Dose of Knowledge

Middle and High School

Opioids and the Brain

Educator Guide

CVS Health

Discovery EDUCATION

Dose of Knowledge

Background

Prescription opioids are used to treat moderate to severe pain and are generally prescribed for a short period of time. Adolescents may be prescribed these after surgery, dental work, or even after a sports injury. Prescription opioids are effective in treating short term moderate to severe pain, but they are to be taken under the careful supervision of a healthcare provider. A few of the most commonly used prescription opioids are oxycodone (OxyContin®), hydrocodone (Vicodin®), morphine, and codeine. Fentanyl is a powerful synthetic opioid that is similar to morphine but is 50–100 times more potent. It is a prescription drug used to treat patients with severe pain, but more recently fentanyl is showing up in illegal street drugs, like heroin or fake prescription pain pills. Heroin is an opioid, but it is an illicit drug not a prescription medication. It is chemically similar to most prescription pain relievers and can produce similar effects. Some slang terms for these opioids are Oxy, Vikes, Big H, Smack, and Percs.

If you have ever touched a hot stove, your hand probably moved away without you even thinking about it. This is because of your nervous system. The nervous system is made of over 100 billion nerve cells called neurons and allows us to be able to react to the outside world as well as control the processes inside our body. The nervous system consists of two parts called the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS includes the nerves in the central part of the body. These nerves are located in the brain and spinal cord. All other nerves in your body, such as the ones that radiate from the spine out to the tips of your fingers, are part of the PNS[1].

Drugs that affect the CNS include both stimulates and depressants. Prescription stimulants are generally used to treat attention-deficit hyperactivity disorder (ADHD) and narcolepsy—uncontrollable episodes of deep sleep. They work by increasing alertness, attention, and energy. Some examples you may have heard of include prescription medications like Adderall®, Ritalin®, Concerta® and the illegal drug, methamphetamine (meth). Side effects of these medications may include: anxiety, trouble sleeping, reduced appetite, and increased heart rate. Misusing prescription stimulants can cause psychosis, paranoia, heart attack, or stroke. Depressants are drugs that slow brain function. When consumed, the individual will have an overall feeling of calmness and drowsiness. These drugs also lower heart rate and blood pressure. Common CNS depressants include Valium®, Xanax®, Klonopin®, and the illegal/illicit drug heroin.

Opioids attach to and activate opioid receptors on brain cells, the spinal cord and other organs in the body, especially the ones involved in pain and/or pleasure. When this attachment occurs, they block the pain signals from the brain to the body and release endorphins throughout the body. Endorphins are neurotransmitters that transmit electrical signals within the nervous system. Endorphins interact with opioid receptors in the brain to reduce the perception of pain. Endorphins naturally block pain by binding to opioid receptors, causing many of the same "euphoric" effects as opioid drugs, such as decreased feelings of pain and increased feelings of pleasure. The release of endorphins can reinforce the act of taking the drug, making the person want to repeat this experience[2]. Endorphins prompt the release of dopamine, which also causes pleasure. Opioid drugs cause a larger flood of dopamine to be released than non-drug things, and the brain remembers this "high" and can start to crave the intensity produced by the opioid drug.

Opioids mainly target cells in the brain, spinal cord, and other organs in the body that involve pain and/or pleasure. When opioids attach to opioid receptors in the brain and spinal cord they block the transmission of pain messages to the brain. In addition to blocking pain messages, opioids also act on the reward center of the brain and allow the individual to feel pleasure and euphoria. These feelings are often

1 National Center for Biotechnology Information. How does the nervous system work? https://www.ncbi.nlm.nih.gov/books/NBK279390/

2 https://www.hopkinsmedicine.org/opioids/what-are-opioids.html

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referred to as the "high." Over time, people continue to crave that "high" and may become tolerant to the number of opioids they are taking and need to increase the dosage or change to a stronger opioid in order to achieve the same pain-free, euphoric feelings they had with a smaller dosage. This is often why opioids can become addictive[3].

