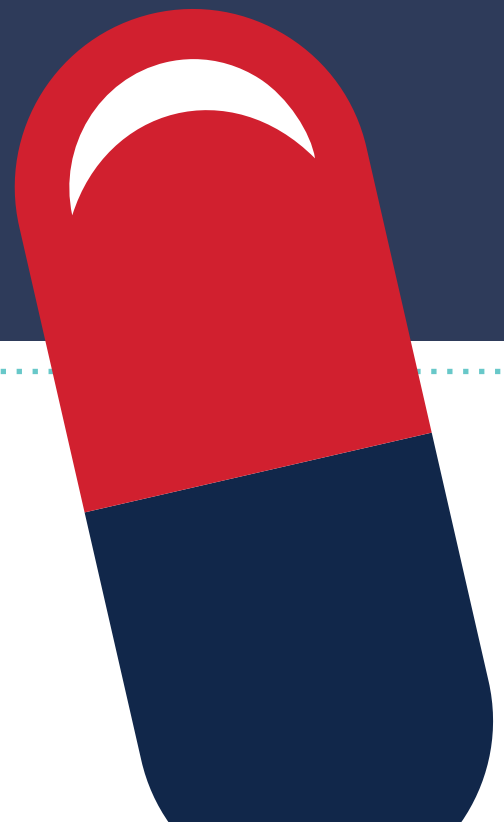


**THE SCIENCE OF ADDICTION:
THE STORIES OF TEENS**

EDUCATOR
GUIDE





THE SCIENCE OF ADDICTION: THE STORIES OF TEENS

Millions of people misuse opioids every year, millions more become dependent, and overdose deaths are on the rise. However, opioid misuse isn't limited to one group. The problem is far reaching, and one particularly vulnerable group is young people. Some teens have struggled with the temptation to misuse opioids and many are struggling with physical dependence and addiction.

The Science of Addiction: The Stories of Teens was designed to help students understand the science behind how opioids impact the body and brain so they can make smart decisions throughout their lives. The self-guided learning module arms students with information, scientific background, and authentic stories of teens to help them understand the risks of opioid misuse and recognize steps they can take to help someone struggling with opioid dependency. Throughout the module, students learn how opioids affect the brain and body, why it is so easy to become physically dependent on opioids, and how they can support those struggling with opioid misuse.

The primary audience is high school students, but middle school students, educators and parents/guardians can also benefit from going through the module. While it is primarily designed for students to move through at their own pace in a one-to-one environment, this Educator Resource Guide has been designed to help educators, guidance counselors, and parents/guardians support or lead the learning in a one-to-many environment or at home.



THE SCIENCE OF ADDICTION: THE STORIES OF TEENS SUMMARY

In this module, students will explore prescription opioid misuse and heroin use through three first-person perspectives. Student voices will narrate unique stories that emphasize signs and symptoms that can help other teens identify an opioid addiction and understand the science of addiction. Students will uncover how to deal with influences that shape decisions to misuse opioids in their adolescent years and beyond. The module revolves around the experiences of three teens:

- Stefon, who becomes physically dependent on prescription opioids after misusing them following a football injury;
- Haley, who becomes physically dependent on prescription opioids after first trying them with friends at a party; and
- Mia, who becomes addicted to heroin after using it with her boyfriend Alex.

HOW THE MODULE WORKS

Students explore the module by listening to each teen's story, learning background information and scientific explanations for what happened in that story, and answering formative and summative assessment questions about what they learned. In its entirety, the module should take 30 to 40 minutes to complete.



EDUCATIONAL STANDARDS

The module content was developed to align with two sets of national education standards: the Next Generation Science Standards (NGSS) and the National Health Education Standards (NHES). For more information about both sets of standards and how the module content follows them, refer to the [Educational Standards](#) section of this document.

