

## Cocaine Addiction Unit Plan

### Part 1: Macro anatomy of the brain

- CNS and PNS
  - Blood-Brain Barrier (oil and water demo)
- Neurons
  - Parts
  - Action potential
- Neurotransmitters
  - Dopamine and its function
    - Chemical structure (model)
  - Release into synapse
    - Tuber demo
  - Re-uptake into pre-synaptic neuron
  - Reward Pathway discussion
    - Brain diagrams
    - Web activity: <http://learn.genetics.utah.edu/content/addiction/reward/>
      - Have students write a paragraph describing the reward pathway

### Part 2: Addiction

- Pre-test about addiction
- Addiction card game to address why addiction happens
- Nova – Frozen Addicts (if available) or video clip from Secret life of the brain
  - Study guide?
- Mouse Party – [learn.genetics.utah.edu](http://learn.genetics.utah.edu)
  - Worksheet
- Eyes of Nye – Addiction
- Genetics of Addiction – [www.learn.genetics.utah.edu/content/addiction/genetics/](http://www.learn.genetics.utah.edu/content/addiction/genetics/)

### Part 3: Cocaine

- KWL chart?
- Breaking the blood-brain barrier
  - Review of blood-brain barrier
  - Demo (oil and water and drops of food coloring)
- History of cocaine in society: [http://www.youtube.com/watch?v=dtfyreAY\\_BY](http://www.youtube.com/watch?v=dtfyreAY_BY)
- Case Study – I can quit any time I want ([sciencecases.lib.buffalo.edu/cs/](http://sciencecases.lib.buffalo.edu/cs/))
  - Use as notes about dopamine and reward pathway
- Chemical Structure (model) and properties
  - Binding in model: Cocaine and DAT

### Part 4: Potential break down, treatment and therapy

- Chemical Structure (model) and properties
  - Case Study – The chemistry of cocaine (more advanced students)
- Acute versus Chronic
- Overdose
  - Antibody (methadone process)
  - Review article: Rhodococcus Cocaine Esterase, BhcE in humans

### Supplemental Materials

NIH – Science education: Addiction <http://www.pbs.org/wnet/closetohome/animation/neuron-main.html>

Ritalin - extension on [learn.genetics.utah.edu](http://learn.genetics.utah.edu)