The teenage brain is not fully developed until around age 25. Because of this, teenage brain cells send a "louder" message than those of adults. This intensity results in teens experiencing sensations of pleasure in a more intense manner than do adults. Along with this, negative emotions such as stress, depression, or anxiety can be heightened as well. Therefore, when teens engage in risky behavior such as drug use, their brains are highly sensitive to the effects of the substance. This can lead to greater risk for substance misuse and ultimately substance use disorder[4].

This lesson will help students examine the effects of opioids on the nervous system and brain. Students will be better able to make a connection between drugs and substance misuse and how that might influence decision-making skills.

3 National Institute on Drug Abuse. *Prescription Drugs*. https://www.drugabuse.gov/publications/brain-power/grades-6-9/drugs-in-cupboard-module-3/background

4 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4671080/

Overview

Students will examine the effects of opioids on the nervous system, look at how opioids impact the adolescent brain, and compare opioids to other prescription medications that are misused before creating an infographic aimed at educating their peers on the issue.

Use of Presentation

The accompanying presentation was created with PowerPoint so that it can be used in a variety of classrooms. If you are using a laptop with an LCD projector, simply progress through the PowerPoint by clicking to advance. All of the interactive aspects of the presentation are set to occur on click. This includes images, text boxes, and links which will appear in a web browser upon clicking. If you are using an interactive whiteboard, tap on each slide with your finger or stylus to activate the interactive aspects of the presentation. In the notes for each slide, there will be information on how to proceed.

This guide provides slide-by-slide instructions to ensure educators are prepared to explain, discuss, and facilitate the hands-on content in the accompanying presentation. Note that timing guidance is provided as a recommendation, but each situation will be unique.

Session Structure

The Health Information: Our Community, Our Responsibility sessions provide the following information to guide the educator through its implementation and teach the necessary skills and content.

- **Learning Objectives:** Each session includes its overall goals as well as specific learning objectives for students.
- **Materials:** Any materials necessary for the session are clearly outlined and included when possible to facilitate easy implementation of the session.
- **Key Terms:** Any words that can be used as vocabulary words will be defined for the teachers.
- **Key Talking Points:** To help the teacher guide discussion and reinforce key concepts, key points are listed next to the corresponding slides.
- **Anticipated Student Responses:** Where relevant, anticipated student responses for activities and questions are provided next to corresponding slides.
- **Reflections:** A learning summary is provided at the end of each session for the educator to provide reinforcement of the key concepts and objectives of each session.

Content Areas

Health, Physical Education

Activity Duration

45–60 minutes

Grade Band

6–12*

***Note:** While appropriate for any audience grades 6–12, “Opioids and the Brain” is specifically geared towards grades 9–12. More introductory information can be found in the “Opioid Use and Misuse” presentation.

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Objectives

Students will

- Examine the effects of opioids on the brain and body
- Compare opioids to other prescription medications and how they impact the brain
- Examine the short-term and long-term effects of opioids on the body

Materials Needed

- Pencils, one per student
- White paper, one per student
- **Age Appropriate Information T-Chart** answer key, one for educator
- Computers, one per pair
    - *Technology Note:* If computers are not available, provide various art supplies (i.e., crayons, colored pencils, markers, etc.).
- **Public Awareness Infographic** handout, one per student.

Educator Prep

1. Read through the instructions to familiarize yourself with the content. Note that timing guidance is provided as a recommendation, but each situation will be unique. Use the Lesson At-a-Glance below to determine how long you plan to spend on each section.
2. Prepare all materials before your session.

Key Terms

- **Addiction:** a psychological and physical inability to stop consuming a substance or an activity even though it is causing harm.
- **Central Nervous System (CNS):** part of the nervous system that contains nerves in the central part of the body located in the brain and spinal cord
- **Dopamine:** a neurotransmitter that plays a role in pleasure
- **Endorphins:** natural pain blockers produced by the central nervous system that relieve pain and stress
- **Euphoria:** feelings of intense happiness or excitement
- **Illegal drug:** a drug that a person is not allowed to own or use; forbidden by law; is illegal to produce
- **Illicit drugs:** substances that either stimulate or inhibit the central nervous system or produce hallucinogenic effects; can be addictive; universally prohibited
- **Mimic:** imitate
- **Naloxone:** brand name Narcan®; a potentially life-saving medication that can rapidly stop or reverse the effects of an opioid overdose
- **Nervous System:** a system of the body that allows the body to react to the outside world as well as to the control processes inside our body
- **Neurotransmitter:** a substance that transmits nerve impulses across a synapse of a neuron
- **Opioids:** Opioids are substances that act on receptors in your brain for pain relief. They are a class of drugs that includes the illegal drug heroin, synthetic opioids such as fentanyl, and pain relievers available legally by prescription