KEY LEARNING OBJECTIVES

After completing *The Science of Addiction: The Stories of Teens*, learners will understand that:

- taking an opioid can impact several systems of the human body.
- opioid misuse can easily and quickly lead to physical dependence.
- anyone can become addicted to opioids.
- prescription opioids can be just as dangerous as street drugs such as heroin.
- there are short-term and long-term effects of misusing opioids that can be warning signs of physical dependency and withdrawal.

HELPING STUDENTS NAVIGATE



HELPING STUDENTS NAVIGATE THE SCIENCE OF ADDICTION: THE STORIES OF TEENS

Preparation

It is recommended that educators complete *The Science of Addiction: The Stories of Teens* before sharing it with students. This will allow you to build your background knowledge and explore what students will experience so that you are better able to anticipate their reactions, questions, and misconceptions.

How to Use *The Science of Addiction: The Stories of Teens*

The Science of Addiction: The Stories of Teens is designed to be flexible to meet the needs of many different learning environments.

Examples include:

- **Self-guided learning** – Students using the module for independent, self-guided learning can move through it at their own pace. Educators in a classroom environment can also assign the module as an out-of-class activity.
- **Working in pairs or at centers** – Students can take turns answering the questions throughout the module and in this guide, or they can work together to answer the questions. Educators who are working with students at different reading levels and with varying knowledge will want to make sure they provide all group members with an opportunity to read and comprehend the information before moving on.
- **Class environment** – If you are leading a group in a one-to-many environment, you can use a projector and screen or whiteboard to make the module the focus of instruction and discussion. Use the questions in this guide and a show of hands during each topic to gauge student comprehension.
- **Customized instruction** – You may also choose to use discrete elements from the module (e.g., activity, assessment) that best fit your time frame and curriculum.

HELPING STUDENTS NAVIGATE



Educator Tip:

Students may be tempted to share personal information about opioid misuse by themselves or others. As always, be sure to follow school or district policies about the sharing of personal information about minors.

Educator Tip:

- Are you ready for your students to begin? Here are some questions that can help set the stage for learning.
- What are opioids? What are some examples of opioids?
- What do you already know about opioid misuse? What have you heard about this epidemic? (Explain the meaning of epidemic, if necessary.)
- Do you think some opioids are more dangerous than others? Why?
- What are some risk factors for becoming physically dependent on opioids?
- Why do people misuse opioids?
- What are the short-term effects of misusing opioids?
- What are the long-term effects of misusing opioids?

A GUIDE THROUGH EACH TOPIC

Introduction, Pre-Assessment, and Confidence Survey



WELCOME

The module introduction begins by giving some facts about the opioid epidemic in the United States. Then, students complete a short flip card activity to help them identify facts and misconceptions about opioids. Finally, students watch a short animation that elaborates on some of the facts from the initial introduction screen.

Educator Tip:

- You may wish to extend the flip card activity with the following discussion questions:
- Which fact or misconception statement is most surprising?
- What misconception do you think is most common with teens your age? Why?
- Which misconception do you think is most important for teens your age to understand? Why?

A GUIDE THROUGH EACH TOPIC



PRE-TEST

Three pre-test items help students gauge their existing knowledge about some of the topics they will explore. Correct answers are in red.

1. How do prescription opioids act on the body to relieve pain?

- a. By relaxing muscles to reduce stress on joints and bones
- b. By blocking pain receptors in the brain
- c. By encouraging damaged cells to heal more quickly
- d. By numbing nerve cells in organs so they don't detect pain

2. Which statement about opioid addiction is true?

- a. A person who is addicted to opioids may not be able to stop taking them, even if he or she wants to.
- b. A person who takes prescription opioids will probably not become addicted unless he or she takes them for several years.
- c. A person who is addicted to heroin is unlikely to also misuse prescription opioids because they don't have the same effects.
- d. A person who is not addicted to other drugs is unlikely to become addicted to opioids.

