SI A&P - Full Discipline Demo - Digital

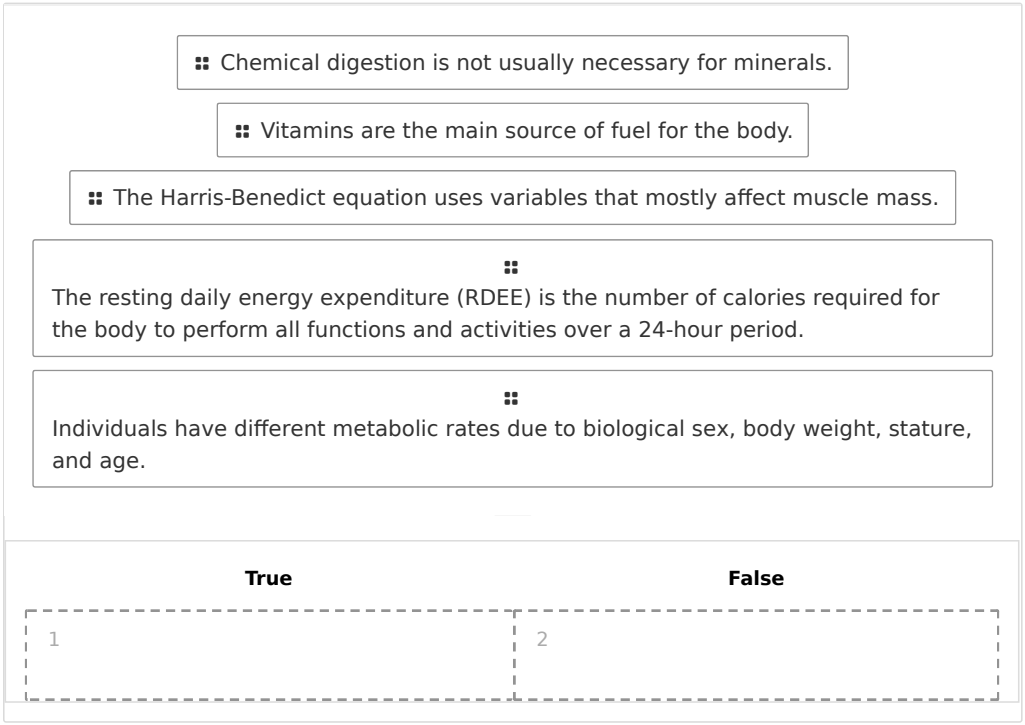
Nutrition - No Materials

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI A&P - Full Discipline Demo - Digital
Course	SI A&P - Full Discipline Demo - Digital
Instructor	Sales SI Demo

Test Your Knowledge

Classify each statement as true or false.



Correct answers:

1 Chemical digestion is not usually necessary for minerals.

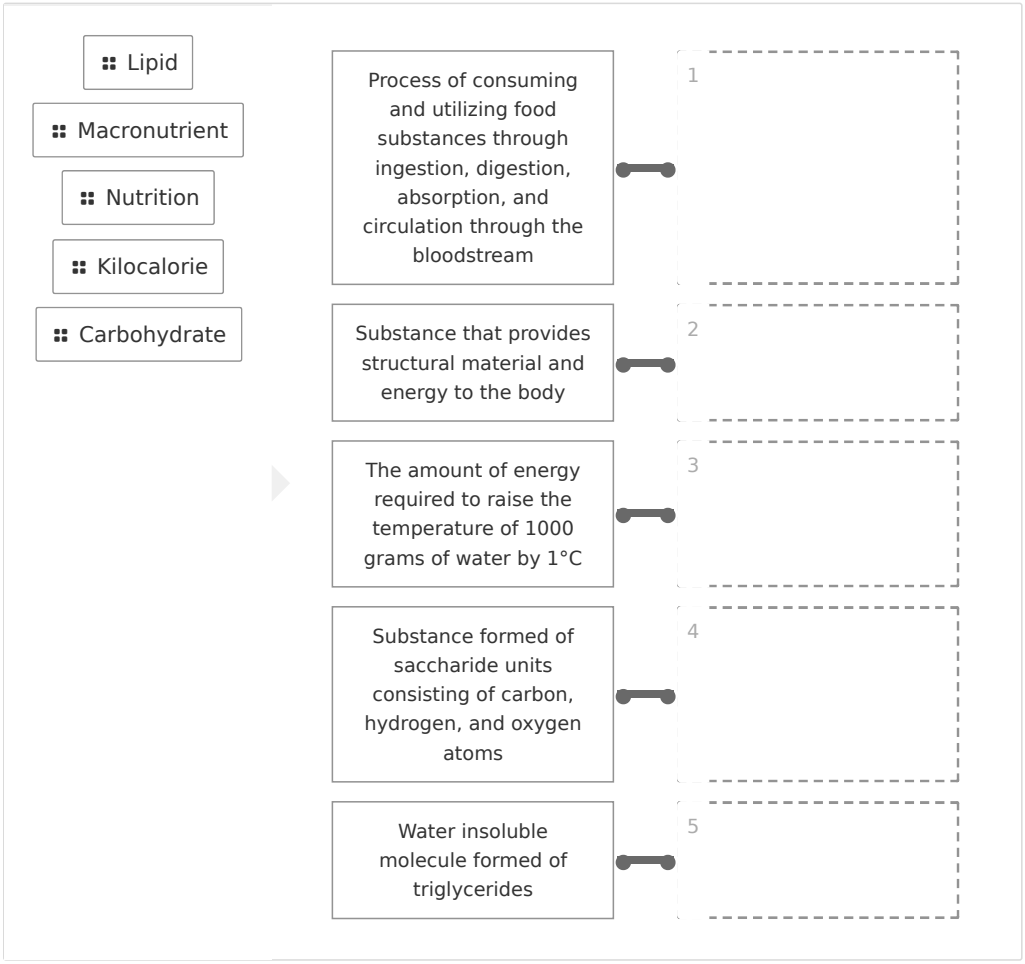
The Harris-Benedict equation uses variables that mostly affect muscle mass.