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- **Opioid Receptor:** a specialized receptor in the brain that receives a signal from opioids
- **Peripheral:** relating to or situated on the edge of something
- **Peripheral Nervous System (PNS):** Includes all other nerves in your body not part of the CNS
- **Prescription:** an instruction written by a medical practitioner that authorizes a patient to be provided a medicine or treatment
- **Prescription drug:** a drug that can be obtained only by means of a physician's prescription
- **Receptor:** a structure that sits outside of a cell and receives (catches) a message
- **Substance Use Disorder:** a disease that affects a person's brain and behavior and leads to an inability to control the use of a legal or illegal drug or medication.
- **Transmission:** the movement of a chemical signal from one place to another

Lesson At-a-Glance

Section	Activity	Approximate Time in a 45-Minute Session	Approximate Time in a 60-Minute Session
Engage	Discussion	6–8 minutes	6–8 minutes
Learn	Nervous system	4–6 minutes	7–9 minutes
	Other prescription drugs	2–3 minutes	4–5 minutes
	What is an opioid, video, and effects of opioids	5–8 minutes	8–10 minutes
	How opioids work	6–7 minutes	10–11 minutes
	Substance misuse	3–4 minutes	3–4 minutes
	Substance use disorder and cycle of addiction	3–5 minutes	5–8 minutes
	The teenage brain	3–4 minutes	3–4 minutes
	Naloxone	2–3 minutes	2–3 minutes
Reflect	Learning summary	2–3 minutes	2–3 minutes
Apply*	Public awareness infographic	10–15 minutes	20–25 minutes

***Note:** Apply section is optional during session if time allows. Educator can choose to provide students with the opportunity to apply what they learned by completing the activity at a later time if they are not able to do it during the session.

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Procedure

Engage

1. Lead a discussion with students by asking the following questions:
   - What are some activities that make you happy or feel good about yourself?
   - How do you think your body is able to feel pain?
   - Do you believe misusing or abusing prescription drugs is a safer alternative to using illegal street drugs? Why?

Learn

Slide 1

2. Ask students to act out what their hands do when they accidentally touch something hot. Anticipated responses include yanking hands back, yelping, etc.
3. Confirm that the instinctual response is to move their hand away quickly. This "instinct" is controlled by the nervous system.
4. Ask the students how they think signals travel from their hand when they touch a hot stove to their brain. Explain to the students that our nervous system uses electrical and chemical signals to communicate.
5. Click to display the information about the nervous system. Read or ask a volunteer to read.

KEY TALKING POINT:

- **The nervous system allows the body to react to the outside world as well as to control processes in the body.**

Slide 2

6. The nervous system is made up of two parts– the central nervous system (CNS) and the peripheral nervous system (PNS).
7. Click to show students that the CNS includes the brain and the spinal cord and responds to sensory information. Click again to show that the PNS includes all the nerves that branch out from the CNS, connecting it to the other parts of the body like muscles and organs.

KEY TALKING POINTS:

- **The nervous system is made up of the central nervous system and the peripheral nervous system.**
- **The central nervous system includes the brain and spinal cord.**
- **The peripheral nervous system includes all other nerves and connects the CNS to the rest of the body.**

Slide 3

8. Explain to the students that different drugs have different effects on the brain and nervous system
9. Explain that the students may recognize some of the names of the medications we will discuss today. It's important to remember that when taking these medications as prescribed by a doctor for a legitimate medical purpose, these medications can be very effective and safe. However, when misused, these medications can have harmful effects.
10. Have the students look at the picture then ask what the difference is between the person on the left and the right.

