

CALORIES AND ENERGY BALANCE

OBJECTIVES/RATIONALE

Maintaining energy balance is essential in health and wellness. The relationship between calories taken in, to those expended has a direct effect on energy balance. The student will calculate energy consumed vs. energy expended.

TEKS 121.24 6E, 7A, 7F, 7E

TAKS Mathematics 1, 2, 9, 10

KEY POINTS

- I. Calories and Energy balance
 - A. Energy in = energy out, weight is maintained.
 - B. Energy in < energy out, weight is lost. Underweight people have expended more calories (energy) than they; have eaten.
 - C. Energy in > energy out, weight is gained.
 1. Overfat individuals have eaten more energy in the form of kcalories than they have expended.
 2. Overfat is NOT the same as overweight. A body builder may be overweight according to weight tables, but not overfat.
- II. Energy in = the kcalories in what is consumed.
 - A. How much carbohydrate protein or fat determines energy in food.
 1. 1 gram of carbohydrate = 4 kcalories
 2. 1 gram of protein = 4 kcalories
 3. 1 gram of fat = 9 kcalories
 4. 1 gram of alcohol = 7 kcalories
 - B. Food intake
 1. For energy balance to occur ones energy needs must be met without any excess energy left over to be stored as fat.
 2. Controlling what and how much is vital to controlling energy intake.
 3. Eating is a complex behavior controlled by the hypothalamus.
 - a. Hunger – the physiological need to eat.
 - b. Appetite – a psychological desire to eat.
 - c. Satiety – the feeling of satisfaction and fullness that eating food gives.
 4. Eating is connected to emotions and can be triggered by things other than hunger.
 - a. Boredom
 - b. Anxiety
 - c. Stress
 5. Things other than satiety can also suppress eating even if a person is hungry.
- III. Energy out = the kcalories the body expends.

- A. The efficiency of converting food to energy is about 25% with the other 75% lost as heat.
- B. Energy utilization
 - 1. Basal metabolism – the energy needed to maintain life when a body is at complete rest.
 - 2. Basal metabolic rate (BMR) – the rate of energy used for metabolism for maintenance activities.
 - a. 60-65% of the energy expended is used to run metabolic processes.
 - b. BMR varies from person to person.
 - aa. Highest in people with lean body tissue.
 - bb. Higher in tall people due to increased surface area.
 - cc. Higher in people with overactive thyroid glands.
 - dd. Lower in obese people.
 - d. BMR can vary for an individual.
 - aa. Slowest during sleep
 - bb. May be increased by increasing the amount of lean body tissue present
 - cc. Declines approximately 5% per decade as one ages.
(Can be prevented with exercise)
 - 3. Physical activity
 - a. the voluntary movement of muscles and the most variable component of the energy equation.
 - b. Makes up 25 – 30 % of the energy used by our bodies.
 - c. Energy required for activities depends on:
 - aa. muscle mass
 - bb. body weight
 - cc. the activity itself

IV. Eating disorders

- aa. Anorexia Nervosa
- bb. Bulimia
- cc. Obesity

ACTIVITIES

- I. Calculate the amount of energy taken in using food labels and estimated energy utilization tables to determine if you are in energy balance. Graph the energy taken in and the energy expended for 5 days.

MATERIALS NEEDED

Food Labels

ASSESSMENT

Completion of the graph

ACCOMMODATIONS

For reinforcement, the student will develop a chart of calories consumed vs. calories expended.

For enrichment, the student will research one of the eating disorders and develop a multimedia presentation.

REFLECTIONS