Individuals have different metabolic rates due to biological sex, body weight, stature, and age.

2 Vitamins are the main source of fuel for the body.

The resting daily energy expenditure (RDEE) is the number of calories required for the body to perform all functions and activities over a 24-hour period.

Match each term with the best description.



Correct answers:

1 Nutrition 2 Macronutrient 3 Kilocalorie 4 Carbohydrate

5 Lipid

Exploration

Examples of macronutrients include ____.

- lipids
- carbohydrates
- proteins
- All of the above ✔

_____ are the only inorganic nutrients required by the human body.

- Proteins
- Minerals ✔
- Lipids
- Vitamins

The physical activity coefficient is used when calculating RDEE.

- True
- False ✔

Exercise 1

How many calories should you consume each day to sustain your current activity levels? Reference your calculations recorded in Data Table 1 in your explanation.

Student responses should state that consumed calories should equal TDEE values from Data Table to sustain current activity levels. Based on the provided data in this answer key, the student should explain that they must consume 2042.65 kcal which is the value recorded for TDEE.

How would your RDEE change in 10 years if all of the other variables stayed the same? Include your calculations. What does this mean for caloric requirements as we age?

Students should use the Harris-Benedict equation, and all should be the same except the age variable. The RDEE will decrease with age, suggesting caloric requirements also decrease with age. From the answer key data: RDEE = 655 + (9.6 x 53.4) + (1.85 x 162.5) - (4.7 x 42) = 1270.87. The value 1270.87 is less than the value recorded in Data Table 1 of 1317.84.

Data Table 1: Determining your Metabolic Rate

(SAMPLE ANSWER BELOW)

Height (cm):	Student answers will vary. Sample answers provided. 162.5
Weight (kg):	53.4
Age (years):	32
Sex:	Female
Resting Daily Energy Expenditure (RDEE) (kcal/24 h):	1317.84
Physical Activity Coefficient:	1.55
Total Daily Energy Expenditure (TDEE) (kcal/24 h):	2042.65

Exercise 2

How would you rate your current diet based on total calories consumed? Reference Data Tables 2-4 and your RDEE calculated from Exercise 1 in your explanation.

Answers will vary based on students. Students should compare the total calories ingested per day to the calculated RDEE value from Exercise 1. In the example here the student consumed an average of 1846 kcal/day compared to their TDEE calculated in Exercise 1 of 2042.65. This student should consider their diet lacking in sufficient calories.

How would you rate the variety of macronutrients and micronutrients consumed in your diet? Reference Data Tables 2-4 and the importance of the Acceptable Macronutrient Distribution Range (ADMR) in your explanation?

Student answers will vary based on the daily diet recorded in Data Tables 2-4. To be concluded healthy, student results should mirror the AMDR chart which suggests approximately 1/2 of all calories come from carbohydrates, 1/4 from lipids, and 1/4 from protein. The AMDR is important because it allows for essential nutrients to be ingested without the increased risk of chronic disease.

