

MIDDLE
SCHOOL
#1

DIGITAL LESSON EDUCATOR GUIDE

Learning How Opioids Work

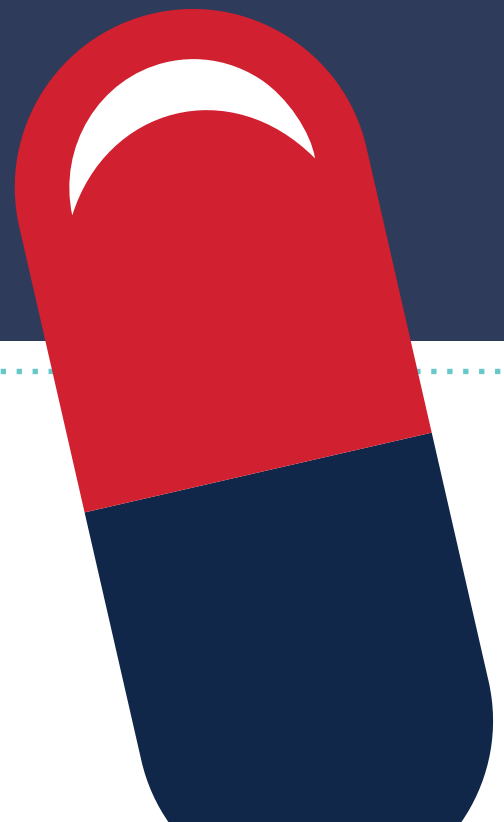


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INTRODUCTION TO OPERATION PREVENTION

Why is Opioid Prevention Important?

The misuse of opioids such as heroin, morphine, fentanyl, and prescription medications is a serious national problem that affects the health, social, and economic welfare of communities. In 2017 there were approximately 192 drug overdose deaths per day in the United States with nearly 68% of those deaths related to pharmaceutical opioids or heroin. About 11.1 million people indicated misusing or abusing prescription painkillers in 2017 while nearly one in seven teens say they have used prescription medicine at least once in their lifetimes to get high. To address this complex problem, federal agencies are working to inform patients, parents, teens, pharmacists, and educators about the dangers of opioid misuse.

How Will My Students Learn About Opioid Prevention?

In this series of sessions, students will learn about endorphins and investigate the science behind the impact of opioids on the mind and body by focusing on different body systems. Through a series of activities, students will investigate changes in the body due to prescription opioid misuse and heroin use. They will use this information to explain the science behind physical dependency and withdrawal. Students then will communicate at least one key takeaway from the lesson by developing a social media campaign to reach a peer audience and reflect on what they have learned.

How Do the Sessions Work?

Teaching Sequence: The two Middle School Educator Guides provide details to help educator facilitate a series of ten 45-minute sessions (5 sessions per lesson) designed to be taught in sequence and used with sixth, seventh, or eighth grade students. This guide was created to give educators ideas and strategies for presenting the content in the digital lessons. It provides slide-by-slide details to prepare educators to discuss, to facilitate activities on, and to engage students in the content of each session.

In addition to the Educator Guides, accompanying presentations were created with PowerPoint so they can be used in a variety of classroom settings. 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 presentations are set to occur on click. The corresponding videos link to the slides. Click on the images to play the videos. If you are using an interactive whiteboard, tap on each slide with your finger or stylus to activate the interactive aspects of the presentations. It does not matter where you tap, but you can make it appear as if you are making certain things happen by tapping them. Teacher notes are included for each slide with information on how to proceed.

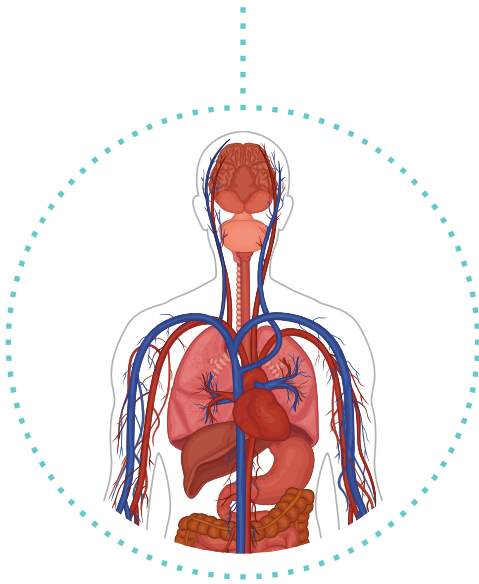
Setting Up Norms/Rules:

It is a good idea before starting the Operation Prevention sessions with middle school students to set up norms or rules for the lessons. Norms are standards or procedures that your class will follow while they are participating in the Operation Prevention sessions. You may already have established class rules/norms and may choose to incorporate them into these sessions as well. However, you will want to consider adding some additional norms due to the more sensitive information that these sessions will discuss. Here are a few suggested norms you may want to consider:

- We value participation by everyone.
- We are open to hearing opinions that may be different than ours.
- We will respect what others have to share and allow them to share it without judgement.
- What we share will be kept confidential. We will not use names when sharing stories.*

*In the case of mandated reporting issues, we recommend you follow your school or organizational guidelines and make sure that students are aware of them.

INTRODUCTION TO OPERATION PREVENTION



It is essential to create a safe and comfortable classroom atmosphere for students to engage in the content of the Operation Prevention sessions. Be sure to revisit the agreed upon norms/rules regularly with your students, and remind them that the purpose of norms is to maintain a safe place where everyone can feel comfortable sharing and learning.

Session Structure:

Each Operation Prevention Middle School session provides the following information to guide the teacher through its implementation.

- **Objectives:** Each session includes its overall goals as well as specific behavioral and cognitive objectives for students.
- **Required Materials:** Any materials necessary for the session are clearly outlined and included when possible to facilitate easy implementation of the session.
- **Student Responses:** Anticipated student responses for activities and questions are included next to corresponding slides.
- **Key Points to Make:** To help the teacher guide discussion and reinforce key concepts, key talking points are listed next to corresponding slides.
- **Definitions:** Any terms that can be used as vocabulary words will be defined.
- **Summary/Wrap Up:** The summary/wrap up is provided to assist educators in reinforcing key concepts and objectives of each session.

SESSION 1 OVERVIEW

SLIDES
1-5

ENGAGE

Understanding Endorphins

Overview:

The human body produces natural endorphins in response to certain sensations—mainly stress, fear, or pain. These chemicals reduce pain and produce a sense of euphoria (feeling good). As an introduction to this topic, students will be guided through a series of brief activities that release endorphins (exercising, smiling, eating chocolate); then, they will describe how they feel before and after each activity. Students will be introduced to the definition of endorphins and learn about these “feel-good chemicals.”

Slides 1-5 contain activities to engage students in the release of endorphins.

Content Areas:

Life Sciences, Health, and Physical Education

Grade Level:

Grades 6–8

Objectives:

- Identify activities that release endorphins.
- Identify what an endorphin is and its role in our bodies.