3. Identify actions you could take to help someone who is misusing opioids. Select all that apply.

- a. Offer to go with them to talk to an adult about getting help.
- b. Tell them you're worried about them.
- c. Ask for help from an adult you trust.
- d. Offer to listen to them if they need to talk about what's going on in their lives.
- e. Give them information about resources that can help.

A GUIDE THROUGH EACH TOPIC



The screenshot shows a web interface for a confidence rating activity. At the top, it says 'OPERATION PREVENTION The Science of Addiction'. Below that, it asks the user to 'Select the image that matches how strongly you agree or disagree with the following statements.' There are three statements, each with a 'Make a selection' dropdown menu. The statements are: 'I know a lot about how opioids affect the brain and body.', 'I know the risks of misusing opioids.', and 'I know how to get help if I think someone I know is misusing opioids.' At the bottom, there is a 'BACK' button, a status indicator 'Make all selections above. Status: 0/3', and a 'NEXT' button. The Discovery Education logo is at the bottom right.

CONFIDENCE RATING

Students are asked how much they agree or disagree with the following statements. This activity will repeat at the end of the module so students can compare their knowledge and confidence at the beginning of the module with their knowledge and confidence at the end.

- I know a lot about how opioids affect the brain and body.
- I know the risks of misusing opioids.
- I know how to get help if I think someone I know is misusing opioids.

TOPIC ONE



MISCONCEPTION ADDRESSED: ONLY CERTAIN PEOPLE MISUSE OPIOIDS.

Educator Tip:

Each section begins with a question that was designed to help students feel connected to the teen in the narrative and the overall topic. If you're using this module in a group setting, encourage dialogue by pausing here to discuss each question, either as a class or in small groups.

In Topic 1, students are presented with the scenario of being prescribed an opioid painkiller after an injury and asked, "Would you be tempted to keep taking the painkillers once you no longer need them?" This section will cover the science behind the "feel-good" effects of misusing opioids, and this teen's story breaks down the misconception that only certain people—"not me"—misuse opioids.

Students are introduced to Stefon, a football player who suffers a serious knee injury. A doctor prescribes him opioids for pain. Stefon begins to misuse them when he realizes that he feels relaxed and happy after he takes them. Toward the end of the narrative, Stefon has begun to notice that he feels sick when he isn't able to take the pills.

Educator Tip:

Many students believe that there is a certain "type" of person who is more likely to misuse opioids. If your students have this misconception, you may wish to point out that before his injury, Stefon was a star athlete—someone whom many people would not expect to misuse opioids.

TOPIC ONE



A LOOK INSIDE THE BODY

How did opioid misuse lead to physical dependence for Stefon? In this click and reveal activity, students learn about endorphins—the body's natural “feel-good” chemicals—and how opioids mimic those endorphins to produce the positive feelings and relaxation that Stefon experienced. They also learn how repeated misuse of opioids can lead to physical dependence. Students click each hot spot on the diagram to reveal information about it.

Educator Tip:

The explanatory text in this activity will make more sense if it is read in the correct order. Learners should click on the hot spots in numerical order to avoid confusion.

Educator Tip:

Some students may benefit from some extra reinforcement of the relationship between endorphins and opioids. You may wish to emphasize that opioids do not cause more endorphins to be produced. Instead, opioids mimic the effects of endorphins—the brain cannot tell the difference between opioids and its own naturally occurring endorphins.

TOPIC ONE



THE SCIENCE BEHIND DEPENDENCE

In this flip card activity, students view specific statements Stefon made. They then learn how the effects of opioids on the brain explain Stefon's experiences.

Educator Tip:

If needed, remind students what they just learned about endorphins and opioids to help them understand the explanations on the backs of the cards.

Educator Tip:

Students may be confused about why Stefon developed a physical dependence. Explain that Stefon was misusing his medication in a way that wasn't prescribed—both by continuing to take them after the pain went away and by taking more than he should.