Data Table 2: Dietary Log Day One

(SAMPLE ANSWER BELOW)

Meal	Foods and Portions	Macronutrients	Micronutrients	Energy (kcal)
Breakfast	Student answers will vary. Sample answers provided. Coffee (1 cup), cream (2 tsp) and sugar (1 tsp);	Protein, fat, carbohydrates	Vitamin A, calcium, Vitamin B12, Vitamin D, Iron,	478

	Bacon(2 pcs), egg (2), and cheese (1 pc gouda) sandwich - ciabatta (small)		Vitamin B6, Magnesium	
Lunch	Ground beef (1/4 pound), wheat bun, 1 tsp ketchup, 1 tsp mustard, 1/2 cup carrots	Protein, fat, carbohydrates	Calcium, Vitamin B12, Iron, Vitamin B6, Magnesium, Potassium, Riboflavin, Zinc, Vitamin A, Vitamin C	456
Dinner	Wheat tortilla (1), rice (1/4 cup), black beans (1/4 cup), bell peppers (1/4 cup), walnuts (1/4 cup)	Protein, fat, carbohydrates	Calcium, Iron, Vitamin B6, Magnesium, Vitamin A, Vitamin C, Potassium	445
Snacks	Banana (1), almonds (1/4 cup), strawberries (1 cup), 2 fun-sized chocolates	Protein, fat, carbohydrates	Vitamin A, Vitamin C, Iron, Vitamin B6, Magnesium, Riboflavin, Calcium, Potassium, Vitamin E, Vitamin D, Vitamin B12	467

Data Table 3: Dietary Log Day Two
(SAMPLE ANSWER BELOW)

Meal	Foods and Portions	Macronutrients	Micronutrients	Energy (kcal)
Breakfast	Student answers will vary. Sample answers provided. Coffee (1 cup), cream (2 tsp) and sugar (1 tsp); Bacon(2 pcs), egg (2), and cheese (1 pc gouda) sandwich - ciabatta (small)	Protein, fat, carbohydrates	Vitamin A, calcium, Vitamin B12, Vitamin D, Iron, Vitamin B6, Magnesium	478
Lunch	Ground beef (1/4 pound), wheat bun, 1 tsp ketchup, 1 tsp mustard, 1/2 cup carrots	Protein, fat, carbohydrates	Calcium, Vitamin B12, Iron, Vitamin B6, Magnesium, Potassium, Riboflavin, Zinc, Vitamin A, Vitamin C	456
Dinner	Wheat tortilla (1), rice (1/4 cup), black beans (1/4 cup), bell peppers (1/4 cup), walnuts (1/4 cup)	Protein, fat, carbohydrates	Calcium, Iron, Vitamin B6, Magnesium, Vitamin A, Vitamin C, Potassium	445
Snacks	Banana (1), almonds (1/4 cup), strawberries (1 cup), 2 fun-sized chocolates	Protein, fat, carbohydrates	Vitamin A, Vitamin C, Iron, Vitamin B6, Magnesium, Riboflavin, Calcium, Potassium, Vitamin E, Vitamin D, Vitamin B12	467

Data Table 4: Dietary Log Day Three
(SAMPLE ANSWER BELOW)

Meal	Foods and Portions	Macronutrients	Micronutrients	Energy (kcal)
Breakfast	Student answers will vary. Sample answers provided. Coffee (1 cup), cream (2 tsp) and sugar (1 tsp); Bacon(2 pcs), egg (2), and cheese (1 pc gouda) sandwich - ciabatta (small)	Protein, fat, carbohydrates	Vitamin A, calcium, Vitamin B12, Vitamin D, Iron, Vitamin B6, Magnesium	478
Lunch	Ground beef (1/4 pound), wheat bun, 1 tsp ketchup, 1 tsp mustard, 1/2 cup carrots	Protein, fat, carbohydrates	Calcium, Vitamin B12, Iron, Vitamin B6, Magnesium, Potassium, Riboflavin, Zinc, Vitamin A, Vitamin C	456
Dinner	Wheat tortilla (1), rice (1/4 cup), black beans (1/4 cup), bell peppers (1/4 cup), walnuts (1/4 cup)	Protein, fat, carbohydrates	Calcium, Iron, Vitamin B6, Magnesium, Vitamin A, Vitamin C, Potassium	445
Snacks	Banana (1), almonds (1/4 cup), strawberries (1 cup), 2 fun-sized chocolates. Banana (1), almonds (1/4 cup), strawberries (1 cup), 2 fun-sized chocolates	Protein, fat, carbohydrates	Vitamin A, Vitamin C, Iron, Vitamin B6, Magnesium, Riboflavin, Calcium, Potassium, Vitamin E, Vitamin D, Vitamin B12	467

Exercise 3

Which of the two macronutrients tested in this exercise are types of carbohydrates? How are these substances digested and absorbed in the body.

