

***Performance Task Item: Up in Smoke: Medical Marijuana***

**Part A:**

**Read the article, “What is Medical Marijuana?” and answer questions 1 and 2.**

1. What is the central idea of the text?
2. Create an outline of this text, and explain its structure.

**Read “The Science of Marijuana, How THC Affects the Brain” and answer questions 3 - 5.**

3. Write a summary of the specific details in “The Science of Marijuana.” How do these details develop the central idea of the text?

4. Evaluate which of the two texts best impacts your understanding of the topic. Provide justifications from the text to support your answer.

5. Delineate and evaluate the arguments and claims in both articles. Assess the validity of the reasoning and the relevance of the evidence provided.

**Part B:**

6. Compare and contrast how the authors' ideas are developed and refined by portions of the texts. Write an informative text to examine the effectiveness of the organization of the content.

7. Create a power point synthesizing information from both texts to answer the question: **When do benefits outweigh risks?**

## ARTICLES/STUDENT MATERIALS/RUBRICS

### **“What is Medical Marijuana?”**

The term *medical marijuana* refers to using the whole unprocessed marijuana plant or its basic extracts to treat a disease or symptom. The U.S. Food and Drug Administration (FDA) has not recognized or approved the marijuana plant as medicine. However, scientific study of the chemicals in marijuana, called *cannabinoids*, has led to two FDA-approved medications that contain cannabinoid chemicals in pill form. Continued research may lead to more medications.

Because the marijuana plant contains chemicals that may help treat a range of illnesses or symptoms, many people argue that it should be legal for medical purposes. In fact, a growing number of states have legalized marijuana for medical use.

Why isn't the marijuana plant an FDA-approved medicine?

The FDA requires carefully conducted studies (clinical trials) in hundreds to thousands of human subjects to determine the benefits and risks of a possible medication. So far, researchers have not conducted enough large-scale clinical trials that show that the benefits of the marijuana plant (as opposed to its cannabinoid ingredients) outweigh its risks in patients it is meant to treat.

What are cannabinoids?

Cannabinoids are chemicals related to *delta-9-tetrahydrocannabinol* (THC), marijuana's main mind-altering ingredient. Other than THC, the marijuana plant contains more than 100 other cannabinoids. Scientists as well as illegal manufacturers have produced many cannabinoids in the lab. Some of these cannabinoids are extremely powerful and have led to serious health effects when abused.

The body also produces its own cannabinoid chemicals. They play a role in regulating pleasure, memory, thinking, concentration, body movement, awareness of time, appetite, pain, and the senses (taste, touch, smell, hearing, and sight).

What is CBD?

There is growing interest in the marijuana chemical *cannabidiol* (CBD) to treat certain conditions such as childhood epilepsy, a disorder that causes a child to have violent seizures. Therefore, scientists have been specially breeding marijuana plants and making CBD in oil form for treatment purposes. These drugs may be less desirable to recreational users because they are not intoxicating.

How might cannabinoids be useful as medicine?

Currently, the two main cannabinoids from the marijuana plant that are of medical interest are THC and CBD.

THC increases appetite and reduces nausea. The FDA-approved THC-based medications are used for these purposes. THC may also decrease pain, inflammation (swelling and redness), and muscle control problems.

CBD is a cannabinoid that does not affect the mind or behavior. It may be useful in reducing pain and inflammation, controlling epileptic seizures, and possibly even treating mental illness and addictions.

NIH-funded and other researchers are continuing to explore the possible uses of THC, CBD, and other cannabinoids for medical treatment. For instance, recent animal studies have shown that marijuana extracts may help kill certain cancer cells and reduce the size of others. Evidence from one cell culture study suggests that purified extracts from whole-plant marijuana can slow the growth of cancer cells from one of the most serious types of brain tumors. Research in mice showed that treatment with purified extracts of THC and CBD, when used with radiation, increased the cancer-killing effects of the radiation (Scott, 2014).

