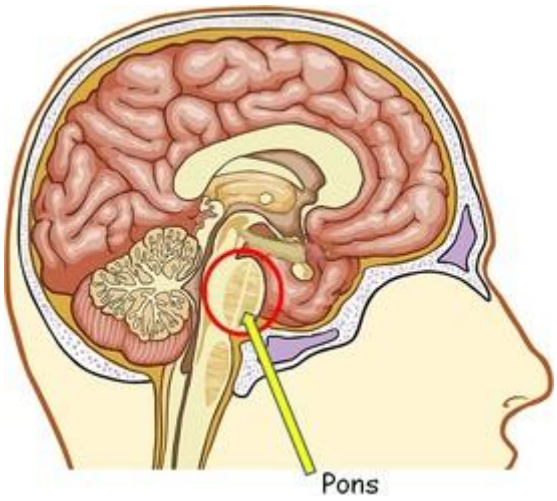
Unit 2
The Brain, Biology and Sleep

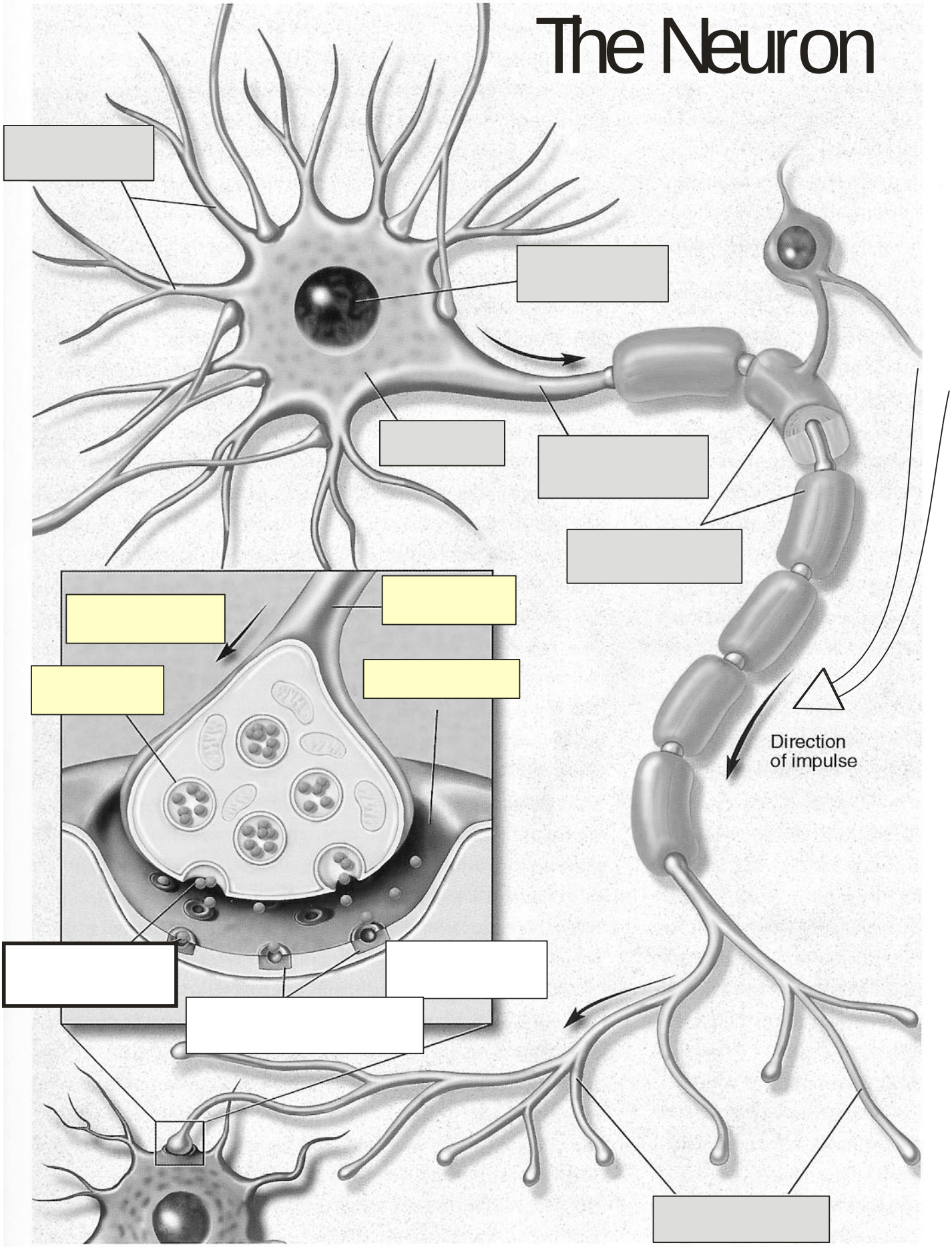
Martin develops a sleeping disorder.



PONS

The Pons portion of the brain lying above the medulla and below the cerebellum and the cavity of the fourth ventricle. The pons is a broad, horseshoe-shaped mass of transverse nerve fibers that connect the medulla with the cerebellum. The pons also plays a key role in sleep and dreaming, where REM sleep, or the sleeping state where dreaming is most likely to occur, has been proven to originate here, in the pons.

