

Name: _____

Date: _____

Homeroom: _____

Class: _____

***Freak the Mighty* (141-152) “Remembering Is Just an Invention of the Mind” and “The Empty Book”**

Lesson Objective: Explore the motif of memory in the novel.

Do Now

Directions: Read the article below and answer the questions that follow. As you read, underline any information that connects to what you already know about memory.

How Memory Works

Adapted from Brilliant.org

Whenever you witness an event, learn a fact, or experience something you want to remember, the memory network of your brain starts the memory-making process. Here’s how scientists think it works:

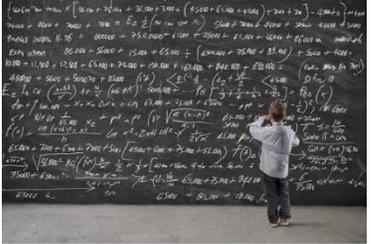
First, your brain consciously registers the memory, a process called **encoding**. Not all incoming information gets encoded. For example, if you’re not paying attention when someone new introduces himself, you may not encode his name and then realize you don’t remember it moments later.

Scientists call the next step **consolidation**. Consolidation means building a record of the encoded information and creating a pathway to recall the memory again. Replaying the experience makes the connections between cells stronger and strengthens this pathway. However, this system isn’t foolproof. The mental replay of something we only imagined can feel as vivid as a real experience. If you picture the sights and sounds of a scene based on a description, you activate similar brain networks as if you had really been there. The more you mentally replay the scene, the more it feels like a real memory, even if it never really happened.

The final step is known as **retrieval**. Every time you remember something, the neural path to that memory gets stronger, making it even easier to recall again and again. There’s no one place in the brain that serves as our memory bank. Instead, many brain cells and several regions work together to make one memory. A memory only happens when many connected neurons fire in a specific pattern.

1. Which of the following best describes how the author organized this text? Why?
 - a. cause and effect; the author describes what causes memories and the effect they have on us
 - b. sequence; the author explains the steps in the process of forming memories
 - c. problem and solution; the author analyzes the problem of forgetting and provides a solution
 - d. compare and contrast; the author states the similarities and differences between the types of memory
2. What information in this article supports Freak’s idea from p. 2, “Remembering is just an invention of the mind”? Explain your thinking.

Vocabulary: Prodigy, Obnoxious, Manifestation

Word	Definition	Related Parts of Speech	Situations	Image
prodigy <i>noun</i>	1) an unusually talented child 2) an amazing event or action	-	<ul style="list-style-type: none"> The piano prodigy was so small she could hardly reach the piano keys, but she played as well as the best adult pianists. _____ _____ _____ 	
obnoxious <i>adjective</i>	very unpleasant, annoying, or offensive	obnoxiously <i>adverb</i>	<ul style="list-style-type: none"> She couldn't concentrate because of the obnoxious roar of the construction equipment next door. _____ _____ _____ 	
manifestation <i>noun</i>	1) a version or form of something 2) a sign that shows something clearly	manifest <i>verb</i>	<ul style="list-style-type: none"> The band changes musical styles constantly, but in their current manifestation, they focus on pop music. _____ _____ _____ 	

Vocabulary Active Practice

As we apply our new word knowledge, be sure to use the vocabulary word in your answer!

1. Do you think Freak is a **prodigy**? Why or why not?
2. How might bitten nails be a **manifestation** of someone's anxiety?
3. What are some sounds you find **obnoxious**? How do these sounds affect you?
4. How might Freak's leg braces be a **manifestation** of his disability?
5. When would a **prodigy** be likely to feel **smug**? Would you find this **obnoxious**?
6. According to Freak, King Arthur in his first **manifestation** was a "wimpy little kid." What did King Arthur become in his next **manifestation**? How was he transformed?

Pages 141-142

1. **Turn and Talk:** How much time has passed between the previous chapter and this one? How do you know?

