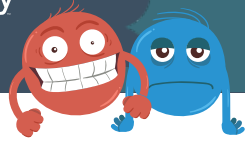


Say “YES” to a Healthy Lifestyle



Discovery
EDUCATION



GRADE
RANGE
5–7

KEEPING KIDS SUBSTANCE-FREE | CLASSROOM ACTIVITY

ASK, LISTEN, LEARN: CAUSE & EFFECT

Learning Objectives

Students will:

- **Research** the main functions of the developing brain.
- **Describe** the effects of cannabis on the endocannabinoid system, as well as the brain and body.
- **Analyze** the dangers associated with adolescent cannabis use.

Overview

Ask, Listen, Learn in partnership with Discovery Education teaches kids what the brain does, what alcohol does to it, and what that does to them! But underage drinking is not the only risky behavior that presents itself to kids; they may come across peer pressure in terms of underage cannabis use as well. It's important to address the risks of underage cannabis use with kids, especially as it becomes legal in some states across the country. In this activity, students will investigate the parts of the developing brain most affected by marijuana use. They will create an infographic that highlights how these brain parts function regularly, compared with how they may function if the developing brain is impaired by cannabis, and they will conclude by discussing the increased harm associated with adolescent marijuana use.

Target Audience

Grades 5–7

Activity Duration

60–75 minutes

Materials

- Device with the ability to play/project video, one for the educator
- Devices with Internet access, enough for half the class
- Handout 1: Three Truths and A Lie, one copy per student
- [How Marijuana Affects Your Developing Brain](#) video, to project
- Handout 2: Endocannabinoids and the Brain, enough for half the class
- Handout 3: Infographic, enough for half the class

Procedure

1. Warm-Up Activity

- Begin by distributing *Handout 1: Three Truths and a Lie*, a copy to each student.
 - Read the four statements aloud, and then ask students to tell a partner which statement they predict is the lie and why.
 - Explain that the class is about to watch a short video that reveals the truth. They will identify the lie and support their selection with evidence from the video.
 - Play the [How Marijuana Affects Your Developing Brain](#) video and pause intermittently to allow students to take notes to help them with their justifications.
 - When the video is complete, encourage students to work in pairs or groups of three to discuss which statements were true and which one was a lie based on their video evidence.
 - Wrap up by encouraging students to share the lie they have identified with the class. Ensure students understand that each statement is true *except* for the statement about the risks of youth marijuana use... Young people are in fact at a higher risk of developing serious long-term effects!
2. Explain that today students will further investigate the effects of underage marijuana use by researching sections of the brain that have a high number of endocannabinoid receptors. Once they have a better understanding of the main jobs of each brain part, they will be able to better understand the effects of marijuana on the developing brain.
3. Distribute one *Handout 2: Endocannabinoids and the Brain* to each pair. Review the directions provided, and then instruct students to begin their research.
4. As groups are finishing up, bring the class back together and review the major roles and responsibilities of each brain section. Be sure students have noted the following:
- **Cerebrum:** Is responsible for interpreting and understanding the senses (vision, hearing, touch, etc.)
 - **Amygdala:** Responsible for emotions like fear and anxiety; also associated with memory
 - **Hypothalamus:** Controls hormones, appetite and stress levels
 - **Hippocampus:** Plays an important role in memory—especially related to navigation and facts
 - **Cerebellum:** Is responsible for motor skills, movement, and coordination
 - **Brain Stem:** Controls automatic functions like breathing, digestion, heartbeat, reflexes, and our sensation of pain
5. Then pose the following question to students: Now we know the jobs of these different parts of the developing brain, *and* we know that the brain has a high number of endocannabinoid receptors, how can we use this information to help us explain marijuana’s effect on the mind and body?

