Environmental Science Institute

The University of Texas - Austin

Exploring Myths About Addiction

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This file contains suggestions for how to incorporate the material from this CD-ROM into curriculum using the Texas Essential Knowledge and Skills for Science.

Middle School

Science, Grade 6

(6.10) **Science concepts.** The student knows the relationship between structure and function in living systems. The student is expected to:

(B) determine that all organisms are composed of cells that carry on functions to sustain life;**[slide 12, 18, How does our limbic system better enable humans to interact? How might this be a survival mechanism? What would happen if the hypothalamus stop sending signals that the body needed water or food?]**

(6.11) **Science concepts**. The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. The student is expected to:

(B) identify cells as structures containing genetic material; and **[slide 16]**

(C) interpret the role of genes in inheritance. **[slide 16, What is it that makes the child of these two parents likely to be predisposed to alcholism?]**

(6.12) **Science concepts**. The student knows that the responses of organisms are caused by internal or external stimuli. The student is expected to:

(A) identify responses in organisms to internal stimuli such as hunger or thirst; ;**[slide 18, What would happen if the hypothalamus stop sending signals that it needed water or food?]**

Science, Grade 7.

(7.10) **Science concepts**. The student knows that species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. The student is expected to:

(C) distinguish between dominant and recessive traits and recognize that inherited traits of an individual are contained in genetic material. **[slide 16, Suppose that it has been determined that the predisposition to alcoholism is a recessive trait, Will all the children of the two parents in the slide show symptoms of this trait?]**

Science, Grade 8.

(8.6) **Science concepts**. The student knows that interdependence occurs among living systems. The student is expected to:

(A) describe interactions among systems in the human organism; **[slide 12, 18, How does our limbic system better enable humans to interact? How might this be a survival mechanism? How does the stomach depend on the hypothalamus? Would an animal missing a hypothalamus starve to death?]**

(8.11) **Science concepts.** The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. The student is expected to:

(B) distinguish between inherited traits and other characteristics that result from interactions with the environment; and **[slide 16, How does the discovery of**

the predisposition to alcoholism trait help research into alcoholism? Could this discovery be an argument for more prevention programs?]

(C) make predictions about possible outcomes of various genetic combinations of inherited characteristics. **[slide 16, Suppose that it has been determined that the predisposition to alcoholism is a recessive trait, Will all the children of the two parents in the slide show symptoms of this trait? Suppose the mother is heterozygous for this trait and the father homozygous for the dominant trait, What ratio of their boys would develop this trait, what ratio of total children would show this trait? Would all the children with this trait become alcoholics?]**

High School

Integrated Physics and Chemistry.

Science concepts. The student knows how solution chemistry is a part of everyday life. The student is expected to:

(B) relate the concentration of ions in a solution to physical and chemical properties such as pH, electrolytic behavior, and reactivity;**[slide 10, Discuss the importance of the chloride ion in maintaining electrical and concentration gradients for proper nerve function? How do these ions help facilitate communication from one cell to another? How does the chloride ion help keep the "integrity" of the vesicle membranes? Why do athletes drink sports drinks instead of water during strenuous exercise? How could the loss of ions in their body effect their activities?]**

Biology.

Science concepts. The student knows that cells are the basic structures of all living things and have specialized parts that perform specific functions, and that viruses are different from cells and have different properties and functions. The student is expected to:

(B) investigate and identify cellular processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, function of cellular parts, and synthesis of new molecules; ;**[slide 10, Discuss the importance of the chloride ion in maintaining electrical and concentration gradients for proper nerve function? How do these ions help facilitate communication from one cell to another? How does the chloride ion help keep the "integrity" of the vesicle membrane? What structures help minimize the loss of neurotransmitters, and how does this help save energy? Where does the waste in the synaptic cleft go? Is it recycled, and if so into what? How does permeability help establish concentration gradients that help cells fire signals? Does this gradient reduce or increase the energy needed for neurons to communicate? How is this gradient replenished?]**

Science concepts. The student knows that, at all levels of nature, living systems are found within other living systems, each with its own boundary and limits. The student is expected to:

(A) interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune;

(B) compare the interrelationships of organ systems to each other and to the body as a whole; and **[slide 12, 18, How does the human limbic system better enable us to learn from each other? How might this be a survival mechanism? Does hunger originate in the stomach? Would an animal missing a hypothalamus starve to death? Could the "need" for a drug lead to death the way hunger might?]**

Chemistry.

Science concepts. The student knows the factors that influence the solubility of solutes in a solvent. The student is expected to:

(C) evaluate the significance of water as a solvent in living organisms and in the environment. **[slide 10, How does the polarity of water help chloride and**

sodium ions in the nerve cells? What happens to the neurons when the cells are dehydrated?]

Science concepts. The student knows relationships among the concentration, electrical conductivity, and colligative properties of a solution. The student is expected to:

(c)compare unsaturated, saturated, and supersaturated solutions; **[slide 10, The loss of water increases the concentration of what ions in the neurons?]**