Scientists are also conducting preclinical and clinical trials with marijuana and its extracts to treat numerous diseases and conditions, such as the following:

- autoimmune diseases (diseases that weaken the immune system):
  - HIV/AIDS
  - multiple sclerosis (MS), which causes gradual loss of muscle control
  - Alzheimer's disease, which causes loss of brain function, affecting memory, thinking, and behavior
- inflammation
- pain
- seizures
- substance use disorders
- mental disorders

Are People with Health- and Age-Related Problems More Vulnerable to Marijuana's Risks?

Regular medicinal use of marijuana is a fairly new practice. For that reason, its effects on people who are weakened because of age or illness are still relatively unknown. Older people and those suffering from diseases such as cancer or AIDS could be more vulnerable to the drug's harmful effects. Scientists need to conduct more research to determine if this is the case.

What medications contain cannabinoids?

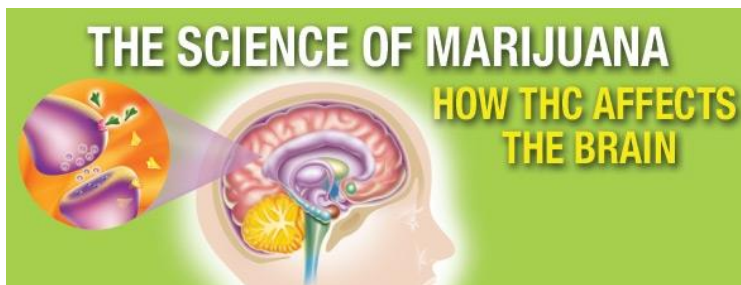
Two FDA-approved drugs, dronabinol and nabilone, contain THC. They treat nausea caused by chemotherapy and increase appetite in patients with extreme weight loss caused by AIDS. The United Kingdom, Canada, and several European countries have approved nabiximols (Sativex®), a mouth spray containing THC and CBD. It treats muscle control problems caused by MS. The United States is conducting clinical trials for its safe use in treating cancer pain. Although it has not yet undergone clinical trials, scientists have recently created Epidiolex, a CBD-based liquid drug to treat certain forms of childhood epilepsy.

Points to Remember

- The term *medical marijuana* refers to treating a disease or symptom with the whole unprocessed marijuana plant or its basic extracts.
- The FDA has not recognized or approved the marijuana plant as medicine.
- However, scientific study of the chemicals in marijuana called *cannabinoids* has led to two FDA-approved medications in pill form.
- Cannabinoids are chemicals related to *delta-9-tetrahydrocannabinol* (THC), marijuana's main mind-altering ingredient.
- The body also produces its own cannabinoid chemicals.
- Currently, the two main cannabinoids from the marijuana plant that are of interest for medical treatment are THC and *cannabidiol* (CBD).
- Scientists are conducting preclinical and clinical trials with marijuana and its extracts to treat numerous diseases and conditions.
- Two FDA-approved marijuana drugs are dronabinol and nabilone, both used to treat nausea and boost appetite.

<https://www.drugabuse.gov/publications/drugfacts/marijuana-medicine>

## “The Science of Marijuana: How THC Affects the Brain”



Some people believe smoking marijuana carries no risks. But scientific research shows that there are risks, especially for teens. Marijuana affects a person’s judgment and can impair his or her ability to drive. For those who use it regularly, it can lead to poor academic performance, or even addiction.

So how does marijuana have such a big impact on a person’s ability to function?

Scientists have asked themselves that question for a long time. And after several decades of research they not only figured out how marijuana works, but scientists also discovered an important communications system in the brain and the body, which they called **the endocannabinoid system** after the cannabis plant from which marijuana comes.

### “Endo”—what?

Understanding the science of marijuana began in the mid-1960s with the identification of THC (delta-9-tetrahydro**cannabinol**) as marijuana’s main active ingredient. Twenty years later, scientists identified the sites in the brain and body where marijuana acts and called them cannabinoid (CB) receptors.

Scientists then discovered the body’s own natural chemicals—anandamide and 2-AG (2-arachidonoyl glycerol)—which also act on CB receptors. These chemicals (called cannabinoids), along with their receptors, make up the endocannabinoid (EC) system.