Educator Tip:

To reinforce what the students just learned before their formative assessment, use this discussion question:

- Exercise and other healthy activities produce endorphins, which have effects similar to prescription opioids and heroin. But what are the key differences between the endorphins produced by the body and the effects of misusing opioids?

(Students' answers should include a discussion of the fact that endorphins produced by the brain through exercise and other healthy activities are natural. Prescription opioids and heroin are artificial versions of these chemicals, which cause even stronger feelings and produce more dopamine than natural endorphins. People who misuse opioids for their "feel-good" effects can develop a physical dependency on them quickly because their brain stops naturally producing the same level of endorphins. They feel sick or depressed when they don't take opioids because their body is so low on natural endorphins.)

TOPIC ONE



FORMATIVE ASSESSMENT

Throughout the module, there are formative assessment questions to reinforce and help students gauge their own learning. In this question, students review what they have learned about the effects of prescription opioids.

Question:

Think about what you learned from Stefan's experiences, and then read the statements below about opioid use. Choose the statements that are true. Select all that apply.

- a. Opioids can't bind as strongly to nerve cells as endorphins do, so opioids cause less dopamine to be released than endorphins do.
- b. Opioids act like naturally occurring endorphins that cause the brain to release dopamine and produce a happy, relaxed feeling.
- c. Only certain types of people are at risk of becoming physically dependent on opioids.
- d. When opioids are misused frequently, the brain begins to make fewer natural endorphins, causing a sick and depressed feeling when the opioids aren't taken.
- e. A person who is physically dependent on opioids feels fine even when he or she has not taken any.
- f. A person has to misuse opioids for a long time before he or she becomes physically dependent.



MISCONCEPTION ADDRESSED: IF AN OPIOID IS PRESCRIBED, WE CAN'T BECOME PHYSICALLY DEPENDENT ON IT.

In Topic 2, students imagine they are at a party, and someone offers them a pill. Would they take it? This teen's story will address the misconception that people cannot become physically dependent on prescription opioids because they are medication.

Educator Tip:

Use the question "What could go wrong?" as a prompt for students about the negative effects of prescription opioid misuse from different perspectives, from the physical (I might get sick) to the social (I might get in trouble with the law).

The next teen story is from Haley. She takes some prescription opioids at a friend's house. She assumes that, because these drugs were prescribed for her friend's father, they are not dangerous. She enjoys the initial feeling, but then has some negative side effects. Despite this, she continues to misuse the opioids and soon finds she feels even worse when she stops taking them.

Educator Tip:

The main misconception addressed in this section of the module is that prescription opioids are not as dangerous as street drugs (like heroin). Many students may believe that prescription opioids are less likely to lead to physical dependence and addiction because they have a legitimate medical use. However, all opioids affect the brain in the same way, and all can lead to physical dependence.

Educator Tip:

Most effects from opioids (positive and negative) are the result of how they affect the brain. It is common for students to not fully appreciate how much brain chemistry impacts the rest of the body. You may wish to review how our experiences are controlled by our brains—brain chemistry determines emotions, perception, and behavior.

TOPIC TWO



EFFECTS OF OPIOIDS

Students click on various quotes from Haley's narrative to view scientific explanations for each statement.

Educator Tip:

The first statement in the activity, in which Haley shares that the pills made her friends and her feel good, ties back to what students learned in the first topic. If needed, remind students of what they learned earlier about how opioids mimic endorphins and produce positive feelings.

Educator Tip:

Understanding why the opioids made Haley feel tired and sick requires an understanding of how the nervous system affects other body systems. If needed, review the relationships between the nervous system and other systems in the body to help students understand the side effects Haley experienced.

Educator Tip:

If students have difficulty understanding why heroin is not more dangerous than prescription opioids, you may wish to remind students that heroin is also an opioid.



COMPARING HEROIN AND PRESCRIPTION OPIOIDS

Students explore an animation that compares the chemical structures and short- and long-term effects of prescription opioids and heroin.