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11. Click and explain that prescription stimulants are generally used to treat attention-deficit hyperactivity disorder (ADHD) and narcolepsy—uncontrollable episodes of deep sleep. They work by increasing alertness, attention, and energy. Some examples you may have heard of include prescription medications like Adderall®, Ritalin®, Concerta® and the illegal drug, methamphetamine (meth). Side effects of these medications may include: anxiety, trouble sleeping, reduced appetite, and increased heart rate. Misusing prescription stimulants can cause psychosis, paranoia, heart attack, or stroke.

12. Click again and explain that depressants have the opposite effects of stimulants. Depressants are medications that include sedatives, tranquilizers, and hypnotics. Some examples you may have heard of include prescription medications like Xanax®, Klonopin®, or Ambien® that work by slowing brain activity, making them useful for treating anxiety, panic, and sleep disorders. Side effects of these medications may include: slurred speech, confusion, dizziness, drowsiness, and slowed breathing. Most are prescribed for a short period of time and are used responsibly by the patient. Combining these types of medications with other drugs, like opioids, or with alcohol dramatically increases the risk for serious and deadly consequences.

KEY TALKING POINTS:

- **Prescription stimulants work by increasing alertness, attention, and energy.**
- **Depressants are medications that slow brain activity, making them useful for treating anxiety, panic, and sleep disorders.**
- **Stimulants and depressants have legitimate medical purposes when used appropriately but can be very dangerous when misused or abused.**

Slide 4

13. Inform students that opioids are substances that act on receptors in your brain for pain relief.

14. Click to explain to them that the legal opioids are only available with a prescription (i.e., Hydrocodone, Oxycodone, Morphine and Codeine). You may recognize their brand names as Vicodin®, OxyContin®, or Percocet®. Other opioids, like heroin, are illegal/illicit.

15. Click again to discuss the opioid fentanyl, which is a powerful synthetic opioid that is similar to morphine but is 50–100 times more potent. It is a prescription drug used to treat patients with severe pain. More recently fentanyl is showing up in illegal street drugs, like heroin or fake prescription pain pills.

16. Ask for 1–2 volunteers to offer examples of any other medications they're familiar with to treat pain that are not opioids. Reinforce to students that there are many common over the counter (OTC) pain medications available. Explain that nonsteroidal anti-inflammatory drugs, referred to as NSAIDs (like aspirin or ibuprofen/Motrin®), help reduce pain and swelling from ailments such as minor sports injuries, headaches, and arthritis. Acetaminophen (Tylenol®) is often used

to treat minor aches and pains and reduce fevers. Emphasize that an OTC medication, like ibuprofen or acetaminophen, may be sufficient to control mild or short-term pain.

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KEY TALKING POINTS

- **Opioids can be both legal (e.g. prescription opioids) and illegal (e.g. heroin).**
- **Fentanyl is an FDA approved opioid pain medication to treat severe pain, but is often dangerously used to lace illicit/ illegal drugs.**
- **NSAIDs (like aspirin or ibuprofen) help reduce minor pain and swelling.**
- **Acetaminophen is often used to treat minor aches and pains and reduce fevers.**

Slide 5

17. Tell students that opioids have many effects on the brain and body. Ask students to draw a T-chart on a piece of paper and title it with "Brain" and "Body." As students watch the upcoming video, they should capture how opioids impact each and write that in the appropriate column.
18. Click to play the video.
19. After the video, invite students to share some facts they learned from the video. Write facts on the board for reference throughout the session. Use the **Age Appropriate Information T-Chart** answer key as a guide.

Slide 6

20. Opioids mainly target cells in the brain, spinal cord, and other organs in the body that involve pain and/or pleasure. This is because they block pain messages and act on the reward center of the brain. They do this by attaching to the opioid receptors in the brain and spinal cord to block the transmission of pain messages to the brain. This is why doctors prescribe opioids to patients.
21. Opioids bind to opioid receptors in the brain and can produce three main effects: 1) decreased feelings of pain, 2) increased feelings of pleasure, and 3) slowed body processes that are usually automatic, like breathing.