The EC system is found in many areas of the brain, which explains why it affects so many different body functions. Cannabinoids exert their influence by regulating how cells communicate—how they send, receive, or process messages. Cannabinoids act like a type of “dimmer switch,” slowing down communication between cells.

## The Endocannabinoid System

Brain cells (neurons) communicate with each other by sending chemical messages. The chemicals (neurotransmitters) cross a gap between neighboring neurons before attaching to their specific receptors.

### Presynaptic:

The neuron sending a message by releasing a chemical when signaled to do so

### Postsynaptic:

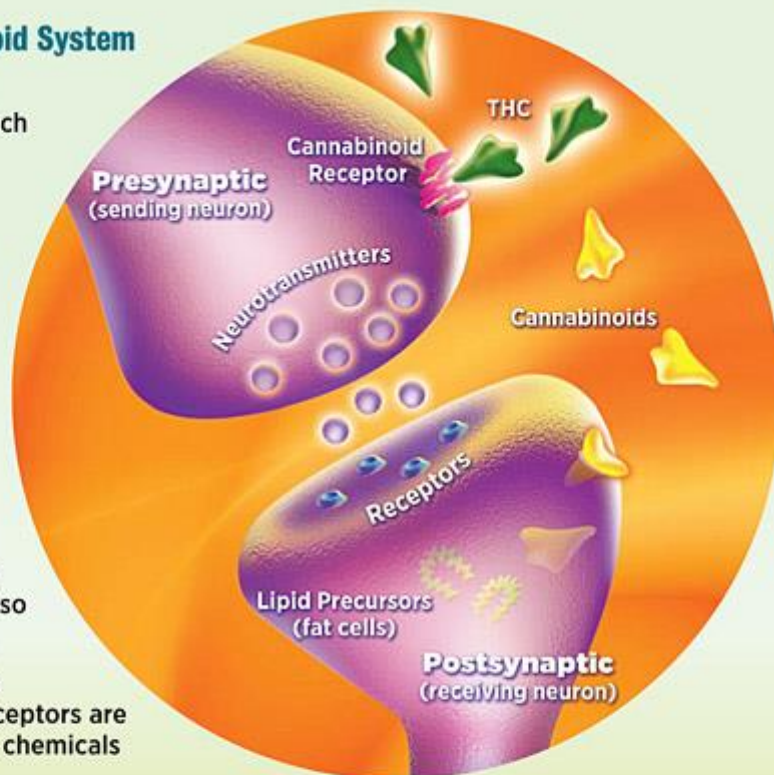
The neuron receiving the message when its receptors are activated by specific chemicals (neurotransmitters)

**Neurotransmitters:** The chemical messengers that travel from one brain cell to another

**Receptors:** Activated by neurotransmitters, receptors trigger a set of events that allows a message to be passed along to other neurons

**Cannabinoids:** Natural chemicals (anandamide and 2-AG) that bind to cannabinoid receptors in the brain and the body

**THC:** The main active ingredient in marijuana; THC, also a cannabinoid, interferes with the normal functioning of the endocannabinoid system

