

**The American Physiological Society
Medical Curriculum Objectives Project**

Complete curriculum objectives available at:
<http://www.the-aps.org/education/MedPhysObj/medcor.htm>

Exercise and Integration

Thermoregulation

INT 1. Diagram the thermal balance for the body, including heat production (metabolism, exercise, shivering) and heat loss (convection, conduction, radiation, and evaporation). Identify those mechanisms that shift from heat production to heat loss when environmental temperature exceeds body core temperature.

INT 2. Define the thermoregulatory set point. Diagram the negative feedback control of body core temperature, including the role of the hypothalamic set point.

INT 3. Contrast the stability of body core with that of skin temperature. Include the role of cutaneous blood flow and sweating on skin temperature.

INT 4. Identify the mechanisms for maintaining thermal balance in the following environments: desert (120°F), snow skiing (10°F), falling through ice into a lake (water temp 37°F), and snorkeling in 80°F water.

INT 5. Explain how the change in core temperature that accompanies exercise differs from the change in core temperature produced by influenza, which alters the thermoregulatory set point.

INT 6. List and describe the physiological changes that occur as a result of acclimatization to heat and cold.

Exercise

INT 7. Contrast the normal distribution of cardiac output with the distribution of cardiac output during aerobic (sustained) exercise and anaerobic (brief maximal burst) exercise. Include local regulation of blood flow and the role of capillary reserve in altering skeletal muscle blood flow.

INT 8. Define VO_{2MAX} and identify situations in which it is limited by cardiac output and by pulmonary gas exchange.

INT 9. Explain the control mechanism by which an increase in minute ventilation and heart rate accompanies exercise and how it can occur without any measurable change in arterial blood gas values.

INT 10. Define the effects of training on the heart and coronary circulation and how these changes contribute to an increase in VO_{2MAX} .

INT 11. Explain how each of the following can alter exercise performance: muscle fatigue, VO_{2MAX} , anaerobic threshold, gender, and age.

INT 12. Describe how chronic physical activity alters insulin sensitivity and glucose entry into

cells.

INT 13. Describe the health benefits of exercise training on the cardiovascular, musculoskeletal, immune systems, and for weight control.