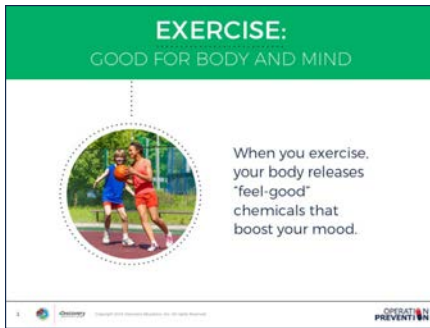
Materials:

- Chart paper and markers
- Timer
- Chocolate or sweet candy
- Access to the Internet

Definitions:

- **Endorphin** – chemicals in the brain that block pain and produce “feel-good” effects
- **Addiction** – a compulsive need for something that makes us feel good

SESSION 1



SLIDE 1

Draw a T-Chart on a large blank sheet of chart paper. Write the words "Before" and "After" at the top of each column. Ask all students to stand up. Invite a few students to describe how they are feeling at this exact moment. Write these words on the "Before" side of the T-Chart. Anticipated responses include: tired, bored, happy, sad, frustrated, etc.

Ask students to think of a physical activity they could do in place (e.g., push-ups, jumping jacks, or dancing). Let students know that you will ask about how the activity made them feel. When all students have an activity in mind, set a timer for one minute. Challenge students to do their chosen physical activity until time is up. Invite a few students to describe how they are feeling at this exact moment. Write these words on the "After" side of the T-Chart. Anticipated responses include: energized, excited, happy, silly, etc.

Display the slide to the class. Exercise activities, particularly continual aerobic (cardio) ones, cause your body to release "feel-good" chemicals. Ask students whether they know anyone who is "addicted" to exercise. How might these chemicals affect their behavior? Explain that exercise creates a rush of chemicals in the body, commonly known as a "runner's high." A person who is "addicted" to exercise seeks the good feeling they experience after working out.

Key Talking Points:

- We don't typically all feel the same at the same time.
- Aerobic exercise can cause us to feel good.
- Exercise releases "feel-good" chemicals in our brains.
- People can be "addicted" to the good feeling they experience after exercising.

SESSION 1



SLIDE 2

Remind students of the class norms. Ask students to think about activities that make them laugh, and have them each write down these activities on a piece of paper. Ask a few volunteers to share. Anticipated responses include: joking with friends, funny movies, cartoons, comedy shows, etc.

Direct students to think about how they feel after smiling or laughing. Students may report a mood “boost”—i.e., they feel more relaxed and less anxious. Add the words students use to describe how they feel on the right side of the T-Chart that you began in the previous slide. Anticipated responses include: relaxed, calm, etc.

Ask, “How does the effect produced by laughing or smiling compare to that produced by exercise?”

Display the slide. Guide students to draw conclusions about why laughing can change how they feel or “boost” their moods. Once students have discussed and drawn their own conclusions, explain that “feel-good” chemicals are also released through laughter, which can improve how you feel and increase your pain threshold.

Key Talking Points:

- Laughing produces the same “feel-good” chemicals as exercise.
- When you feel good from laughter or exercise, this can increase your pain threshold.

SESSION 1



SLIDE 3

NOTE: The following activity includes eating chocolate. Prior to class, determine whether anyone has a food allergy or dislikes chocolate, so you can make alternate arrangements if necessary.

Distribute a small piece of chocolate to each student. Instruct them to eat it slowly with their eyes closed and focus on how it changes their mood. Ask students to describe how they feel after eating chocolate. Add new words on the right side of the T-Chart.

Ask, "What do you think caused the effects that you felt?" Then, display the slide. Guide students to draw conclusions about why chocolate makes them feel differently. Explain to students that eating chocolate also causes the release of chemicals in your body that make you feel pleasure. Chocolate is considered a "comfort" food because it makes many people feel better when they are stressed or sad.

Ask students what might happen if they ate a chili pepper instead of chocolate. Some students might respond that it would hurt their mouths, while others might enjoy the taste. Then, explain that chili peppers contain a chemical called capsaicin, which puts the "heat" in chilies. This burning sensation causes the body to release the same "feel-good" chemicals that chocolate releases—in this case, the chemicals help to reduce the pain in your mouth. These chemicals also cause the pleasurable feeling associated with eating spicy foods.

Finally, ask each student to brainstorm additional examples of an activity that might release "feel-good" chemicals. Ask these questions:

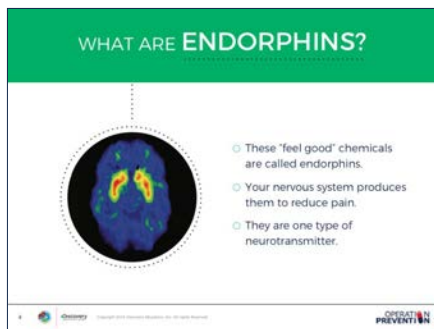
- What activities make you feel happy afterward?
- What activities do you do to feel better?
- What activities may be painful but still enjoyable?

(Examples may include scoring a point in a sport, hugging, or biting into a hot slice of your favorite pizza.)

Key Talking Points:

- Chocolate and food we like to eat also release "feel-good" chemicals in our bodies like exercise or laughing do.
- Foods that make us feel good are known as "comfort foods."
- "Comfort foods" can make us feel better when we are stressed or sad.
- Eating "comfort foods" can become an addiction for some people.
- Each person may have different comfort foods or foods that release "feel-good" chemicals.
- Different activities can feel different to different people.

SESSION 1



SLIDE 4

Now that students have performed activities that release endorphins, they will learn what an endorphin is.

Click to display the image of the brain. Ask students if they’ve ever seen an image of a brain “lighting up” like this. What do they think is happening here?

Once students have shared their thoughts, explain that messages in the brain are transmitted, or sent, across cells. This image shows messages being sent between cells in the brain—the colors (particularly red and yellow) represent brain activity that corresponds to messages being transmitted.

Click the slide to reveal the text definition of endorphins. Identify that the “feel-good” chemicals produced by students’ bodies in the previous activities were endorphins. The body’s nervous system produces endorphins in response to certain sensations—mainly stress, fear, or pain. In scientific terms, endorphins block messages of pain from reaching the brain and stimulate pleasure centers in the brain. Endorphins are only one type of neurotransmitter, or chemical, that sends messages through the nervous system.

Key Talking Points:

- Messages in our brains are sent between cells.
- Through science, we can see how our brain activity reacts to endorphins
- “Feel-good” chemicals are also known as endorphins.
- The body’s nervous system produces endorphins in response to certain sensations—mainly stress, fear, or pain.
- Endorphins block messages of pain from reaching the brain and stimulate the pleasure centers of the brain.
- Endorphins are only one type of neurotransmitter, or chemical that sends messages through the nervous system.

SESSION 1



SESSION SUMMARY

- Everyone's body produces "feel-good" chemicals or endorphins.
- We can create endorphins by exercising, laughing, or eating comfort foods.
- Endorphins help block pain in our brains.
- Knowing how endorphins work in our bodies can help us make good decisions.

