

Grade Level 9-12

Lesson Length
1 class period



Lesson Summary: Students play a "game" that models the unknown potential for individual addiction, as well as some scientific inquiry processes. Originally from the NIH curriculum [The Brain: Understanding Neurobiology through the Study of Addiction](#).

Standards Alignment

Next Generation Science Standards

- MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
- MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
- **Framework for K-12 Science Education:** Science & Engineering Practices 2,4,6,7,8

Minnesota Science Standards – Alignment Matrix brainu.org/resources/MNSTDS

- Science is a way of knowing about the natural world and is characterized by empirical criteria, logical argument and skeptical review. Benchmark codes: **9.1.1.1.2** and **9.1.1.1.6**
- Scientific inquiry uses multiple interrelated processes to investigate and explain the natural world. Benchmark codes: **9.1.1.2.1**, **9.1.1.2.2** and **9.1.1.2.3**
- Science and engineering operate in the context of society and both influence and are influenced by this context. Benchmark codes: **9.1.3.3.2**
- Organisms use the interaction of cellular processes as well as tissues and organ systems to maintain homeostasis. Benchmark codes: **9.4.1.1.1** and **9.4.1.1.2**
- Cells and cell structures have specific functions that allow an organism to grow, survive, and reproduce. Benchmark codes: **9.4.1.2.2**, **9.4.1.2.4** and **9.4.1.2.5**

Objective

Students should be able to

- figure out that the risk card determines their fate.
- figure out that the activity mimics one's predisposition to become addicted with very little exposure.
- discuss different kinds of activities that might become addictive, from drugs and alcohol to shopping and playing on the internet.
- challenge hypotheses through data collection, interpretation, and sharing conclusions.

Materials

- one deck of playing cards for each group of students
- one dealer instruction sheet for each group of students
- player instruction sheets for each group
- one Whole Group Discussion Questions page for instructor
- poster paper or MS PowerPoint access (organizing findings for whole class sharing)

Procedure

1. Tell students this game has no winners but their job is to figure out what the game models.
2. Students are assigned roles. One student is the dealer who must read all of the instructions; the rest of the students are players who figure out what the game models.
3. Hand out dealer and player instruction sheets. While the rest of the players read over their instructions for clarity, take dealers aside and explain their role.
4. Answer player questions and summarize player instructions to be sure they clearly understand their objectives and are ready to play.
5. Begin playing until students are able to draw some conclusions about the rules of the game. More specifics are given on the player instructions sheet.
6. Ask each group to draw conclusions about what they think the rules of the game are, based on evidence they've gathered while playing successive rounds. Organize and display these conclusions for whole-class sharing and discussion. You can decide if you want to tell them the rules afterward or leave it *in question* like many ideas in science.
7. Lead a discussion using the Whole Group Discussion Questions sheet.

Explain

Extensive background material for this lesson can be found at

<http://science.education.nih.gov/supplements/nih2/addiction/guide/pdfs/lesson4.pdf>

Individuals make choices to begin using drugs. Some people begin using drugs to relieve a medical condition and then continue to use the drugs after the medical need is over.

Children who are depressed or who have a psychiatric disorder sometimes begin using illicit drugs to self-medicate. Other people begin taking drugs to feel pleasure, to escape the pressures of life, or to alter their view of reality. This voluntary initiation into the world of addictive drugs has strongly influenced society's view of drug abuse, drug addiction, and its treatment.

When does drug abuse become drug addiction? No one becomes addicted with the first use of a drug. Drug abuse and drug addiction can be thought of as points along a continuum.

Any use of a mind-altering drug or the inappropriate use of medication (either prescription or over-the-counter drugs) is **drug abuse**.

The point when drug abuse becomes drug addiction is less clear. Different drug abusers may reach the point of addiction at different stages. Scientists continue to investigate the factors that cause the switch between the two points.

Discussion Points:

1. No one knows the point at which they'll become addicted before taking drugs. The unknown risk card models this unknown predisposition to become addicted. In the NIH Curriculum, the risk card is called a *switch* card.
2. Picking more choice cards mimics engaging in risky behaviors that could cause addiction.
3. Everyone's risk factors are different. They depend upon both genes and environment.
4. Addiction is a *disease of learning*. Once addicted, it is very difficult to unlearn the behavior. For drug addiction, the drugs themselves mimic or alter the ability of neurotransmitters to function properly and for synapses to remodel.

Explore

Play the game again.

Discuss with students how their behavior changed once they understood what the game modeled.