6. Divide students into pairs and distribute one *Handout 3: Infograp* to each pair. Then prepare students for the activity by performing the following:
 - Read through the instructions together.
 - Encourage students to use their research and their analysis skills to infer what could happen if the brain’s endocannabinoid receptors are blocked by marijuana. It may be helpful to talk through an example, such as: If the cerebellum is responsible for our coordination, it is likely that our balance and/or motor skills would be affected if this part of the brain could not transmit messages or function properly.
 - Depending on the resources available, explain that every pair may either use an online tool, design program, or paper and art supplies to create their infographic.*

***Tip:** If your students need extra support in understanding infographics, perform a quick Internet image search and share some examples.

7. When students have finished their infographics, bring the class back together and encourage students to share their work. Ensure students understand that, as a result of blocking endocannabinoid reception sites in the brain, marijuana use can:
 - Impair coordination
 - Change (and increase) appetite
 - Harm the ability to learn and store memories
 - Alter thinking, judgement, and decision-making skills
 - Change sensitivity to pain
8. Explain that while marijuana use is considered illegal by the federal government, there are some states that have made it legal in certain circumstances. Many states have made marijuana legal for medical reasons when prescribed by a doctor. In this case, it is usually prescribed to help patients deal with severe conditions. Some states have also made marijuana legal for recreational (or general) use by adults over the age of 21.

Stress, however, that marijuana use for anyone under the age of 21—when not prescribed by a doctor—is *illegal*—because the brain is still developing.

9. **Wrap Up:** Lead a final discussion around the following questions and encourage students to include information they learned from the video and their research to develop thoughtful responses:
 - Considering marijuana’s effects on the developing brain, how could using it affect your daily life?
 - Be sure students consider their performance in school, sports, and extracurricular activities as well as their safety.
 - Why do you think marijuana use may be legalized in some states for adults but not for children and teens?

- Ensure students understand that their brains are still developing. When marijuana is introduced to the developing brain, it can have a stronger and more harmful effect than it does on adults. It can also lead to more severe long-term effects—such as increased risk of cognitive and mental damage, mental illness, and addiction to alcohol and other substances in adulthood.
- Based on what you learned today, what would you say to a friend or sibling who was considering trying marijuana? Why?

Optional Extensions

- To reinforce how marijuana impacts the developing brain and dive deeper into learning about the developing nervous system, utilize the [Marijuana and Your Developing Brain Lesson Plan](#) with your class.
- Students can watch the [How Alcohol Affects Your Developing Brain](#) video and compare/contrast the effects of underage drinking and underage marijuana use on the developing brain.

Standards

Next Generation Science Standards

From Molecules to Organisms: Structures and Processes

- MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- MS-LS1-8: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

National Health Standards

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

- 1.8.1: Analyze the relationship between healthy behaviors and personal health.
- 1.8.5: Describe ways to reduce or prevent injuries and other adolescent health problems.
- 1.8.8: Examine the likelihood of injury or illness if engaging in unhealthy behaviors.
- 1.8.9: Examine the potential seriousness of injury or illness if engaging in unhealthy behaviors.

Common Core English Language Arts Standards

Reading

- CCSS.ELA-LITERACY.CCRA.R.1: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- CCSS.ELA-LITERACY.CCRA.R.7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.¹

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.
- CCSS.ELA-LITERACY.CCRA.W.7: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

Speaking and Listening

- CCSS.ELA-LITERACY.CCRA.SL.5: Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

Three Truths and A Lie

1. Marijuana contains a chemical called THC. THC looks like and acts like endocannabinoids, and it prevents endocannabinoids from doing their jobs.
2. Young people who use marijuana often are at a low risk of experiencing serious long-term effects (such as cognitive and memory damage, serious mental illnesses, and adult addiction to alcohol or other drugs) from using marijuana.
3. The three parts of the endocannabinoid system are:
 - a. Endocannabinoids
 - b. Cell receptors
 - c. Enzymes
4. Endocannabinoids are responsible for sending important messages that help regulate memory, appetite, body temperature, motor coordination, stress level, and more.

Video Notes

Endocannabinoids and the Brain

Directions: The brain parts labeled below have a high number of endocannabinoid receptors. Because of this, these brain sections are more likely to be affected by underage marijuana use.