Discovery OPERATION PREVENTION

SLIDE 5

Summary/Wrap of Session:

- Everyone's body produces "feel-good" chemicals or endorphins.
- We can create endorphins by exercising, laughing, or eating comfort foods.
- Endorphins help block pain in our brains.
- Knowing how endorphins work in our bodies can help us make good decisions.

SESSION 2 OVERVIEW

SLIDES
6-9

EXPLORE

What Are Opioids

Overview:

In this session, students will also be introduced to the concept of opioids, which are drugs that are either derived from the opium poppy plant or that are synthetically produced to have similar effects. Heroin is an example of the former type, but there are many other opioids, including legal drugs such as morphine, codeine, and fentanyl, which doctors prescribe to patients in extreme pain. Opioids have a chemical structure similar to endorphins, which enables them to attach to the same places in the brain. As a result, the brain cannot tell the difference between the effects from activities that produce natural endorphins (e.g., exercising, laughing, and eating chocolate) and the effects caused by taking opioids.

Objectives:

- Identify what opioids are and why they are prescribed.
- Examine how the effects of opioids mimic the feeling of endorphins.
- Explain what it means to misuse opioids.
- Examine why people misuse opioids.

Required Materials:

- Copies of the article [“Opioids: Just the Facts”](#)
- Paper for students to answer questions
- Copies of the [“Opioids: Just the Facts Capture Sheet”](#)

Definitions:

- **Euphoria** - a feeling or state of intense excitement and happiness
- **Misuse** - not using something properly

SESSION 2



SLIDE 6

Remind students what they have learned about endorphins before moving on to the topic of opioids.

Ask students to identify a few examples of other words ending with “-oid.” Anticipated responses might include: factoid (a tiny fact), android (a machine that is like a human; “android is derived from the Greek root andros, which means “man”), thyroid (gland in your neck that secretes hormones), tabloid (newspaper ½ the size of a regular one), fibroid (benign tumor), etc.

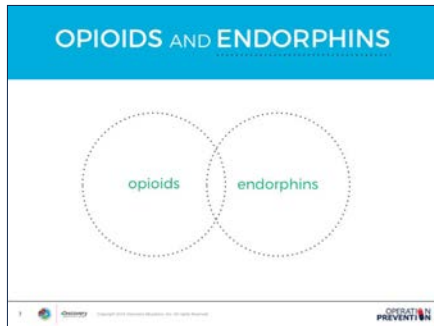
Click the slide to display the definition of opioids. Ask students if they know where opioids come from. Then, click to reveal that opioids can be synthesized, or made, from natural sources (like the poppy plant) and artificial sources (like chemicals in a laboratory). Break down the word “opiod” into two parts: “opium” (a drug derived from a plant called the opium poppy) and “-oid” (meaning “like” or “similar to”). Connect the two parts of the word so that students understand that the effects of opioids are like the effects of opium.

Click the slide to reveal the last bullet point. Explain that morphine, codeine, fentanyl, and heroin are in a class of drugs called opioids. Heroin is illegal, but doctors prescribe the other opioids to patients in extreme pain. These people might be recovering from surgery or a serious injury. In scientific terms, these drugs reduce the intensity of pain signals reaching the brain.

Key Talking Points:

- Opioids are drugs that work on the nervous system to reduce pain signals reaching the brain.
- Opioids can be natural or created in labs.
- Heroin is an illegal opioid
- Codeine and morphine are prescription opioids.
- Doctors prescribe opioids to people who are in extreme pain, for example someone recovering from surgery or a serious injury.
- Like endorphins, opioids reduce the intensity of pain signals reaching the brain.

SESSION 2



SLIDE 7

Display slide. Ask students to provide examples of the similarities and differences between opioids and endorphins.

Key talking points:

- Endorphins are neurotransmitters and transmit electrical signals within the nervous system to reduce the perception of pain (they are naturally produced in the body).
- Endorphins act similarly to opioids and block pain receptors.
- Endorphins increase the 'feel-good' sensations.
- Endorphins do not lead to addiction or dependence.
- Opioids also decrease pain reception in the brain and can lead to feelings of euphoria.



SLIDE 8

Now that students have learned what opioids are, they will learn what it means to misuse them.

Click the image on the slide to open the [article](#).

Divide the class into small groups of three students. Make sure each group has access to the Opioids: Just the Facts article, either on a digital device or a printout. Give students time to read the article.

Distribute an [Opioids: Just the Facts capture sheet](#) to each group. Review the cooperative learning roles listed on the top, and give students one minute to assign roles. Then, read the directions and instruct students to complete the tasks.

When groups have completed their capture sheets, invite the Recorder from each group to share the group's thoughts with the class. Facilitate discussion about the different ideas that arise.

Key Talking Points:

Young people can misuse prescription opioids different ways:

- Taking medication that was prescribed for someone else.
- Taking a higher dose of your own medication than was prescribed.
- Taking an opioid with the intention of getting high.
- Sharing a prescription medication you have access to with someone else.

SESSION 2



SLIDE 9

Summary/Wrap of Session:

- Opioid use affects us physically and can be harmful.
- In order to be healthy, we need to understand and protect ourselves from the risks of opioid misuse.
- Knowing how opioids work helps us to make better decisions for ourselves if we are prescribed them for pain or injury.

SESSION 3 OVERVIEW

SLIDES
10-15

EXPLAIN

How Opioids Affect the Body

Overview:

Students will examine the structure of neurons and the process of neurotransmission to better understand how opioids affect the body, particularly the nervous system. Neurons are the tiny nerve cells that send messages along the human nervous system. Some of these messages control life-sustaining functions, such as circulation, respiration, and digestion. Opioids block pain signals from reaching the brain by attaching to certain parts of neurons called opioid receptors. In this section, students will compare an image or a model of a healthy, functioning nervous system to one that has been impacted by opioid misuse. Students will study the parts of a neuron and the process of neurotransmission to understand how opioids affect the body and why this matters.

Objectives:

- Examine the effects of opioids on the human nervous system
- Explain how neurons (nerve cells) send and receive information.

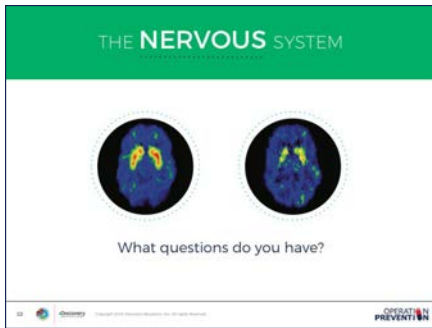
Required Materials:

- [Opioids and Neurotransmission capture sheet](#) (one per group)

Definitions:

- **Neurotransmission** – process that drives information between neurons

SESSION 3



SLIDE 10

Now that students know what opioid misuse means, they will examine the effects of opioids on the human nervous system.

Review what students have learned from the previous sessions.