KEY TALKING POINTS:

- **Opioids bind to receptors in the brain and target nerve cells that experience pain and pleasure.**
- **Opioids can decrease pain, increase pleasure, and affect automatic body processes.**

Slide 7

22. Read or ask for a volunteer to read the information about endorphins.
23. Click to reveal that the presence of endorphins leads to the release of dopamine.
24. Click again and explain the effects of the release of dopamine, a neurotransmitter that plays a role in pleasure.
25. Ask 1 or 2 volunteers to share why it might be problematic for the body to crave the intensity produced by opioids over natural dopamine release. Reinforce that this craving is what can lead to misuse, tolerance, dependence, and ultimately substance use disorder, overdose, or death.

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KEY TALKING POINTS

- **Endorphins are the body's natural pain relievers.**
- **Opioids mimic endorphins.**
- **Endorphins prompt the release of dopamine, which produces pleasure.**
- **Opioid drugs cause a larger flood of dopamine than endorphins do (euphoria=intense feelings of pleasure)**
- **Misuse of opioids can lead to substance use disorder, overdose, or death.**

Slide 8

26. Click to reinforce that the body's response to dopamine rushes can result in tolerance and dependence.
27. Click again to review the information in the table. Tolerance is when the body requires higher or more frequent dosages to gain the same effect—like needing more gold stars to feel as happy as you did before. Dependence is when the parts of the brain responsible for releasing dopamine only function normally when the drug is taken.

KEY TALKING POINTS

- **Tolerance is when one requires higher or more frequent dosages to experience the same effects of a drug.**
- **Opioid dependence is when the brain can only release dopamine if the drug is present.**

Slide 9

28. Substance misuse is when people start to use a substance, like drugs or alcohol, for non-medical purposes in a manner that's harmful to themselves or others.
29. Click to reveal the ways in which a person can misuse prescription drugs. Ask 2–3 volunteers to share what they think would happen to themselves or someone they know if they misused a prescription medication. Anticipated responses might include: it can lead to substance use disorder or addiction, it can cause overdose or death, etc.
30. Reinforce that not all opioids contain the same potency or strength, and only a doctor can prescribe the correct form. Therefore, the dosage prescribed for someone else can be wrong for you, can be risky, and ultimately can lead to overdose or death. It is also important that students understand that buying drugs anywhere other than a pharmacy can run the risk of being laced with ultra-potent synthetic drugs, such as Fentanyl or Carfentanyl.

KEY TALKING POINT

- **When a drug is used in a manner other than how it was prescribed, it is referred to as misuse.**

Slide 10

31. Now that students have explored opioids' effects on the body and substance misuse, they will learn other common signs and symptoms of an individual misusing substances, like opioids.
32. Click to reveal some of the physical signs/ symptoms of substance misuse.

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33. Click again and explain the behavioral signs/ symptoms of substance misuse.

34. Lastly, click to reveal other common signs and symptoms of misusing opioids.

KEY TALKING POINTS:

- **Common signs and symptoms of substance misuse can be physical, behavioral, or be displayed in new habits or preoccupations.**

Slide 11

35. Define substance use disorder (SUD) as a disease that affects a person's brain and behavior and leads to an inability to control the use of legal or illegal drugs. Explain this is a disease with repeated actions that will cause the nerve cells to communicate differently—a cycle that involves binging on drugs, becoming intoxicated, withdrawal, and the preoccupation with using more drugs.

36. Click to reveal the image of the brain. Explain that substance use disorder makes the brain want to recreate the feelings it experiences when the drug is present– increased feelings of pleasure and decreased feelings of pain. Regardless of the consequences, a person with substance use disorder will continue to seek a drug. One has to take more of a substance to obtain the same dopamine "high" because his/her brain has adapted. Reinforce that this is known as tolerance. As a result, the user will increase the amount of the substance they take in an effort to achieve the high they are used to.

37. When they are not taking the substance, people will experience withdrawal, causing them to feel severe physical and emotional distress. Eventually, the person's brain can no longer function as it should without the presence of the substance. They will become extremely preoccupied or obsessed with thinking about how they will get their next fix so that they can avoid withdrawal and just be able to function.

38. These changes in the brain remain even after substance use stops and explain why it can be so difficult for someone to stop using and for relapse to occur. However, keep in mind, that with the right support, treatment, and care, recovery is possible!