How Memory Works (cont'd)

Adapted from Brilliant.org

There are three main ways of forgetting memories. Sometimes, a memory simply fades over time. This may happen because the connections between brain cells gradually weaken or the triggers needed to retrieve it are lost. A second type of forgetting happens at night when we sleep. This is when we clear out unnecessary information or erase outdated memories. The third type of forgetting is when a person intentionally suppresses unpleasant memories. This is a way to regulate our emotions and to focus on the present instead of getting lost in negative memories of the past. We don't know exactly how it happens, but part of our brain seems to step in and block the troubling memories from being retrieved. Even though it's still somewhere in our mind, eventually we can't find it.

Our brains have so many ways to forget because forgetting is one of the most important things we do. Forgetting allows us to move past traumatic life events. Forgetting also allows us to clear out "junk"; all of the sights sounds, smells, and pieces of information your brain processes every day would overflow our neural pathways if we couldn't sweep out the unnecessary information.

2. Why might the author say forgetting is "one of the most important things we do"?

-  3. On p. 141, Freak says, "The world is really and truly green all over." What does he literally mean by this? What could the color green represent? Consider the passage of time and the importance of forgetting.

 4. Reread this excerpt from p. 142:

“First you need to invent a time machine,” I say. “So you can go back there and give all the cavemen a hard time about indoor plumbing.”

Freak goes, “You don’t need a time machine if you know how to remember.”

Which is something I’ll always remember, him saying that and me trying to figure it out.

a. What might Freak mean when he says, “You don’t need a time machine if you know how to remember”?

b. How does the science of memory support Freak’s statement? Include information from the article “How Memory Works.”

c. **Challenge:** In what verb tense is the final line of this excerpt written (e.g., past, present, future)? What tense does Max typically use in his narration? What might this change indicate?

Pages 142-146: On Your Own

Annotation Task: As you read, annotate any potential **foreshadowing** about Freak’s health. Is there anything the adults seem to know that Max does not?

Notes

5. On p. 143, Max narrates, “The deal is, this is really two birthdays for the price of one, because Freak the Mighty is almost a year old.” What does he mean by this? Why might Freak say Freak the Mighty is a **prodigy**?

6. What happens at the end of this chapter? How was this **foreshadowed** throughout pp. 142-146? (**Hint:** You may wish to review your annotations.)

7. **Challenge:** Consider the **reliability** of Max’s narration in this section. Did he seem to be aware of the hints that something was seriously wrong with Freak? How might this be an example of **dramatic irony**?

Pages 147-152

8. **Turn and Talk:** Why might Max have brought the ornithopter to the hospital? Consider multiple reasons.
9. On p. 149, Freak says, “I’m not coming home...Not in my present **manifestation**.” How does Max interpret this comment? What do you think as a reader?

-  10. Reread this excerpt from pp. 150-151:

“That’s for you,” he says. “I want you to fill it up with our adventures.”

“Huh?”

“Write it down, dummy. I was going to do it, but now it looks like I’ll be busy getting used to my new bionic body. It’ll probably take me weeks just learning how to walk with long legs.”

I put the book down.

“You’re the one with the brain,” I say. “I’m the long legs.”

“Don’t get me upset,” he warns. “I won’t have the time, so you’ll have to do it. Just write it all down like you’re talking. Put in all the fun we had, the cool things we did. Our adventures.”

“But you know I can’t write, Kevin.”

“It’s all in your head, Max, everything you can remember. Just tell the story of Freak the Mighty, no big deal.”

- a. A **motif** is an idea, symbol, image, or device that occurs multiple times throughout a text. What ideas or images in this excerpt have repeated multiple times in the novel?

Notes

- b. Kevin tells Max, “It’s all in your head...everything you can remember. Just tell the story of Freak the Mighty, no big deal.” What might Kevin mean by this? Consider the **motif** of memory throughout the novel.

11. Consider this conversation between Max and Grim on pp. 151-152:

Nobody talks much at supper that night, except when Grim opens his big mouth and says, “Poor Gwen looks like she’s in terrible pain.”

I go, “Poor Gwen? She’s not the one having the special operation.”