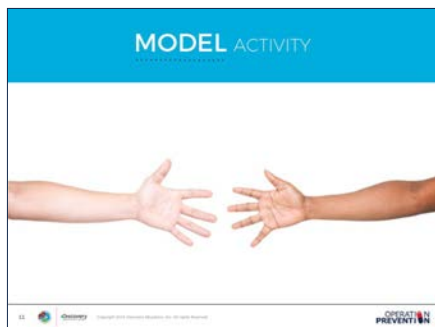
Display the two images of the brain, which is part of the body's nervous system. Let the students know what each image represents: a healthy brain (left) and the brain of a person who misuses drugs (right). Invite several students to share what they observe.

Click the slide to reveal the question at the bottom. Explain that one of the most important practices that scientists do is ask questions, because scientific questions help identify relationships and clarify information. Tell students that you would like them to be scientists and generate questions about the images on the screen.

Direct students to generate a list of questions they have about opioid misuse. Anticipated responses may include:

- What is the relationship between endorphins and opioids?
- How does misusing opioids affect the human nervous system and other body systems?
- Why is quitting opioids so difficult?

SESSION 3



SLIDE 11

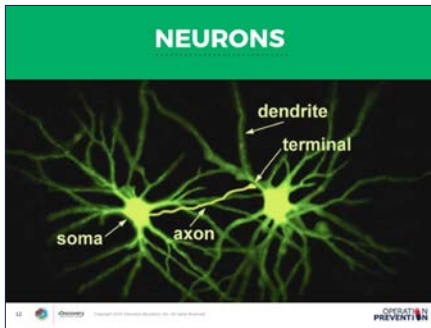
Now that we have some questions to answer about how opioids affect the body, we are going to start by learning about neurotransmission. Neurotransmission is how the nervous system sends electrical and chemical signals through the body.

In this activity, students will use their bodies to model neurotransmission before they learn the science behind this process. Say, “Now that we have some questions to answer about how opioids affect the body, we are going to start by learning about neurotransmission. Neurotransmission is how the nervous system sends electrical and chemical signals through the body,” and conduct the following activity in the classroom.

1. Direct students to stand around the room, a little more than an arm’s-length apart. They should not be able to touch each other.
2. Ask: How can we send a message from student to student using our arms and fingers only?
3. Students should try to extend their arms and spread their fingers to send signals like sign language. Encourage other creative ways to send a message using only students’ arms and fingers.
4. See if students can point out a drawback of this model. (There isn’t a direct connection between students.) This will segue into the purpose of neurotransmitters.

Open up a full-class discussion to summarize what students learned from this model and what questions they have about neurotransmission.

SESSION 3



SLIDE 12

Now that students have modeled neurotransmission, they will learn the structure of a neuron to investigate how neurotransmission works.

Important background information includes:

- The body's nervous system is made up of a network of tiny nerve cells called neurons.
- The sense organs (e.g., eyes, ears, nose, skin) send messages to the brain about stimuli outside the body.
- The brain processes these messages and sends back its own messages that command the body to respond in appropriate ways.
- All this communication happens through extensive networks made up of neurons.

Click to display the image of the neuron, with four labeled parts. Point as you describe how neurons are composed of several parts: soma (cell body), dendrites (branches), and an axon (fibers) leading to a terminal (bulb). Trace the path on the image as you explain the purpose of each part of the neuron.

If there is time, guide students to do the neurotransmission activity again and this time talk through the different parts of the neuron while doing the activity.

Key Talking Points:

- The branches (dendrites) receive messages from neighboring neurons.
- The middle (soma) processes the information.
- It creates an electrical signal (a major impulse called the action potential) and sends it down the fiber (axon) toward the bulb at the tip (terminal); the signal can then be transferred to the dendrites of a neighboring neuron.

Encourage students to make connections between their body parts in the model activity and the neuron. (The body is the soma, the arm is the axon, and their fingertips are the terminal.) Then, ask students to predict what each part of a neuron does. (If time allows, have students repeat the neurotransmission activity and make the above connections while they do.)

SESSION 3



SLIDE 13

Now that students have modeled neurotransmission and the parts of a neuron, they will learn about the process of neurotransmission (sending a message). Direct students to label a sheet of paper with Steps 1, 2, 3, 4, and 5. Alternatively, students can use five note cards.

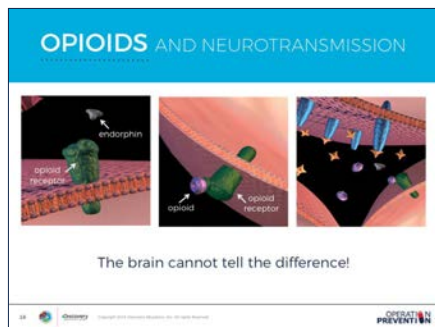
Direct students to record the five steps of neurotransmission as they watch the following video. Alternatively, you can record the five steps together as a class.

Watch the video [“Thinking Brain – Mysteries of the Brain”](#) (4:49) as a class. This video explains the process of neurotransmission. Pause frequently for students to record the five steps, or plan to watch the video several times. Anticipated responses include:

1. Dendrites receive information as electro-chemical signals.
2. Soma (cell body) processes information.
3. Action potential travels down the axon of the “talking” neuron until it reaches the terminal.
4. Neurotransmitters are released into the synapse (gap).
5. Neurotransmitters bind to spines on dendrites of a “listening” neuron.

Discuss how something like a neurotransmitter would have helped students send a message during the model activity.

SESSION 3



SLIDE 14

Now that students understand the role of neurotransmitters, they will learn how opioids simulate natural endorphins during neurotransmission. This everyday analogy may help students better understand this process: Neurotransmitters are like “keys” that fit certain “locks” in the brain. Different keys fit different locks. Because the shapes of opioids and endorphins are similar, opioids are able to fit into “locks” intended for endorphins.

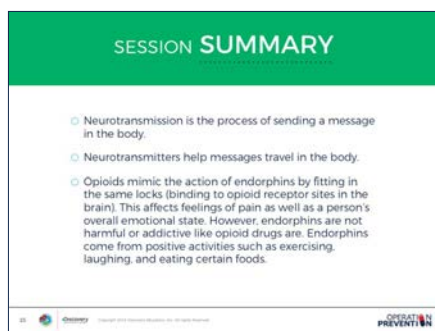
Divide students into groups of three. Click to display the slide and ask students to study the images.

Distribute an [Opioids and Neurotransmission capture sheet](#) to each group. Review the cooperative learning roles listed on the top, and give students one minute to assign roles. Then, read the directions and instruct students to complete the tasks.

When groups have completed their capture sheets, invite the Recorder from each group to share the group’s thoughts with the class. Facilitate discussion about the different ideas that arise.

Key Talking Points:

- Opioids mimic the action of endorphins by fitting in the same “locks” (binding to opioid receptor sites in the brain).
- This affects feelings of pain as well as a person’s overall emotional state.
- Endorphins are not harmful or addictive like opioid drugs are.
- Endorphins come from positive activities such as exercising, laughing, and eating certain foods.