What is the benefit of identifying the macronutrient content of different food when analyzing dietary intake?

Data Table 5: Testing for Protein Results
(SAMPLE ANSWER BELOW)

Sample	Initial Color	Final Color	Protein Present?
Albumin (1)	Clear/White	Pink or Violet	Yes
Gelatin (2)	Clear/White	Pink or Violet	Yes
Glucose (3)	Clear	Blue	No
Water (4)	Clear	Blue	No

Data Table 6: Testing for Reducing Sugars Results
(SAMPLE ANSWER BELOW)

Sample	Initial Color	Final Color	Reducing Sugars Present?
Potato (1)	Clear/White	Orange/Red	Yes
Onion (2)	Clear/White	Orange/Red	Yes
Glucose (3)	Clear	Orange/Red	Yes
Water (4)	Clear	Blue	No

Data Table 7: Testing for Starch Results
(SAMPLE ANSWER BELOW)

Sample	Initial Color	Final Color	Starch Present?
Potato (1)	Clear/White	Dark blue or black	Yes
Onion (2)	Clear/White	Yellow/Brown	No
Starch (3)	White	Dark blue or black	Yes
Water (4)	Clear	Yellow/Brown	No

Data Table 8: Testing an Unknown - Protein
(SAMPLE ANSWER BELOW)

Sample	Initial Appearance	Final Appearance	Protein Present?
Positive control (may vary by student)	Answers will vary	Pink/violet	Yes
Negative control (may vary by student)	Answers will vary	Blue	No
Unknown (3)	Clear/white	Blue	No

Data Table 9: Testing an Unknown - Reducing Sugars
(SAMPLE ANSWER BELOW)

Sample	Initial Appearance	Final Appearance	Reducing Sugars Present?
Positive Control (student selection may vary)	answers may vary	Orange/Red	Yes
Negative Control (student selection may vary)	answers may vary	Blue	No
Unknown (3)	Clear/White	Orange/Red	Yes

Data Table 10: Testing an Unknown - Starch
(SAMPLE ANSWER BELOW)

Sample	Initial Appearance	Final Appearance	Starch Present?
Positive Control (student selection may vary)	answers may vary	Dark blue/Black	Yes
Negative Control (student selection may vary)	answers may vary	Yellow/Brown	No
Unknown (3)	Clear/white	Dark blue/Black	Yes

Competency Review

_____ are categorized as either carbohydrates, lipids (fats), or proteins.

- Macronutrients ✔
- Micronutrients
- Vitamins
- Minerals

One kilocalorie (or dietary Calorie) is equal to _____ calories.

- 10
- 100
- 1000 ✔
- 5000

_____ are macromolecules that provide the framework for all cellular structures in the body.

- Carbohydrates
- Lipids
- Proteins ✔
- Vitamins

____ are micronutrients classified as fat-soluble or water-soluble.

- Sugars
- Starches
- Proteins
- Vitamins ✔

The Harris-Benedict equation is identical for males and females.

- True
- False ✔

The activity levels of individuals are directly related to their metabolic rates.

- True ✔
- False

An individual with a RDEE of 1318 kcal/24 hr and an activity coefficient of 1.55 has a TDEE of _____ kcal/24 hr.

- 850.32
- 1316.45
- 1319.55
- 2042.9 ✔

When creating a daily dietary log, _____ should be recorded.

- foods
- portions
- macronutrients
- All of the above ✔

Biuret solution turns _____ after 5 minutes when added to a test tube containing albumen.

- light blue
- amber
- purple ✔
- dark red

Extension Questions

Sarah has tried numerous fad diets, while maintaining her activity levels and total Calorie intake, but failed to lose weight. Apply your knowledge of TDEE and nutrition to suggest a new approach to healthy weight loss for Sarah. (SAMPLE ANSWER BELOW)

Sarah should log her dietary intake for several days to analyze her total nutrition. Sarah should then calculate her TDEE and compare that to her dietary intake. Then Sarah should look for ways to improve both her nutrition levels, by consuming an acceptable macronutrient distribution range, and her activity coefficient.