Grim and Gram just look at each other like they can’t believe I’m so dumb, and finally Gram says, “Maxwell, dear, make an effort to eat your vegetables.”

- a. Why might Grim call Kevin’s mom “Poor Gwen”? **Challenge:** When has he previously used this phrase?

- b. How might this moment be an example of **dramatic irony**? Consider the contrast between Max’s and Grim’s perspectives.

-  12. What might the empty book represent or symbolize to Max?

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Homework

Directions: Read the article below and answer the questions that follow.

A "bionic" leg that's a marvel of 21st century engineering

by Los Angeles Times, adapted by Newsela staff

A lot goes into walking. It takes balance, strength and brainpower. Just ask Zac Vawter. He lost his leg in a motorcycle accident in 2009. But with the help of a team of scientists and doctors, he has taught a whole new type of artificial leg to walk, kick, and do everything else that a leg does.

The team includes scientists who develop software, surgeons, and people who make artificial limbs called prosthetics. Together they designed a leg that can receive commands directly from Vawter's brain.

The leg has learned to read what Vawter wants it to do. A bundle of nerves that end above his missing knee gives signals to the leg, a scientific report said.

Roughly 1 million Americans have lost all or part of a leg. Vawter and his robotic leg offer hope that future prosthetics might feel more natural.

Imagine It, and It Happens

Vawter's prosthetic is a marvel of 21st century engineering. But Vawter's ability to control the prosthetic with his thoughts makes his case remarkable. If he wants his artificial toes to curl toward him, all he has to do is imagine the movements. The same with shifting his artificial ankle so he can walk down a ramp.

The leg weighs just over 10 pounds. It has two separate engines. One powers movement in the ankle and the other in the knee. It has sensors that are capable of detecting and measuring movement all over.

In most prosthetics, the wearer has to turn a key to change from one type of movement to another. Not so in Vawter's robotic leg.

"Teaching" the Leg to Read

"With this leg, it just flows," said the 32-year-old software engineer. "There isn't anything special I have to do to make it work right." Vawter lives in Washington. Most of the time he uses a typical prosthetic. But he travels to Chicago several times a year to work with the robotic leg.

Vawter couldn't just strap on the bionic lower limb. First engineers in Chicago had to "teach" the leg how to read tiny muscle movements in his right thigh. Those movements told the leg what Vawter wanted it to do.



Vawter spent hours with his thigh wired up. He imagined making certain movements with his missing knee, ankle and foot.

Engineers broke down those recorded electrical signals to log an entire collection of movements. They used special software to do this. The prosthetic could then be programmed to recognize the smallest twitch of a muscle in Vawter’s thigh.

It took a new type of surgery to make this possible, though. In most amputations, the nerves in the thigh are left to wither or die.

Rewiring the Severed Nerves

Dr. Todd Kuiken is a neurosurgeon at the rehabilitation institute. He developed the new method. It is called “reinnervation.” Vawter’s orthopedic surgeon was trained in the delicate operation. He rewired the severed nerves to control some of the muscles in Vawter’s thigh. The muscles would be used less frequently after the amputation.

Those nerves recovered from the shock of the injury. Then they began to regrow. They could carry electrical signals. When Vawter thought about flexing his right foot in a particular way, the nerve endings would cause a special motion in his hamstring. The same sort of thing happened with other muscle movements.

The bionic leg performs better than standard prosthetics, according to the report. The robotic leg, programmed to follow Vawter’s commands, reduced errors by 44 percent. Those errors cause unnatural movements, pain and falls.

Vawter said he had “fallen down a whole bunch of times” while wearing his everyday prosthetic. He has not fallen once while moving around on his bionic leg.

He said he could move a lot faster too – which would be helpful for keeping up with his 5-year-old son and 3-year-old daughter. But first, Vawter added, he needs to persuade Hargrove’s team to let him wear it home.

1. How is a bionic leg different from a traditional prosthetic?

2. What is the main idea of the section “Rewiring the Severed Nerves”?