SLIDE 15

Summary/Wrap of Session:

- Neurotransmission is the process of sending a message in the body.
- Neurotransmitters help messages travel in the body.
- Opioids mimic the action of endorphins by fitting in the same locks (binding to opioid receptor sites in the brain). This affects feelings of pain as well as a person’s overall emotional state. However, endorphins are not harmful or addictive like opioid drugs are. Endorphins come from positive activities such as exercising, laughing, and eating certain foods.

SESSION 4 OVERVIEW

SLIDES
16-21

Investigating Opioid Misuse, Dependency, and Addiction

Overview:

In this section, students will examine how opioids impact body systems. Students will evaluate this information to describe which body systems are most impacted by opioid misuse. This will lead to a discussion around the science of physical dependency (what happens when you misuse the drug over time?) and withdrawal (what happens when you suddenly stop using opioids?).

Objectives:

- Describe the short- and long-term negative effects of opioid misuse on the body.
- Differentiate between how endorphins and opioids affect the body.
- Demonstrate how opioid use affects the nervous system and body by developing a social media campaign and presenting it to classmates.
- Explain how opioids affect the different body systems.
- Examine what happens when you misuse an opioid over time.
- Explain what happens when you suddenly stop taking opioids.

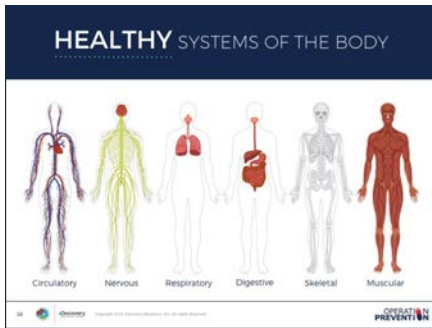
Required Materials:

- Chart paper
- [Long-Term Effects of Opioid Misuse](#) (one per student)
- [Blank outline of human body](#) (one per student)

Definitions:

- **Physical dependency** – when the brain adapts to the effect of a drug and develops tolerance
- **Withdrawal** – a group of physical and psychological symptoms that result from the discontinuance of an addicting drug
- **Tolerance** – when the body becomes less responsive to a drug

SESSION 4



SLIDE 16

Lead students through a quick review of the body systems by clicking on the slide to display the images of the bodies. Ask students to identify what each image represents.

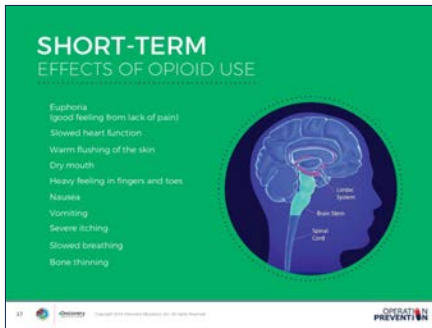
Click to display the text labels. From left to right, the images show the circulatory, nervous, respiratory, digestive, skeletal, and muscular systems.

Ask students to share how each body system should function in a healthy person. (If time allows, each student can record a brief description of each system) Anticipated responses include:

- Circulatory system- heart pumps blood back and forth
- Digestive system- mouth eats, stomach digests, intestines move
- Nervous system- transmit signals to and from different body parts
- Respiratory system- take in air, breath with lungs to get oxygen to body
- Skeletal system- bone support structure of the body
- Muscular system- gives body strength, balance, and movement

Remind students that as they continue to learn about opioids and how they can be misused, they should keep in mind how the different body systems operate to learn about how opioids can affect them.

SESSION 4



SLIDE 17

Now that students have considered healthy, functioning body systems, they will examine the short-term effects of opioid misuse on these systems.

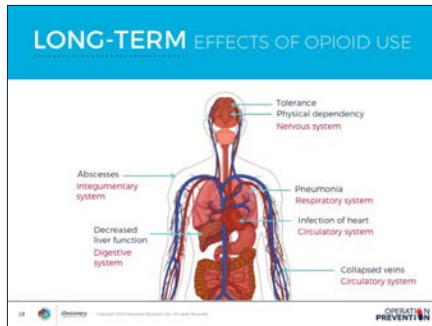
Ask students to consider ways that an endorphin rush from opioid misuse affects each system in the body. Ask: What effects appear during or immediately after? What effects might appear years later? Then, direct students to organize their effects into “short-term” (seconds, minutes, hours, days) and “long-term” (weeks, months, years).

Then, display the slide. Using a large sheet of chart paper, direct students to organize the effects listed on the slide into each system: nervous (euphoria), circulatory (slowed heart function), respiratory (slowed breathing), digestive (dry mouth, nausea and vomiting), muscular (warm flushing of the skin, heavy feeling in fingers and toes, itching), and skeletal (bone thinning).

Connect these short-term effects to the brain and nervous system by interacting with the image and saying the following:

- “Opioids can slow breathing by altering activity in the brain stem (point to this section), which controls automatic body functions such as breathing and heart rate.”
- “Opioids can increase feelings of pleasure by altering activity in the limbic system (circle these system), which controls emotions.”
- “Opioids can block pain messages transmitted through the spinal cord (draw an arrow up along this section) from the body.”

SESSION 4



SLIDE 18

Now that students have examined the short-term effects, they will examine the long-term effects of opioid misuse on the body.

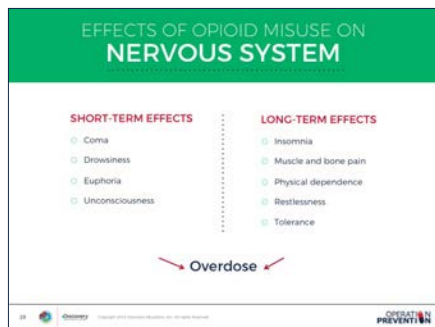
First, ask students to consider ways that opioid misuse affects other systems in the body. Ask: Which effects occur over the long term? Remind students that long-term refers to weeks, months, or years after use.

Then, display the image. [Using the Long-Term Effects of Opioid Misuse student activity sheet](#), direct students to organize the effects listed on the slide into each system: circulatory (infection of heart, collapsed veins), respiratory (pneumonia), digestive (decreased liver function), and nervous (tolerance, physical dependency). Note that abscesses, or sores caused by the buildup of pus, can affect a variety of systems, most noticeably the integumentary (skin).

Key Talking Points

- The most important conclusion is that a long-term effect of opioid use is physical dependence.
- Once a person becomes physically dependent on opioids, they require increasing amounts of the drug (tolerance) and suffer withdrawal (defined in slide 21) if they cease using the drug.
- They also risk becoming addicted, which happens when seeking and using the drug becomes a compulsion, or the primary purpose in life. This greatly increases the risk of experiencing the other long-term effects.²

SESSION 4



SLIDE 19

Now that students understand the overall effects of opioids on the body, they will compare the short-term and long-term effects of opioid misuse on the nervous system.

Ask students to imagine how a person would feel if they experienced endorphin rushes every day, multiple times per day. What would happen to the way they feel? If students have misconceptions, ask if they have ever eaten several spicy things back to back. Does the food taste less spicy over time?

