photosynthesis, a natural process that turns energy from sunlight to energy stored in sugar and releases oxygen to the air. Sucrose is the most abundant sugar found in nature, and occurs in the greatest quantities in sugar cane and sugar beets. While the term 'sugar' refers to sucrose, the term 'sugars' can also be used to describe sucrose, as well as other types of sugars found in nature such as glucose, fructose and lactose.
2. **b) 16.** There are 16 calories in a level teaspoon of sugar (1 tsp = 5 ml or 4 g). This compares to 36 calories for the same amount (4 grams) of fat or oil (e.g. butter, margarine, canola oil).
3. **False.** Low-carbohydrate diets have been popularized without detailed evidence of their effectiveness or safety. Among published studies, weight loss while using low-carbohydrate diets was principally associated with decreased caloric intake and increased diet duration. Much of the initial weight loss comes from water loss when stored carbohydrate (glycogen) is used for energy. In fact, there are many factors contributing to body weight or body fatness, and the excess amount of calories eaten compared to the amount expended through daily activities is one of the factors.
4. **d) All of the above.** Foods in each of these food groups naturally contain carbohydrates, including sugars and starches. When a sugar-containing food is eaten, the body cannot tell whether the sugar in the food came from a fruit or vegetable or whether it was spooned from a bowl. Sugar, regardless of its source, is broken down in the same way in the body.
5. **b) 10%.** Canadians consume approximately 10% of their energy (Calorie) intake as added sugars, equivalent to about 50 g of added sugars per person per day. "Added sugars" include all sugar, corn syrups, honey, and maple syrup added to foods. It does not include sugars that naturally occur in fruits, vegetables and dairy products. This estimate is based on disappearance data (all sugars, syrups and honey "available for consumption"). Disappearance data are higher than actual intakes because they do not account for sugars lost in food processing (e.g. bread, wine), wastage, and used for non-food purposes.
6. **a) No sugars have been added to the product.** "No sugar added" means that the product must not contain added sucrose or any other sugars as ingredients, such as honey, maple syrup, fruit juice, fructose, etc. The food may however, contain artificial sweeteners such as sucralose and aspartame, or sugar alcohols. Sugar alcohols are carbohydrates that are partially digested and absorbed, and therefore provide calories. Despite the "no sugar added" claim, the food product can contain sugars naturally present (e.g. from fruits, milk).
7. **False.** Sugar performs a variety of functions in food products, in addition to providing a sweet taste and flavour. For example, it is a natural preservative, as sugars attract water which helps to prevent food from spoiling. Sugar is added to ready-to-eat cereals, where it contributes to binding and browning characteristics. In baking, sugar provides a source of nourishment for the growth of yeast, which helps the leavening process. Sugars or other carbohydrates (except lactose) can also be used to produce alcohols by fermentation.
8. **Glucose.** The human brain uses a large amount of energy, and typically uses glucose (a component of sucrose (sugar)) as its sole source of energy for functioning. Glucose can be derived from dietary carbohydrate, synthesized in the body from other substrates such as amino acids, or released from glycogen storage in the liver and muscle. The brain can also use ketones as an alternative source of energy when carbohydrate (glucose) supply is low; ketones are generated from metabolizing fatty acids. The human brain is only about 2% of the weight of an adults body, although it requires almost 20% of the total energy required for the body.
9. **White bread.** Glycemic Index ranks carbohydrate-containing foods by how much they raise our blood glucose levels. White bread is made up of primarily starches, which is broken down to glucose in our body. Table sugar, honey, and apple juice contains glucose and fructose in different proportions. Brown rice is whole grain and has a higher amount of fibre than white rice. As a result, when compared on the same quantity, the amount of glucose is the highest in white bread, which leads to a higher and faster rise in blood glucose levels.

10. All except stevia. The term "sugars" or "total sugars" refers to all monosaccharides and disaccharides naturally occurring or added to foods. Examples of monosaccharides are glucose and fructose and examples of disaccharides include sucrose, lactose, and maltose. Sugars occur naturally in foods such as milk (lactose) and fruits and vegetables (glucose, fructose, and sucrose). Sugars such as sucrose, honey, glucose, and many others are also added to foods to provide sweetness and other important functional properties.

Stevia is a type of non-caloric sweetener derived from the leaves of the plant species *Stevia rebaudiana*, native to Brazil and Paraguay. The active compounds are steviol glycosides, which have a different structure than sugars.

11. Glucose, fructose, and sucrose. Almost all fruits and vegetables naturally contain sucrose, as well as glucose and fructose, in varying amounts. For example, bananas, sweet peas, and peaches contain primarily sucrose, whereas glucose and fructose are the main sugars in pears and tomatoes. While sucrose is found in almost all plants, sugar cane and sugar beets store sucrose in the greatest quantities and thus are harvested as the commercial sources of sugar.

12. c) Declining. The best estimate of actual food consumption comes from Canadian Community Health Survey (CCHS) data. The most recent CCHS - Nutrition survey was conducted in 2015, and showed that Canadian adults consumed on average 86.9 g/day (18.8% of energy) from total sugars, 47.5 g/day (9.9% energy) from free sugars, and 41.7 g/day (8.6% energy) from added sugars. In the previous CCHS conducted in 2004, total sugars intake represented a daily average of 20.0% energy for adults, where 11.4% energy came from free sugars and 9.9% energy came from added sugars. However, it should be noted that differences in population demographics (e.g. older age), survey methods, and under-reporting status between CCHS 2004 and CCHS 2015 may have influenced these observations.

13. c) Disagree. All food and beverage sources of protein, carbohydrate (sugars and starches), fat, and alcohol contribute calories. Research suggests eating too many calories from all sources - sugars, starches, fats, proteins, and alcohol - can contribute to weight gain as the excess calories from these nutrients are not used and instead stored as fat. A number of meta-analyses and reviews concluded that when the amount of sugars in the diet is replaced by the same quantity of starch (another type of carbohydrate), there is no change in total caloric intake or in body weight. When sugars are added to a diet, weight gain is often observed. When sugars are removed, weight loss is observed, demonstrating that the impact of the addition and subtraction of calories from sugars on body weight; but when total caloric intake is controlled, there is no change in body weight.

14. c) Disagree. There is a popular belief that sugar consumption can lead to addiction similar to that of drug or alcohol dependency. This notion was based on the dopamine reward pathway related to pleasurable sensations, which is activated not only by sugar, but also by other pleasurable foods, physical activities, or social events. Currently, there is insufficient evidence to support the idea of sugars addiction in humans. The study of food preferences and cravings does not support a specific role for sucrose or sweet taste in increasing food cravings as an addiction model would predict; a preference for a sweet taste or palatable foods should not be confused with addiction.

15. a) Agree. Cariogenic foods are those that produce or promote the development of tooth decay. Cariogenic foods contain highly fermentable carbohydrates, may have a sticky consistency, and are broken down into sugars in the mouth by the enzyme amylase in the saliva, which can be further fermented by oral bacteria into organic acids. Examples of cariogenic foods and beverages include:

- Sugary and starchy foods such as bread, rice, noodles, crackers, cakes, sweetened cereals, and hard and chewy candies.
- Sticky foods such as dried fruits, fruit snacks, cookies, and chewy candies (toffee).
- Beverages such as sweetened soda, fruit drinks, fruit juice, and other sweetened beverages (including sugar-free sodas, which contain acid that erodes tooth enamel).