05 Unit Brain Disorders and Addiction

Content Area: **Science**
Course(s): **Neuroscience**
Time Period: **Semester 1**
Length: **4 weeks**
Status: **Published**

Standards

HS-LS1	From Molecules to Organisms: Structures and Processes
HS-LS1-1	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
	Structure and Function
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
	Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
	Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.
LS1.B	Growth and Development of Organisms
	Analyzing and Interpreting Data
LS3.B	Variation of Traits

Enduring Understandings

- Addiction is one of the most severe types of substance use disorders, when an individual can no longer control the impulse to use a substance even when there are negative consequences.
- Genetic and environmental factors can both place some people at greater risk of developing a substance use disorder.

Essential Questions

- What factors influence the development of brain disorders?
- What factors influence the drug addiction?
- How does alcohol/ drug use impact brain development?

Knowledge and Skills

Knowledge:

- Some substances influence the brain and body by interfering with neurotransmitter signaling functions.
- Over time, a substance that overstimulates neural signaling can cause neurons to reduce their responsiveness, leading to tolerance of the drug.
- Other substances act by mimicking neurotransmitters, hormones, or other naturally occurring molecules.
- Substances that target components of the brain's reward system are more likely to lead to addiction.
- Autism spectrum disorders (ASD) are diagnosed based on two main criteria: impaired social communication and interaction, and repetitive behaviors or narrow, obsessive interests.
- Genes often play a role, with many psychiatric disorders tending to run in families.
- Medications used to treat most anxiety disorders work by altering the levels of neurotransmitters that carry signals between brain regions.
- Several factors combine to cause depression: genes, biological risk factors, environmental triggers, and psychological influences. Many people develop depression in response to the stress of a difficult life experience or a disabling medical problem such as cancer or chronic pain. Inside the brain, depression appears to disrupt the hypothalamus.
- Opioids interact with endorphin receptors in the brain, which control motivation, emotion, food intake, and our response to pain.
- Neuroscientists have discovered that regular marijuana use is linked to abnormal neurobiology in brain regions related to reward, cravings, and thought control — all are key players in addiction. Marijuana use during the teen years can have long-lasting effects on thinking, memory, and learning.

Skills:

- Research how stress and trauma affects the developing brain.
- Analyze and discuss data on the effects of alcohol on the adolescent brain.
- Develop models to show how different drugs affect brain function.

Transfer Goals

- Both genetic and environmental factors play a role in shaping the developing brain.
- Chemical influences, like alcohol and drug abuse negatively affect brain development possibly be interrupting the mylination process.
- Better understanding normal brain function can lead to age-specific therapies for brain disorders.

Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit?usp=sharing

Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit?usp=sharing