Discuss the concept of tolerance: the need to take large amounts of a substance to get the same effect as before. Then, display the slide containing the table. Review each effect.

Discuss the concept of physical dependence³: a normal adaptation to repeated use of a substance, which is not the same as addiction.

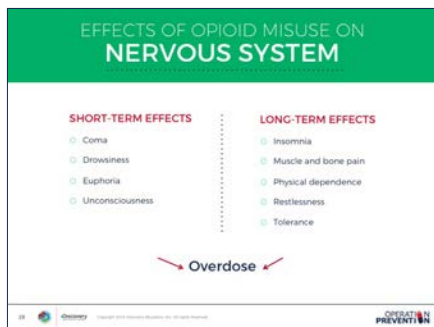
Click to display the text (“Overdose”) below the table.

Key Talking Points:

- Explain that an overdose is when someone takes too much of a drug and the body starts to shut down, sometimes leading to death.
- Overdoses are common with opioid misuse because many prescription drugs are very strong and some people do not take them as directed.
- Elaborate on how an overdose can happen immediately after misusing an opioid or later.
- Because your body and brain are still growing, they are very sensitive to substances that change how your body works. Introducing even a little bit of an opioid can have larger, life-long effects. Doctors prescribe opioids in very exact doses for specific amounts of time. If the prescription isn't meant for you, then it may be too much for your body to handle.
- When people develop a tolerance for opioids, they must take a higher dose to achieve the same painkilling effects. However, their body does not usually develop a similar tolerance to the other effects. When people take more and more opioids to feel a small good effect, the bad effects multiply and overcome the body, leading to an overdose.

Finally, distribute a [blank outline of a person](#) to each student. Ask students to label the effects of opioid misuse on different parts of the body.

SESSION 4



SLIDE 19 continued

Summarize this slide by asking students why understanding the short- and long-term effects of opioids is important.

Sample Students Response:

- So we can make good healthy choices for our bodies.
- Understanding how opioids affect our bodies will help us make good decisions.
- Information will help us think carefully about if and when we use opioids for medical reasons.
- Opioids can have some long-lasting impacts on our body that aren't healthy.

Teachers should be sure to make the connection for students about the importance of knowledge and using information to make good decisions.



SLIDE 20

Now that students have a general understanding of how opioids initially affect the body, they will examine specific problems caused by opioid misuse.

Watch the [2018 Virtual Field Trip video](#).

Facilitate a class discussion about the effects of opioids on the body. Suggested questions include:

- How would you define someone who is physically dependent on opioids? What behaviors suggest that someone is misusing opioids?
- Why might individuals misusing opioids steal? Why do you think physical dependency on opioids could shift from prescription opioid misuse to heroin use?
- What challenges does physical dependency present for opioid misusers and their families?

After watching and discussing the video, direct students to write or draw a conclusion of how the effects of opioids help to explain why people may misuse opioids.

SESSION 4



SLIDE 21

Now that students have examined physical dependency, they will examine what happens when a person who is physically dependent on opioids suddenly stops.

Ask students if they have any routines (like brushing their teeth every morning) and how their bodies would feel if this routine were interrupted. Ask several students to share their thoughts with the class.

Click the slide to reveal the definition of withdrawal. Ask students to identify the causes of withdrawal (physical dependence and tolerance) and describe the possible effects.

Click to display the image. Ask students to describe what they see and identify the short- and long-term effects.

Recall that physical dependence causes the body to adapt to the presence of a drug. Explain that withdrawal symptoms occur if drug use is stopped or reduced suddenly. Withdrawal may occur within a few hours after the last time the drug is taken. Symptoms of withdrawal include restlessness, anxiety, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with “goose bumps,” and involuntary leg movements. Major withdrawal symptoms peak between 24–48 hours after the last use and subside after about a week. However, some people have shown persistent withdrawal signs for many months.

Give students a few minutes to revisit their questions from the beginning of **Explore**. They may add new questions, revise existing ones, or respond to ones that might have been answered by what they learned in this section.

SESSION 5 OVERVIEW

SLIDES
22-25

Applying What We Have Learned

Overview:

In this section, students first summarize their learning by completing an informal matching assessment and discuss ways to avoid opioid misuse. Then, students will communicate one key takeaway they learned by developing a social media campaign to reach a peer audience.

Objectives:

- Examine the effects of opioids on the human nervous system.
- Explain how neurons (nerve cells) send and receive information.

Required Materials:

- Paper or note cards

Definitions:

- **Neurotransmission** – process that drives information between neurons
- **Endorphin** – a natural chemical that is released in the brain to reduce pain or make you feel relaxed or energized
- **Neuron** – a cell that sends messages to and from the brain
- **Opioid** – class of drugs found naturally and can be made synthetically to reduce pain
- **Physical dependency** – when the brain adapts to the effect of a drug and develops tolerance
- **Withdrawal** – a group of physical and psychological symptoms that result from the discontinuance of an addicting drug
- **Tolerance** – when the body becomes less responsive to a drug

SESSION 5



SLIDE 22

Avoid Opioid Misuse

Now that students have learned about opioid use and how it affects their bodies, discuss how they can make good decisions to avoid opioid misuse and deal with stress.

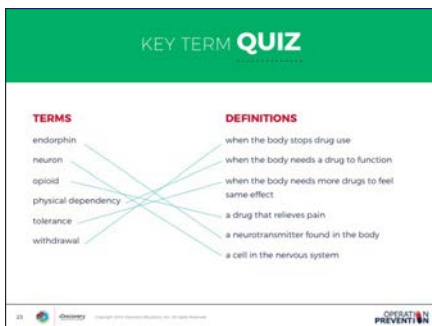
Ask students to turn to a shoulder partner and share ways in which they like to relax. Allow volunteers to demonstrate their ideas via charades in front of the class.

As a class, brainstorm healthy ways to release natural endorphins and reduce stress. Record ideas on the board. Anticipated responses might include:

- Identify stressors and brainstorm ways to alleviate stress (alternative activities to opioids or drug use)
- Learn stress relieving techniques to help your body become naturally calm
- Develop habits that include pro-healthy activities like exercise, listening to music, watching funny movies, etc.
- Use prescription medication (responsibly) only as directed and only under the direction of a physician/adult

Key talking Points:

- We all have different ways to release “feel-good endorphins.”
- Proactively planning for stressful times can help us make healthy choices for handling them.



SLIDE 23

Students will first review the key vocabulary they have learned. They can turn to their shoulder partner to discuss which definitions belong with which terms.

Instruct students to match each key term on the left of the slide with its definition on the right. You may wish to ask a series of student volunteers to come to the board to draw a line between the columns, or have students individually write each pair of matching letters and numbers.

Display the correct answers. Address any misconceptions.

SESSION 5

SLIDE 24

PUBLIC AWARENESS CAMPAIGNS

A public awareness campaign...