Educator Tip:

As the chemical structures of different opioids are displayed, point out the similarities between them. Clarify that morphine, oxycodone, and codeine are all opioids that are commonly prescribed for pain. Emphasize that these substances are only slightly different from heroin. They all share the same base molecular structure with different groups of atoms on the outside.

Educator Tip:

Students may not understand why overdosing on opioids can cause breathing difficulties. Opiates act directly on the respiratory center in the brainstem, where they cause a slowdown in activity. This results in a decrease in breathing rate. Excessive amounts of an opiate, like heroin, can cause the respiratory centers to shut down breathing altogether. When someone overdoses on heroin, it is the action of heroin in the brainstem respiratory centers that can cause the person to stop breathing and die.

Educator Tip:

To reinforce what the students just learned before their formative assessment, use this discussion question:

- If you were working on a report on opioid misuse and different kinds of opioids, such as heroin, oxycodone, and codeine, what information would you include to compare and contrast these substances? (Students' answers should acknowledge that prescription opioids such as oxycodone and codeine have legitimate medical uses, but heroin does not; all opioids affect the brain and body in similar ways; and that people can become dependent on any opioid, not only heroin.)

TOPIC TWO



FORMATIVE ASSESSMENT

Throughout *The Science of Addiction: The Stories of Teens*, there are formative assessment questions to reinforce and help students gauge their own learning. In this question, students categorize statements as referring to heroin, prescription opioids, or both.

Question:

Read each description and decide whether it applies to prescription opioids only, heroin only, or both prescription opioids and heroin.

- a. May be prescribed by a doctor (Prescription Opioids Only)
- b. Can lead to dependence and addiction (Both Prescription Opioids and Heroin)
- c. Stimulates reward centers in the brain (Both Prescription Opioids and Heroin)
- d. Has no accepted medical use (Heroin Only)
- e. Can lead to overdose (Both Prescription Opioids and Heroin)
- f. Can have unpleasant effects (Both Prescription Opioids and Heroin)

TOPIC THREE



MISCONCEPTION ADDRESSED: I WON'T BECOME ADDICTED.

In Topic 3, students consider “What would you do?” if they knew someone who seemed like they were becoming addicted to prescription opioids or heroin. This teen’s story will address the cycle of addiction and why it happens to people who misuse opioids.

Educator Tip:

The question here “What would you do?” is a good chance to gauge how much students know about addiction intervention and recovery. Be prepared to ask follow-up questions like “Who would you contact? How would you contact them? When would you ask for help?” Encourage students to present their ideas, but be sensitive that some students may know someone personally who is recovering. (There may be some feelings of resentment, frustration, or guilt.)

The final teen story is from Mia. Mia notices her boyfriend Alex and his friends using heroin. Although Alex is reluctant, Mia convinces him to let her try it. Soon, both Mia and Alex become addicted to heroin and are unable to stop even though they want to.

Educator Tip:

In the previous two narratives, the teens develop physical dependence, but not addiction. It is important for students to understand that it is possible to become addicted to prescription opioids, just as Mia became addicted to heroin.

TOPIC THREE



FROM DEPENDENCE TO ADDICTION

In this slider activity, students learn how heroin use can lead to addiction. At each point on the slider, they see information about a stage in the development of addiction.

Educator Tip:

Because heroin has no accepted medical applications, the term use—rather than misuse—is included in this activity. Point out to students that the effects of heroin use are the same as those of prescription opioid misuse that they have seen in previous topics.

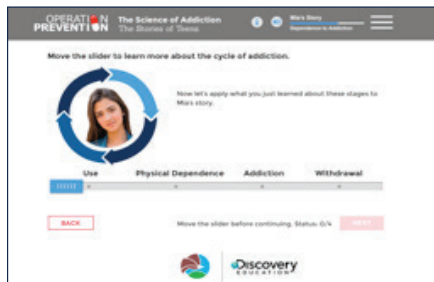
Educator Tip:

Students may have difficulty understanding the difference between physical dependence and addiction. Point out that addiction is a chronic illness, and that people who are addicted to heroin or other substances may not be able to stop using them, even if they want to.