39. Click to reveal the image of the stigma word cloud. Reinforce to students that addiction is a brain disease NOT a moral failing. It's important that they recognize that the words we use matter. Instead of using stigmatizing terms, like addict or junkie, use person-first language like "a person with a substance use disorder". No matter the situation, no one likes to feel judged or devalued. In order to encourage people to reach out for help, it is important to reduce the stigma surrounding their situation. Do not use language that reinforces stereotypes and instead use language that positions addiction as a treatable disease.

KEY TALKING POINTS:

- **Substance use disorder is a disease that affects a person's brain and behavior.**
- **This disease creates a cycle, often referred to as the "cycle of addiction".**
- **The words we use matter. Instead of using a stigmatizing term, like addict or junkie, use person-first language like "a person with a substance use disorder".**

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Slide 12

40. Ask the students at what age they think the teenage brain is fully developed. Allow for several responses, then click to reveal that the rational part of the teen brain responsible for decision-making is not fully developed until age 25 or later. The decision-making and emotional parts of the brain do not always develop at the same rate.
41. Click again to reveal to students the names of these two parts of the brain. The prefrontal cortex controls decision-making and behavior. The amygdala controls emotions and aggression.
42. Highlight that the teen brain mostly uses the amygdala since the rational, decision-making prefrontal cortex is not fully developed. This makes it difficult to control emotions, often results in risky, impulsive behavior, and the lack of awareness of consequences leads to poor planning and judgement. This also explains the desire for teenagers to participate in high-excitement/low-effort activities such as experimenting with drugs.
43. Click a final time to reinforce that teens may be more likely to make risky and impulsive choices because their brains are largely controlled by the amygdala.

KEY TALKING POINTS:

- **The rational, decision-making prefrontal cortex of the teen brain is not fully developed until age 25 or later.**
- **The amygdala controls emotion and aggression.**
- **Teenagers process information with mainly the amygdala since the prefrontal cortex is not fully developed. Result: difficult to control emotions, risky, impulsive behavior, lack of awareness of consequences, poor planning and judgement, leading to an increased risk of addiction.**

Slide 13

44. Use this slide to make the connection with students that the combination of increased impulsivity and a susceptible brain put them at increased risk for addictive behaviors.
45. Reinforce that introducing substances that change the chemistry of their brains while their brains are still developing can cause lifelong effects.
46. The earlier a person begins misusing a substance, the greater risk they are at for substance use disorder, overdose, or death. Inform students that 90% of those suffering from substance use disorder report starting use during their teens*.

KEY TALKING POINTS:

- **The combination of impulsive decisions and a susceptible brain makes teens prime targets for addictive behaviors.**
- **Introducing substances that change the chemistry of the brain at this stage of development may have lifelong impacts.[5]**

Slide 14

47. Ask a student volunteer to explain what a "human resource" is in the context of the use and misuse of opioids."
48. If not provided by volunteer, explain that human resources like a parent, teacher, coach, or other trusted adult can be the first resource they consult, both to safely use prescription opioids and for help if they or someone they know is struggling with substance misuse or substance use disorder.

5 https://www.centeronaddiction.org/addiction-research/reports/adolescent-substance-use-america%E2%80%99s-1-public-health-problem

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49. Reinforce that a reliance on human resources can help them make healthy choices and achieve their dreams.
50. Direct students to turn to another student near them and identify a person whom they could rely on as a human resource.

KEY TALKING POINTS:

- **Opioid misuse is illegal and can negatively affect your health and future.**
- **If you know someone who is misusing drugs, be a friend and support them to get help.**
- **"Human Resources" are important resources as well. These can include parents, teachers, doctors, coaches, etc.**
- **Making healthy decision can help you achieve your dreams and goals.**

Slide 15

51. Naloxone, also known by the brand name Narcan®, is a potentially life-saving medication that can rapidly stop or reverse the effects of an opioid overdose.
52. Click to reveal that Naloxone works by knocking opioids off the receptors in the brain, allowing for normal breathing to be restored. Naloxone is available at many pharmacies nationwide, available to patients without an individual prescription from their doctor, and oftentimes schools have it on hand in case of an emergency.
    - **Teacher note:** This content is for educational purposes only and is not intended to provide medical advice. Refer to applicable school, district and medical policies and the instructions of a qualified physician when determining how and when to administer Naloxone or any other medication.
53. Reinforce that they should always call 911 if they suspect someone is experiencing an overdose.
54. Explain that in most states there are laws (Good Samaritan Laws) that protect people who call 911 to get help for a friend. Even if you've also been drinking or using drugs, you should always call 911 for help and never leave a friend alone.