- shares knowledge of facts.
- sends a positive message.
- challenges negative perceptions.
- increases support for new approaches.
- influences people to make better choices.

Possible Topics:

- Sick Children
- Refugees
- Public Health
- Disease

Discovery OPERATION PREVENTION

Now that students have investigated opioid misuse, they will share with their peers the most important thing they learned.

Use the slide to introduce the idea of a public awareness campaign. Click to display the bullet points that define a public awareness campaign⁴, and review it with students to make sure everyone understands what a campaign is.

Click again to display possible topics. Then, show students examples of existing campaigns. Suggestions include:

- Save the Children Campaign
<https://www.savethechildren.org/us/more-ways-to-help/campaign-with-us>
- Red Ribbon Campaign
www.redribbon.org
- Sick Children: #ShareYourEars
<http://wish.org/content/disney/share-your-ears?cid=WBST-SHAREYOUREARS-MICROSITE>
- Disease: ALS Ice Bucket Challenge
<http://www.alsa.org/fight-als/ice-bucket-challenge.html>
- Public Health: Truth #FinishIt
<https://www.thetruth.com/>

Key Talking Points:

- Public awareness campaigns share facts, send positive messages, and challenge negative perceptions.
- Campaigns can be used to increase support for new approaches or influence people to make better choices.
- Public awareness campaigns can be effective tools for conveying information.

SESSION 5



SLIDE 25

Finally, students will communicate their most important takeaway from this lesson by creating a social media campaign to raise public awareness. This is the final assignment for this lesson.

Read aloud the directions on this slide for how students should complete the assignment. Click the slide to reveal each step one at a time.

1. Choose one idea you learned in this lesson about opioid misuse.

Encourage students to think about the most important thing they learned that they would want to share with a peer. Was it about natural endorphins? Physical dependency? Withdrawal?

2. Decide how your social media campaign will communicate the science of opioid misuse.

Students should consider whether they will include diagrams of the brain or body, videos comparing endorphins to opioids, or other visual elements that reveal the science behind opioid misuse. This is an opportunity for students to brainstorm with peers before moving onto the next step.

3. Write a hashtag.

Students will likely be familiar with using hashtags, but if not, provide a brief explanation: hashtags are words/phrases that begin with “#” and accompany social media posts. They are meant to group messages on a specific topic.

4. Create an example post.

Encourage students to use their imagination, but their ideas should be based on evidence from the lesson. Students can use computers or paper, depending on the available technology.

5. Submit this post to your teacher.

After students have completed their assignments, invite several students to share their posts with the class. If possible, determine a way for students to share their posts with peers outside of the classroom.

WORKS CITED

- ¹ Miech, R. A., Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2016). Monitoring the Future national survey results on drug use, 1975–2015: Volume I, Secondary school students. Ann Arbor: Institute for Social Research, The University of Michigan. Available at <http://monitoringthefuture.org/pubs.html#monographs>
- ² Principles of Drug Addiction Treatment: A Research-Based Guide, NIH Publication No. 12–4180 Printed 1999; Reprinted July 2000, February 2008; Revised April 2009; December 2018 at <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/preface>
- ³ Misuse of Prescription Drugs. (2014, November). National Institute on Drug Abuse, 1-16. Retrieved from <https://www.drugabuse.gov/publications/misuse-prescription-drugs/overview>
- ⁴ Creating Public Awareness Campaigns That Work. (2013, June 12). Retrieved September 29, 2016, from <https://jointcenter.org/research/creating-public-awareness-campaigns-work>

OPIOIDS: JUST THE FACTS

THE NIDA BLOG TEAM

August 27, 2018

There's been a lot of talk about the opioid crisis lately. You might be wondering: What exactly are opioids? And why are they such a problem?

If you've had a sports injury or surgery, your doctor may have prescribed you an opioid for pain relief. When taken as prescribed by a medical professional, opioids are relatively safe and can be very good at treating pain. However, some people misuse opioids to get high—misuse means taking a medication that wasn't prescribed for you, or taking more of it than your doctor prescribed.

Here are some facts about opioids you should know:

What are opioids?

Opioids are naturally found in the opium poppy plant. Some prescription opioids are made from this plant, and others are synthetic (made in labs).

What are the most commonly used opioids?

The most commonly used prescription opioids are oxycodone (OxyContin®), hydrocodone (Vicodin®), codeine, and morphine. Some slang terms for misused opioid pills are "Oxy," "Percs," and "Vikes."

Another opioid, heroin, is not a medication and is often shot into the arm through a syringe to produce a high. Sometimes prescription opioids are misused by being crushed and injected.

What are the risks of misusing opioids?

Opioid misuse can cause harmful health effects like slowed breathing, which can lead to a fatal overdose.

When misused repeatedly, opioid use can also change the brain, leading to addiction.



Any other opioids I should know about?

Yes. Fentanyl is an opioid drug that's 50 to 100 times more powerful than heroin. Medically, it's used to treat extreme pain and for pain related to surgeries. But it's also made illegally and mixed with other drugs. Illegal fentanyl is responsible for many fatal overdoses in people who thought they were taking another drug.

For your own safety, use an opioid only under the care of a doctor and only as prescribed.

Adapted from: The National Institute on Drug Abuse Blog Team. Opioids: Just the Facts. Retrieved from <https://teens.drugabuse.gov/blog/post/opioids-just-facts>.

OPIOIDS: JUST THE FACTS

Review the learning roles below and assign a group member to each role:

- LEADER** Person who keeps track of time and leads the group to read the article and answer the questions.
- RECORDER** Person who writes down the answers to the questions.
- REPORTER** Person who will share out the group's answers with the larger group.

After reading the "Opioids: Just the Facts" article, discuss your thoughts as a group and answer the questions:

1. What new information did you learn?

2. What information did you think was the most surprising?

3. Why is the information you read about important to share with your peers?

OPIOIDS AND NEUROTRANSMISSION

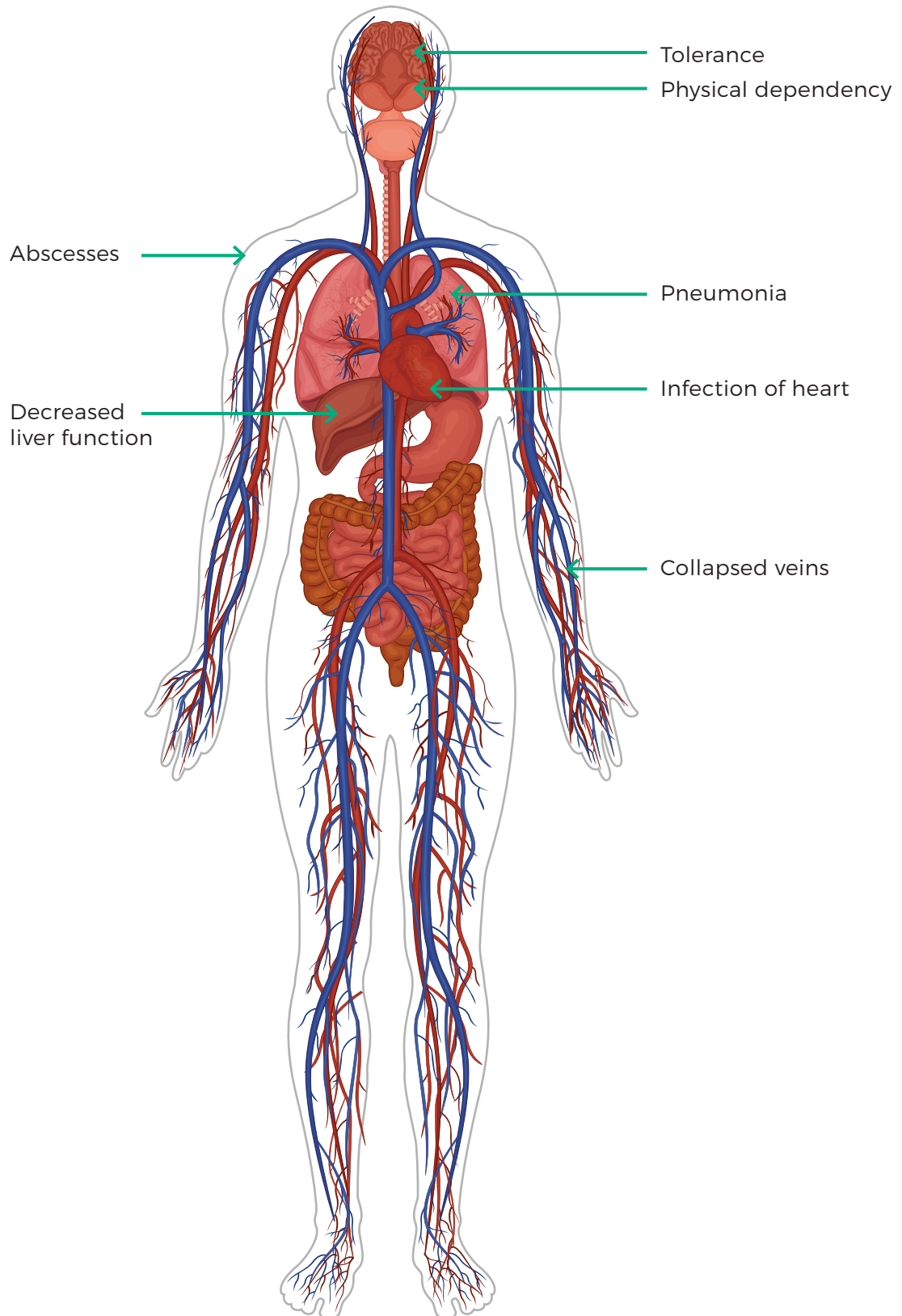
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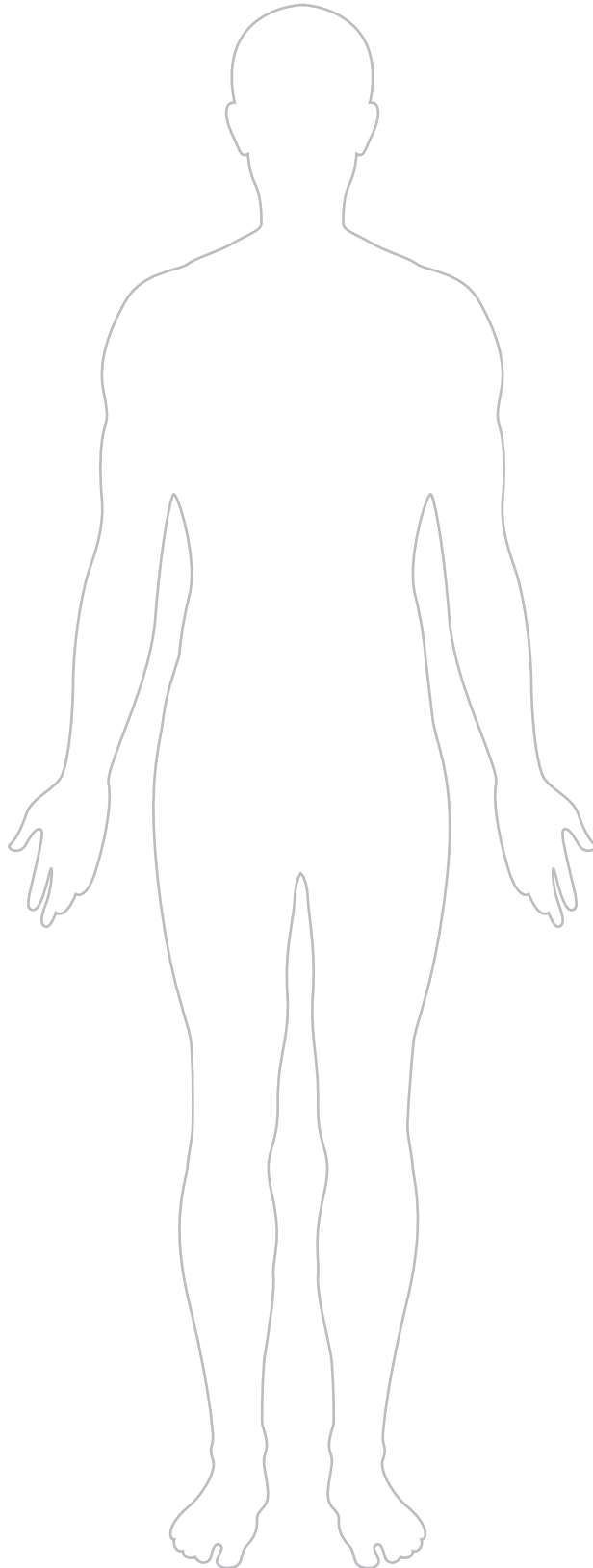
After reading the article, discuss your thoughts as a group and answer the questions:

1. What do you notice about the shape of each “key” in the image?
2. The opioid receptor is the “lock” from the analogy. What type of “lock” does each key fit into?
3. What conclusion can you draw about the brain from this relationship?

LONG-TERM EFFECTS OF OPIOID USE



HUMAN BODY OUTLINE



NATIONAL STANDARDS

This lesson plan has been developed based on the following national standards:

Next Generation Science Standards

PS1.B: Chemical Reactions

Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2),(MS-PS1-3),(MS-PS1-5)

LS1.D: Information Processing

Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1-8)

LS1.A: Structure and Function (circulatory, muscular, nervous)

In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3)

National Health Education Standards

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

1.8.9: Examine the potential seriousness of injury or illness if engaging in unhealthy behaviors.

Students will demonstrate the ability to advocate for personal, family, and community health.

8.8.2: Demonstrate how to influence and support others to make positive health choices.

CCSS.ELA-LITERACY

CCSS.ELA-LITERACY.RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

CCSS.ELA-LITERACY.RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CCSS.ELA-LITERACY.RST.6-8.8

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.