Educator Tip:

It is important for students to understand that misusing opioids when young significantly increases the risk of physical dependence and addiction. The brain continues to develop and grow until people are in their 20s (or even 30s). Opioids change the way the brain works by creating a dependency on artificial sources for its reward circuit (dopamine system) and blocking neurotransmitters. If those changes occur while the brain is still developing, they can affect brain function for the rest of a person's life.

TOPIC THREE



MIA'S STORY

Next, students review the same stages in the development of addiction, but in the context of Mia's experiences.

Educator Tip:

If students still struggle with the difference between physical dependence and addiction, use Mia's story to clarify. Mia became physically dependent on heroin when she felt ill when she stopped using it. She became addicted when she began to focus only on using heroin and relied on it to get through the day, and when it began to interfere with her ability to make decisions. However, this is only one example, and the signs of physical dependency or addiction may vary from person to person.

Educator Tip:

To reinforce what students just learned before their formative assessment, use this discussion question:

- Heroin and other opioids have been around for a long time, and people have become addicted to them for as long as they have been around. Most people know that misusing opioids can lead to addiction. Why do you think people who know the risks still start misusing opioids? (Students might mention that people may not think they will become addicted, or that even if they do become addicted, they will be able to recover easily. Students' answers should also recognize the factors that make it easy for people to become addicted to opioids—the strong “rush” when taking them and the fact that the brain easily adapts to them because they mimic natural brain chemicals.)

TOPIC THREE



FORMATIVE ASSESSMENT

Throughout the module, there are formative assessment questions to reinforce and help students gauge their own learning. In this question, students identify true statements about heroin.

Question:

Think about Mia's experience. Which statements about how Mia became addicted to heroin are true? Select all that apply.

- a. Endorphins and opioids attach themselves to the same receptors—producing the same relaxed and happy feelings.
- b. Heroin stimulates the body's reward system by causing the release of dopamine, causing a rush of positive feelings.
- c. The stimulation of the brain's reward center is unrelated to the brain's ability to make decisions.
- d. Regions of the brain can become tolerant of opioids with continued misuse, increasing the risk of overdose.
- e. Changes in brain chemistry from heroin use can make people feel like they still need heroin even after physical withdrawal symptoms pass.

CONCLUSION, CONFIDENCE SURVEY, POST-ASSESSMENT



WRAP UP 1

In the first part of the Wrap Up, students learn more about what happened to Stefon, Haley, and Mia.

Educator Tip:

If you are leading students through the screens, you may want to pause and invite students to list the most important things they learned during the module before showing the review screen.



WRAP UP 2

In the second part of the Wrap Up, students learn strategies for helping someone who may be struggling with opioid misuse. This activity is divided into three sections:

- **Things to Know** reviews some important facts about addiction and physical dependence and how they can affect behavior.
- **What to Say** gives some suggestions for addressing concerns about opioid misuse.
- **Where to Get Help** gives information about specific resources that may be helpful to those struggling with opioid misuse. OperationPrevention.com offers those resources in the parent tool kit

Educator Tip:

Students may benefit from role-playing to help them apply and practice what they have learned in this section.

Educator Tip:

Find some local resources to help those struggling with opioid misuse, such as support groups, treatment centers, and prevention materials. Make information about those resources available to students as they complete this module.

Educator Tip:

Students may have trouble understanding why a person may react negatively to a friend offering help. You may wish to brainstorm examples of obstacles when offering help and ways to overcome them. For example, you could explain that people often don't want to admit when they are scared or when they've made a mistake. So, it's common for people to react with anger instead of expressing fear or embarrassment. It's important to be patient and remain calm.