KEY TALKING POINTS:

- **Naloxone can rapidly stop or reverse the effects of an opioid overdose.**
- **If you find a person unresponsive, not breathing, or struggling to breath, you should always call 911.**
- **Good Samaritan Laws protect people who call 911 to get help for a friend, even if they have also been misusing substances.**

Reflect

Slide 16: Facilitate students' reflection on their learning by reviewing the following points:

- The nervous system is made up of two parts—the central nervous system and the peripheral nervous system.
- Stimulants and depressants have different effects on the brain and nervous system.
- Misusing prescription stimulants can cause psychosis, paranoia, heart attack, or stroke.
- Misusing depressants can cause slurred speech, confusion, dizziness, drowsiness, and slowed breathing. Combining these types of medications with other drugs, like opioids, or with alcohol, dramatically increases the risk of serious and deadly consequences.
- Endorphins are natural pain blockers produced by the central nervous system.

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- Opioids mimic endorphins and can provide a feeling of euphoria.
- Opioids bind to receptors in the brain to block pain messages from the nervous system.

Slide 17

- It is important to use prescription medication as prescribed. Misusing prescription medications is illegal and dangerous.
- Common symptoms of substance misuse can be physical, behavioral, or be displayed in new habits or preoccupations.
- Substance misuse can alter brain function. Teen brains are even more at risk since they're still developing.
- Misusing substances, like prescription opioids, can lead to addiction or a substance use disorder.
- Naloxone is a potentially life-saving medication that can stop or reverse the effects of an opioid overdose.
- Good Samaritan Laws protect people who call 911 to get help for a friend, even if they have also been misusing substances.
- The words we use matter! Avoid using stigmatizing language.
- Seek guidance from a trusted adult if you have questions or need help. "Human Resources" can include parents, teachers, doctors, coaches, etc.

Apply (Optional—If Time Allows)

Slide 18

1. Tell students that in order to share what they have learned about opioids; they will create a public awareness infographic to educate their peers about the risks of opioid misuse.
2. Explain that an infographic is a way to communicate information quickly using pictures, charts, and just a little text. Reference the image.

Slide 19

3. Inform students that they will be creating a public awareness infographic to inform others about the risks associated with opioid misuse.
4. Distribute one **Public Awareness Infographic** handout and one computer to each student.
   - **Technology Note:** If computers aren't available, distribute white paper and art supplies to each student.
5. Click to review the requirements of each infographic:
   - How opioids affect the teenage brain
   - How misuse can lead to substance use disorder
6. If using computers, direct students to the free online program you would like them to use to make their infographics (Canva, Piktochart, Snappa, Visme, Infogram, Venngage, Easel.ly).
7. Click to reveal the timer. Enter the time you are giving students to complete their infographic. Set the timer for **15 minutes** (45-minute session) or **25 minutes** (60-minute session).
   - **Note:** If using printed version of PowerPoint, use a stopwatch or smartphone clock app to keep time.
8. If time allows, have students present their Public Awareness Infographics to the class.

Extension Ideas

- Have students create a small skit to help educate others about opioids. They can act their skits out or record and place them in an online forum.
- Have students research some of the best ways to help a person who is misusing opioids.

National School Standards

UNITED STATES

National Health Standards

- Standard 7: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.
- Standard 8: Students will demonstrate the ability to advocate for personal, family, and community health.

Common Core State Standards for English Language Arts

- Writing
    - CCSS.ELA-LITERACY.CCRA.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- Speaking and Listening
    - CCSS.ELA-LITERACY.CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
    - CCSS.ELA-LITERACY.CCRA.SL.2 Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Age Appropriate Information T-Chart

ANSWER KEY

BRAIN	BODY
• acts on pain receptors • blocks pain messages • increases positive emotions	• offers pain relief • can cause respiratory depression • can lead to overdose or death

Public Awareness Infographic