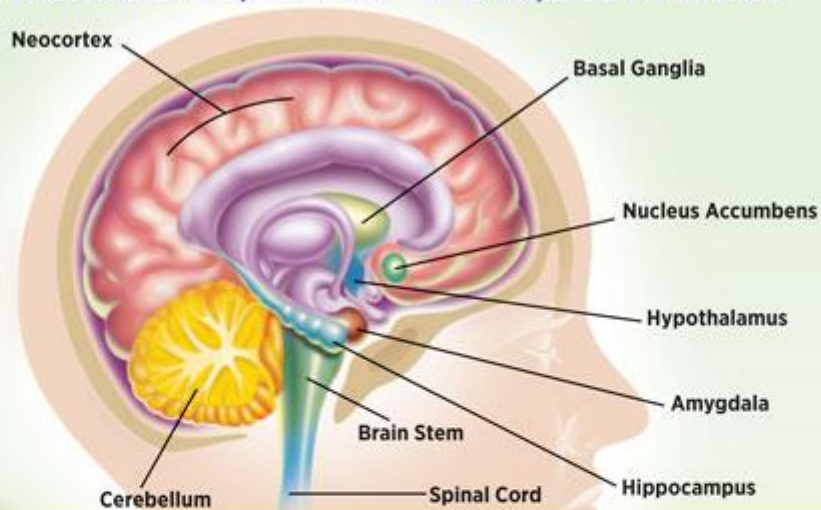


So how does THC affect the EC system?

When someone smokes marijuana, THC gets into the brain rapidly and attaches to cannabinoid receptors. The natural EC system is finely tuned to react appropriately to incoming information. But THC overwhelms the EC system. It prevents the natural chemicals from doing their job properly and throws the whole system off balance.



How does THC affect behavior? *It depends on where the CB receptors are in the brain.*



| Brain Structure   | Regulates  | THC Effect on User                        |
|-------------------|--|---|
| Amygdala          | emotions, fear, anxiety                            | panic/paranoia                            |
| Basal Ganglia     | planning/starting a movement                       | slowed reaction time                      |
| Brain Stem        | information between brain and spinal column        | antinausea effects                        |
| Cerebellum        | motor coordination, balance                        | impaired coordination                     |
| Hippocampus       | learning new information                           | impaired memory                           |
| Hypothalamus      | eating, sexual behavior                            | increased appetite                        |
| Neocortex         | complex thinking, feeling, and movement            | altered thinking, judgment, and sensation |
| Nucleus Accumbens | motivation and reward                              | euphoria (feeling good)                   |
| Spinal Cord       | transmission of information between body and brain | altered pain sensitivity                  |

The brain structures illustrated above all contain high numbers of CB receptors

<http://headsup.scholastic.com/students/the-science-of-marijuana>

## Constructed Response Rubric

| Score Point | Descriptor   |
|-------------|--|
| <b>3</b>    | <p><b>The 3 response fully accomplishes the task requirements. It</b></p> <ul style="list-style-type: none"> <li>• <b>includes a complete interpretation that goes beyond the text,</b></li> <li>• <b>has clear logic or reasoning, and</b></li> <li>• <b>provides specific, relevant support from the text.</b></li> </ul>                              |
| <b>2</b>    | <p><b>The 2 response adequately accomplishes the task requirements. It</b></p> <ul style="list-style-type: none"> <li>• <b>includes an adequate interpretation,</b></li> <li>• <b>may have minor flaws in logic or reasoning, and</b></li> <li>• <b>provides general but relevant support from the text.</b></li> </ul>                                  |
| <b>1</b>    | <p><b>The 1 response minimally accomplishes the task requirements. It</b></p> <ul style="list-style-type: none"> <li>• <b>includes a minimal interpretation,</b></li> <li>• <b>may have gaps in understanding or flaws in logic or reasoning, and</b></li> <li>• <b>may provide sparse or irrelevant support from the text.</b></li> </ul>               |
| <b>0</b>    | <p><b>The 0 response does not accomplish the task requirements. It</b></p> <ul style="list-style-type: none"> <li>• <b>may provide no support from the text,</b></li> <li>• <b>may be limited to information copied directly from the text and presented as the student’s own ideas, and</b></li> <li>• <b>may be incorrect or illogical.</b></li> </ul> |

## Argument Writing Rubric

**Purpose and Forms:** “Arguments are used for many purposes—to change the reader’s point of view, to bring about some action on the reader’s part, or to ask the reader to accept the writer’s explanation or evaluation of a concept, issue, or problem. An argument is a reasoned, logical way of demonstrating that the writer’s position, belief, or conclusion is valid.”