CONCLUSION, CONFIDENCE SURVEY, POST-ASSESSMENT

OPERATION PREVENTION The Science of Addiction The Stories of Teens

Select the image that matches how strongly you agree or disagree with the following statements.

I know a lot about how opioids affect the brain and body.

I know the risks of mixing opioids.

I know how to get help if I think someone I know is misusing opioids.

Select an answer above before continuing.

Discovery EDUCATION

CONFIDENCE RATING

Students are provided another confidence rating to assess their knowledge of the effects of opioid misuse.

OPERATION PREVENTION The Science of Addiction The Stories of Teens

How do opioids affect the body? Question 7 of 8
Choose all that apply.

A. Block pain receptors in the brain

B. Increase heart rate and breathing rate

C. Stimulate brain reward centers

D. Slow breathing

E. Increase dopamine in the brain

F. Encourage damaged cells to heal more quickly

Select all that apply before continuing.

Discovery EDUCATION

POST ASSESSMENT

The Science of Addiction: The Stories of Teens concludes with a series of assessment questions to help students gauge what they have learned. Students are asked questions about the effects of opioids, physical dependence, and signs of misuse. Students are limited to one try on these questions, and they will not receive feedback on these summative questions. Upon completion of all questions, the final screen will show the correct answers, which are in red below.

1. How do opioids affect the body? Choose all that apply.

- a. Block pain receptors in the brain
- b. Increase heart rate and breathing rate
- c. Stimulate brain reward centers
- d. Slow breathing
- e. Increase dopamine in the brain

2. Stefon's friend Darryl was worried about Stefon's misuse of opioids. What steps would you recommend Darryl take to help Stefon? Choose all that apply.

- a. Tell Stefon that he is worried about him and give some reasons why
- b. Search Stefon's locker for the opioids
- c. Avoid talking about it with Stefon so he doesn't push him away
- d. Talk to Stefon's football coach about it
- e. Find some resources online to suggest to Stefon

CONCLUSION, CONFIDENCE SURVEY, POST-ASSESSMENT



POST ASSESSMENT CONT.

3. During opioid misuse, the nervous system influences other systems in our body, often leading to physical dependence on opioids. Choose the correct phrases in the dropdown menu to describe the stages of how opioids impact the brain and body.

With the continued misuse of opioids, the structure of the brain changes so that it produces **fewer endorphins** naturally without opioids. The brain becomes **physically dependent on opioids** to stimulate nerve cells to produce dopamine. Prolonged opioid misuse **changes the brain's chemical structure**, affecting the area of the brain that controls decision making, leading to addiction.

4. Which statements about opioid addiction are true? Choose all that apply.

- a. Teens are less likely to become addicted to opioids because the centers of the brain affecting judgment and perception are still developing.
- b. When people are addicted to opioids, they may continue to misuse the substances even after they decide to stop.
- c. It is easier for someone to recover from an addiction to prescription opioids than from an addiction to heroin.
- d. Most people become addicted to opioids only after using them for more than a year.
- e. Opioid addiction can affect the brain's chemical systems and reward circuits.

5. Place these stages in order of how they happen to describe how opioids affect the brain, leading to addiction.

- Opioids mimic natural brain chemicals.
- Brain becomes physically dependent on opioids.
- Larger doses are needed to produce a "high."
- Person relies on the opioid to get through the day.

CONCLUSION, CONFIDENCE SURVEY, POST-ASSESSMENT



POST ASSESSMENT CONT.

6. Read these entries that Haley’s friend Cindy wrote in her online journal. Cindy is worried that Haley’s behavior might indicate that she is misusing opioids. Select the sentences that describe things Haley did that probably made Cindy concerned.

Jan 4

Haley and I had such a good time at rehearsal tonight! This play is going to be awesome. I'm so glad she convinced me to try out!

