Name: _____ **Date:** _____

Answer Key: The Hidden Chemist in Your Kitchen: 8th Grade Nutrition Challenge

Evaluate 10 complex scenarios regarding bioavailability, glycemic loads, and metabolic pathways to determine how food fuels cellular performance.

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1. An athlete consumes a meal of white rice and honey two hours before a race. Analyze the likely physiological response regarding her blood glucose and insulin levels.

Answer: B) A rapid glucose spike followed by an insulin surge, potentially causing a 'crash'.

White rice and honey have high glycemic indices, causing rapid glucose entry into the bloodstream and a corresponding spike in insulin to manage the sugar.

2. Bioavailability refers to the proportion of a nutrient that is digested, absorbed, and utilized through metabolic pathways rather than just the total amount present in the food.

Answer: A) True

Nutrition science distinguishes between total nutrient content and bioavailability, which is influenced by food preparation and individual digestive health.

3. To increase the absorption of non-heme iron found in plant sources like lentils, one should consume them alongside foods high in ____.

Answer: C) Vitamin C

Ascorbic acid (Vitamin C) acts as a reducing agent that facilitates the absorption of non-heme iron in the small intestine.

4. Consider the role of 'Essential Fatty Acids' (EFAs) like Omega-3. Why does the human body require these specifically from dietary sources?

Answer: B) The body lacks the enzymes to synthesize them with double bonds at specific positions.

Humans cannot synthesize Alpha-linolenic acid (Omega-3) or Linoleic acid (Omega-6) because we lack the desaturase enzymes to insert double bonds beyond the delta-9 position.

5. The metabolic process of breaking down large molecules like glycogen into glucose to release energy is known as ____.

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Answer: B) Catabolism

Catabolism is the set of metabolic pathways that breaks down molecules into smaller units that are either oxidized to release energy or used in other anabolic reactions.

6. A 'Complete Protein' source must contain all nine essential amino acids in proportions that match human requirements.

Answer: A) True

Essential amino acids cannot be made by the body; therefore, a 'complete' protein provides the full profile needed for muscle and tissue repair.

7. Based on the thermic effect of food (TEF), which macronutrient requires the most energy for the body to process and digest?

Answer: C) Protein

Protein has the highest TEF, requiring roughly 20-30% of its caloric content just to be digested and processed by the body.

8. While searching for a healthy snack, you find a product with 0g 'Trans Fats' but 'Partially Hydrogenated Oil' in the ingredients. This is a result of ____.

Answer: A) Regulatory loopholes allowing <0.5g per serving to be rounded down

In many regions, labeling laws allow manufacturers to claim 0g trans fat if the amount is less than 0.5 grams per serving, even if hydrogenated oils are present.

9. Which of the following is a symptom of 'Micro-nutrient Malnutrition' often seen in populations with high-calorie but low-nutrient diets?

Answer: B) Hidden hunger (deficiency in essential vitamins/minerals)

'Hidden hunger' occurs when the quality of food does not meet nutritional requirements, even if the caloric intake is sufficient or excessive.

10. The primary role of insoluble fiber is to provide the body with a long-term source of glucose for endurance activities.

Answer: B) False

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Insoluble fiber is not digested for energy; its primary role is to add bulk to stool and assist in the movement of food through the digestive tract.