| Argument  | Advanced<br>4<br>90-100   | Proficient<br>3<br>70-89  | Basic<br>2<br>60-69   | Below Basic<br>1<br>50-59   |
|---|---|---|---|---|
| <b>Ideas/Purpose:</b><br>The argument is focused and clearly states the claim(s).                                       | <ul style="list-style-type: none"> <li>Claim(s) is clearly stated and distinguished from alternate or opposing claims</li> <li>Claim(s) is purposefully focused and consistent</li> <li>Complex claims are well-developed</li> <li>Alternate or opposing claims are thoroughly addressed</li> </ul>             | <ul style="list-style-type: none"> <li>Claim(s) is clearly stated and distinguished from alternate or opposing claims</li> <li>Claim(s) is focused and consistent</li> <li>Alternate or opposing claims are addressed</li> </ul>  | <ul style="list-style-type: none"> <li>Claim(s) is sometimes clear, focused or consistent</li> <li>Alternate or opposing claims are sometimes addressed</li> </ul>  | <ul style="list-style-type: none"> <li>Claim(s) is unclear, unfocused, inconsistent or missing</li> <li>Alternate or opposing claims are not addressed or missing</li> </ul>  |
| <b>Organization:</b><br>The writing has a clear and effective organizational structure creating unity and completeness. | Claims, reasons, and evidence are organized into clear categories: <ul style="list-style-type: none"> <li>Skillful and varied use of transitions</li> <li>Logical progression of ideas from beginning to end</li> <li>Purposeful introduction and conclusion</li> <li>Strong connections among ideas</li> </ul> | Claims, reasons, and evidence are organized into clear categories: <ul style="list-style-type: none"> <li>Appropriate use of transitions with some variety</li> <li>Adequate progression of ideas from beginning to end</li> <li>Evident introduction and conclusion</li> </ul> | Claims, reasons, and evidence are inconsistently organized into categories: <ul style="list-style-type: none"> <li>Some use of transitions</li> <li>Inadequate progression of ideas from beginning to end</li> <li>Ineffective introduction and conclusion</li> </ul> | Claims, reasons, and evidence are inconsistently organized into categories: <ul style="list-style-type: none"> <li>Little or no use of transitions</li> <li>Confusing progression of ideas</li> <li>Missing introduction and/or conclusion</li> <li>No connections among ideas</li> </ul> |

|  |   |  |  |   |
|--|---|--|--|---|
|  |   | <ul style="list-style-type: none"> <li>• Adequate connections among ideas</li> </ul>   | <ul style="list-style-type: none"> <li>• Weak connections among ideas</li> </ul>   |   |
| <p><b>Elaboration of Evidence:</b><br/>The claim is developed and supported with logical reasoning and relevant evidence using accurate, credible sources.</p> | <ul style="list-style-type: none"> <li>• Provides comprehensive support/evidence for the claim(s) , demonstrating a thorough understanding of the topic or text</li> <li>• Presents well-chosen evidence (sources, facts, and details)</li> <li>• Skillfully integrates evidence with correct citations</li> <li>• Analyzes and draws strong conclusions from evidence</li> </ul> | <ul style="list-style-type: none"> <li>• Provides adequate support/evidence for the claim(s), demonstrating an understanding of the topic or text</li> <li>• Uses relevant, logical evidence (sources, facts, and details)</li> <li>• Integrates evidence from sources with generally correct citations</li> <li>• Analyzes and draws logical conclusions from evidence</li> </ul> | <ul style="list-style-type: none"> <li>• Provides inadequate support/evidence for the claim(s) , demonstrating a partial understanding of the topic or text</li> <li>• Uses some irrelevant, repetitive, or inadequate evidence (sources, facts, and details)</li> <li>• Limited integration of evidence from sources with some attempt at citations</li> <li>• Inconsistently analyzes evidence</li> <li>• Conclusions drawn are sometimes not logical</li> </ul> | <ul style="list-style-type: none"> <li>• Provides little or no support/ evidence for the claim(s) , demonstrating a lack of understanding of the topic or text</li> <li>• Frequently uses irrelevant, repetitive, or inadequate evidence (sources, facts, and details)</li> <li>• Does not integrate evidence from sources or lacks citations</li> <li>• Fails to analyze evidence</li> <li>• Conclusions drawn are not logical or are missing</li> </ul> |
| <p><b>Language and Vocabulary:</b><br/>The writing uses precise and topic-specific language and</p>  | <ul style="list-style-type: none"> <li>• Uses precise, academic language</li> <li>• Use of topic-specific vocabulary is clearly appropriate</li> </ul>  | <ul style="list-style-type: none"> <li>• Uses a mix of precise with more general language</li> <li>• Use of topic-specific vocabulary is</li> </ul>  | <ul style="list-style-type: none"> <li>• Uses simplistic language</li> <li>• Inconsistent use of topic-specific vocabulary</li> </ul>  | <ul style="list-style-type: none"> <li>• Uses limited or vague language</li> <li>• Lacks topic-specific vocabulary</li> <li>• Lack of formal/ appropriate style</li> </ul>  |