Jan 15

Haley missed another rehearsal tonight. She said she wasn't feeling good. It's weird, she was so happy and chill at lunch.

Jan 20

Haley wasn't in school today. I texted her and she said she was still feeling sick.

Jan 22

At least Haley came to school today. She was so out of it, though. Midway through class she opened her bag to take out a book. I thought I saw a container with some pills in it.

KEY VOCABULARY

Addiction	a chronic brain disease that causes a person to compulsively seek out drugs despite the harm they cause
Dopamine	a neurotransmitter that helps to control movement, motivation, emotions, and sensations like pleasure
Endorphin	an opioid produced naturally by the brain that can relieve pain and produce pleasurable feelings
Opioid	a substance that binds to opioid receptors in the brain and that can produce pleasurable feelings and relieve pain
Physical Dependence	a condition in which the brain has become adapted to the presence of drugs, producing negative effects when the drugs are stopped and making larger doses of the drug necessary to get the same effect
Prescription Opioid	an opioid prescribed by a physician for the treatment of a medical condition
Withdrawal	unpleasant feelings and reactions that result when a person is physically dependent on a substance and stops taking that substance

EDUCATIONAL STANDARDS

The module content was developed to follow two sets of education standards: the Next Generation Science Standards (NGSS) and the National Health Education Standards (NHES).

The specific standards to which *The Science of Addiction: The Stories of Teens* aligns include:

Next Generation Science Standards

HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

- LS1.A: Structure and Function: Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.

LS1.D: Information Processing

- By the end of grade 12: In complex animals, the brain is divided into several distinct regions and circuits, each of which primarily serves dedicated functions, such as visual perception, auditory perception, interpretation of perceptual information, guidance of motor movement, and decision making about actions to take in the event of certain inputs. In addition, some circuits give rise to emotions and memories that motivate organisms to seek rewards, avoid punishments, develop fears, or form attachments to members of their own species and, in some cases, to individuals of other species (e.g., mixed herds of mammals, mixed flocks of birds). The integrated functioning of all parts of the brain is important for successful interpretation of inputs and generation of behaviors in response to them.

National Health Education Standards

Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.

- 1.12.9 Analyze the potential severity of injury or illness if engaging in unhealthy behaviors.

Standard 4: Students will demonstrate the ability to use interpersonal communication skills to enhance health and avoid or reduce health risks.

- Demonstrate how to ask for and offer assistance to enhance the health of self and others.

Standard 5: Students will demonstrate the ability to use decision-making skills to enhance health.

- Examine barriers that can hinder healthy decision making.

ADDITIONAL RESOURCES

These resources can be used to reinforce or expand upon students' understanding of key concepts.

Resource: NIDA for Teens

Source: National Institute on Drug Abuse

Description: Information on drugs and drug abuse

Link: <https://teens.drugabuse.gov/>

Resource: Operation Prevention

Source: Discovery Education and the Drug Enforcement Agency

Description: Resources for preventing and addressing opioid misuse

Link: <https://www.operationprevention.com/>

Resource: Just Think Twice

Source: Drug Enforcement Administration

Description: A site for students to get the facts about drugs.

Link: www.justthinktwice.com

Resource: Al-Anon/Alateen

Source: Al-Anon Family Groups

Description: Support groups for friends and families of people with addiction (Note: Al-Anon/Alateen focuses primarily on those affected by people with alcohol abuse issues, but many meetings and services are also applicable to people affected by others' opioid misuse.)

Link: <http://al-anon.alateen.org/>

Resource: The Partnership for Drug-Free Kids

Source: The Partnership for Drug-Free Kids

Description: Site that translates the science of teen drug use and addiction into actionable information and guidance.

Link: www.drugfree.org

Resource: Get Smart about Drugs

Source: Drug Enforcement Administration

Description: A site for teachers, parents and caregivers to get the facts about drugs.

Link: www.getsmartaboutdrugs.gov