Use kids.kiddle.co to research the main responsibilities of each brain section, and jot them in the blanks below. Some brain parts may be responsible for more than one job!

CEREBRUM

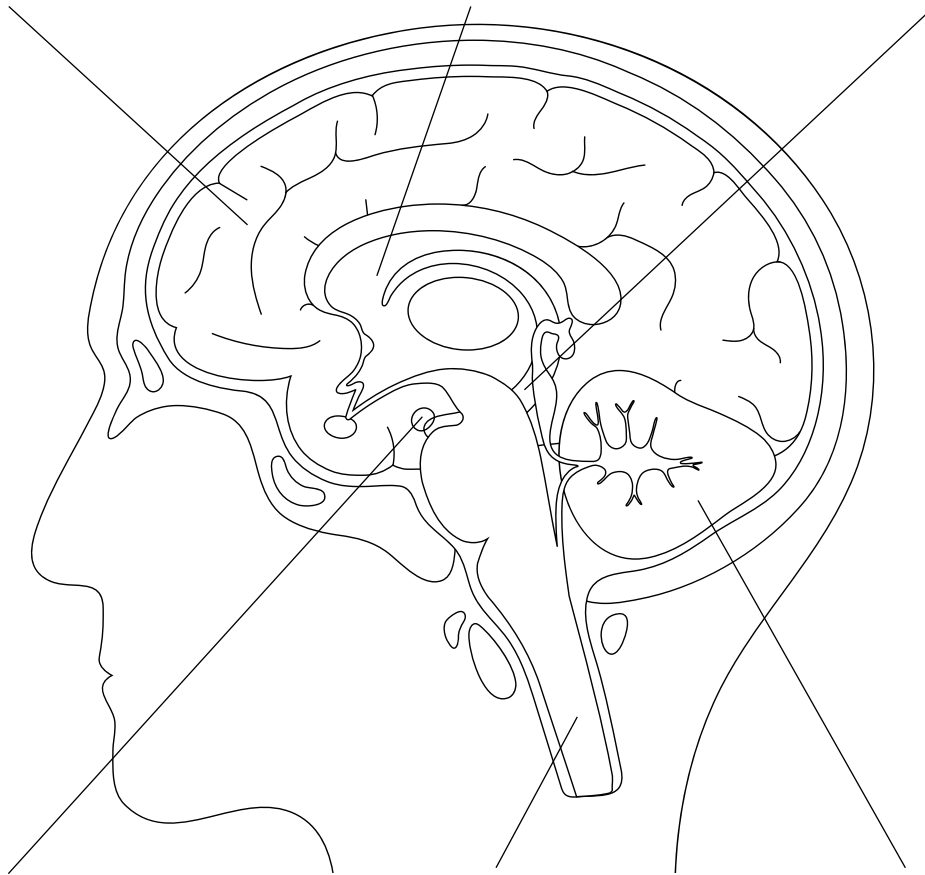
Responsible for: _____

HYPOTHALAMUS

Responsible for: _____

HIPPOCAMPUS

Responsible for: _____



AMYGDALA

Responsible for: _____

BRAIN STEM

Responsible for: _____

CEREBELLUM

Responsible for: _____

Infographic

Overview: An infographic is a collection of imagery, charts, and/or text designed to give viewers a brief overview of a complicated topic. In other words, an infographic is a visual that makes subjects easier to understand.

Your Job: Create an infographic for your peers that explains how the developing brain is supposed to function *and* what may happen if marijuana interferes.

Requirements: Your infographic should...

- Be visually appealing
- Be easy to understand
- Include the following brain parts:
 - Cerebellum
 - Medulla
 - Brain stem
 - Cerebrum
 - Hypothalamus
 - Hippocampus
- Explain what each brain section above is *supposed* to do
- Suggest what may happen if THC blocks the endocannabinoids receptors and what brain sections can't do their job(s)