|   |   |  |  |   |
|---|---|--|--|---|
| <p>maintains a formal/appropriate style.</p>  | <p>for the audience and purpose</p> <ul style="list-style-type: none"> <li>Establishes and consistently maintains a formal/appropriate style</li> </ul>   | <p>generally appropriate for the audience and purpose</p> <ul style="list-style-type: none"> <li>Establishes and generally maintains a formal/appropriate style</li> </ul> | <ul style="list-style-type: none"> <li>Lacks a consistent formal/appropriate style</li> </ul>                            | <p>shows little sense of audience and purposes</p>  |
| <p><b>Conventions:</b><br/>The writing demonstrates a command of conventions and assigned format.</p> | <ul style="list-style-type: none"> <li>Minimal errors/patterns of error in usage, sentence structure, punctuation, capitalization, spelling, and format</li> <li>Skillful use of sentence structure enhances meaning</li> </ul> | <p>Minimal errors/patterns of error in usage, sentence structure, punctuation, capitalization, spelling, and format</p>  | <p>Frequent errors/patterns of error in usage, sentence structure, punctuation, capitalization, spelling, and format</p> | <p>Severe errors/patterns of error in usage, sentence structure, punctuation, capitalization, spelling, and format interfere with understanding</p> |

**0=no evidence/missing**

## Power Point Project Rubric

|  | <b>5</b>   | <b>4</b>   | <b>3</b>  | <b>2</b>  | <b>1</b>  |
|--|--|--|---|---|---|
| <b>Content</b>                             | Content is accurate and information is presented in a logical order.                                   | Content is accurate but some information is not presented in a logical order, but is still generally easy to follow. | Content is accurate but information is not presented in a logical order, making it difficult to follow. | Content is questionable and information is not presented in a logical order, making it difficult to follow. | Content is inaccurate and information is not presented in a logical order, making it difficult to follow. |
| <b>Slide Creation</b>                      | Presentation flows well and logically. Presentation reflects extensive use of tools in a creative way. | Presentation flows well. Tools used correctly.   | Presentation flows well. Some tools used to show acceptable understanding.                              | Presentation is unorganized. Tools are not used in a relevant manner.                                       | Presentation has no flow. No tools used.  |
| <b>Slide Transitions</b>                   | Transitions are smooth and interesting. Transitions enhance the presentation.                          | Smooth transitions are used on most slides.  | Smooth transitions are used on some slides.   | Very few transitions are used and/or they distract from the presentation.                                   | No transitions used.  |
| <b>Pictures, Clip Art &amp; Background</b> | Images are appropriate. Layout of images is pleasing to the eye.                                       | Images are appropriate. Layout is cluttered.   | Most images are appropriate.  | Images are inappropriate.   | No images.  |
| <b>Mechanics</b>                           | No spelling errors. No grammar errors. Text is in author's own words.                                  | Few spelling errors. Few grammar errors. Text is in author's own words.  | Some spelling errors. Some grammar errors. Text is in author's own words.                               | Some spelling errors. Some grammar errors. Most of text is in author's own words.                           | Many spelling errors and/or text is copied.   |



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