The Neuron



Word Bank for Neuron Diagram

Dendrite

Axon

Sending Neuron

Synaptic Gap

Nucleus

Terminal Branches

Vessicle

Cell Body

Myelin Sheath

Action Potential

Neurotransmitters

Receptor Sites

In addition to labeling each of the structures you should also include a description/explanation of their functions. Room had been left to do this next to each of the terms above.

The Neuron-Part 1

Step 1—Watch: http://goo.gl/4UQcE2 and begin labeling your neuron diagram.

Step 2 – Watch: http://goo.gl/CaUSOq and continue labeling your neuron.

Step 3— Use your book to complete the diagram, if necessary.

Step 4—Be prepared to construct your own neuron and analogy in class tomorrow.

The Neuron-Part 2

Step 1—With a partner, create and label a neuron on your desk using play-doh and dry erase makers.

You cannot use your book or notes.

Step 2—Be prepared to explain how messages are sent from one neuron to another.

Step 3— Create your own analogy of something that works like a neuron does:

_____

_____

_____

_____

Step 4—Explain what part(s) of the neuron might be effected when a person's neurons are not sending messages as quickly as they should.

_____

_____

_____

Step 5— Give an example of a situation in which someone's neurons might not be working at 100%.

_____

_____

_____

What could cause the situation you described above?

Broccoli Lab

You will be exploring the main parts of the **Central Nervous System** in this activity.

In order to perform this lab you need the following items:

1 Broccoli Bunch 1 White Gummy 1 Red Gummy 1 Green Gummy 1 Gummy Worm
3 Toothpicks Your textbook

Use your textbook and answer the questions. Then, follow the directions for labeling your broccoli.

1. What are the 2 Parts of the Central Nervous System?

2. What 2 things does the Medulla control?

3. Where is the Medulla located?

   - Label the Medulla on your broccoli stem by using the <u>white gummy</u> and a toothpick.

4. What 2 functions does the Cerebellum control?

5. Where is the Cerebellum located?

6. What problems does a person experience if the Cerebellum is damaged?

   - Label the Cerebellum on your broccoli stem using the <u>red gummy</u> and a toothpick.

7. Where is the Thalamus located?

   - Label the Thalamus with your <u>green gummy</u>.

8. What does the Thalamus control?

9. What does the Reticular Formation control?

10. Where is the Reticular Formation located?

    - Label the Reticular Formation with your gummy worm.

11. The lower part of the brain is the first part to develop. Why do you think this part of the brain develops first?

Grapefruit Lab

Now it's time to move to the **Cerebral Cortex** and **Cerebral Hemispheres**. The Cerebral Hemisphere is divided into 4 lobes: the **Frontal Lobe**, **Parietal Lobe**, **Temporal Lobe**, and **Occipital Lobe**.

In order to perform this lab you need the following items:

1 Grapefruit	2 Orange / Clear Gummies	2 Yellow Gummies	1 gummy worm
2 Red Gummies	2 Green Gummies	8 Toothpicks	1 Piece of Wax Paper

Use your textbook to answer the following questions. Then, follow the directions to label your grapefruit.

1. What is the job of the **Cerebral Cortex**?

- Expose your Cerebral Cortex by removing the outer layer of your grapefruit. Please be sure to keep your "ingredients" on the wax paper.
- Now, separate the grapefruit in 2 equal sections(1/2) approximately 2/3 of the way down the grapefruit. Be careful that the lower 1/3 of the grapefruit is still intact.
  - You have just created the 2 **Cerebral Hemispheres**. The **left hemisphere** and the **right hemisphere** are mirror images of each other and yet they have separate functions.
- Place the <u>gummy worm</u> at the base of where the left and right hemispheres meet. This is the **Corpus Callosum**.

2. What job does the **Corpus Callosum** have in a whole brain individual?

3. What is the function of the **Occipital Lobe**?

4. What occurs if this lobe is damaged?

- The lobe at the very back of the Left and Right Hemispheres is called the Occipital Lobe. Label each side of this Lobe with the <u>orange gummies</u> and 2 toothpicks. Remember that the Left Hemisphere and Right Hemisphere are mirrored images of each other, so you have 2 Occipital Lobes 1 in the Left Hemisphere and 1 in the Right Hemisphere.

5. What is the function of the **Temporal Lobe**?

- The lobe in front of the Occipital Lobe and on the sides of the brain is the Temporal Lobe. Label the Temporal Lobe in each hemisphere with the yellow gummies and 2 toothpicks.

6. What is the function of the **Parietal Lobe**?

- The Parietal Lobe sits on top of the Temporal and Occipital Lobes in each hemisphere. Label the Parietal Lobes with the red gummies and 2 toothpicks.

7. What are the jobs of the **Frontal Lobe**?

- The largest part of the human brain just behind the forehead is the Frontal Lobe. Label the Frontal Lobe in each hemisphere with the green gummies and 2 toothpicks.

8. Who was Phineas Gage? Why is he important to our study of the brain?

9. What is the function of the Motor Cortex?

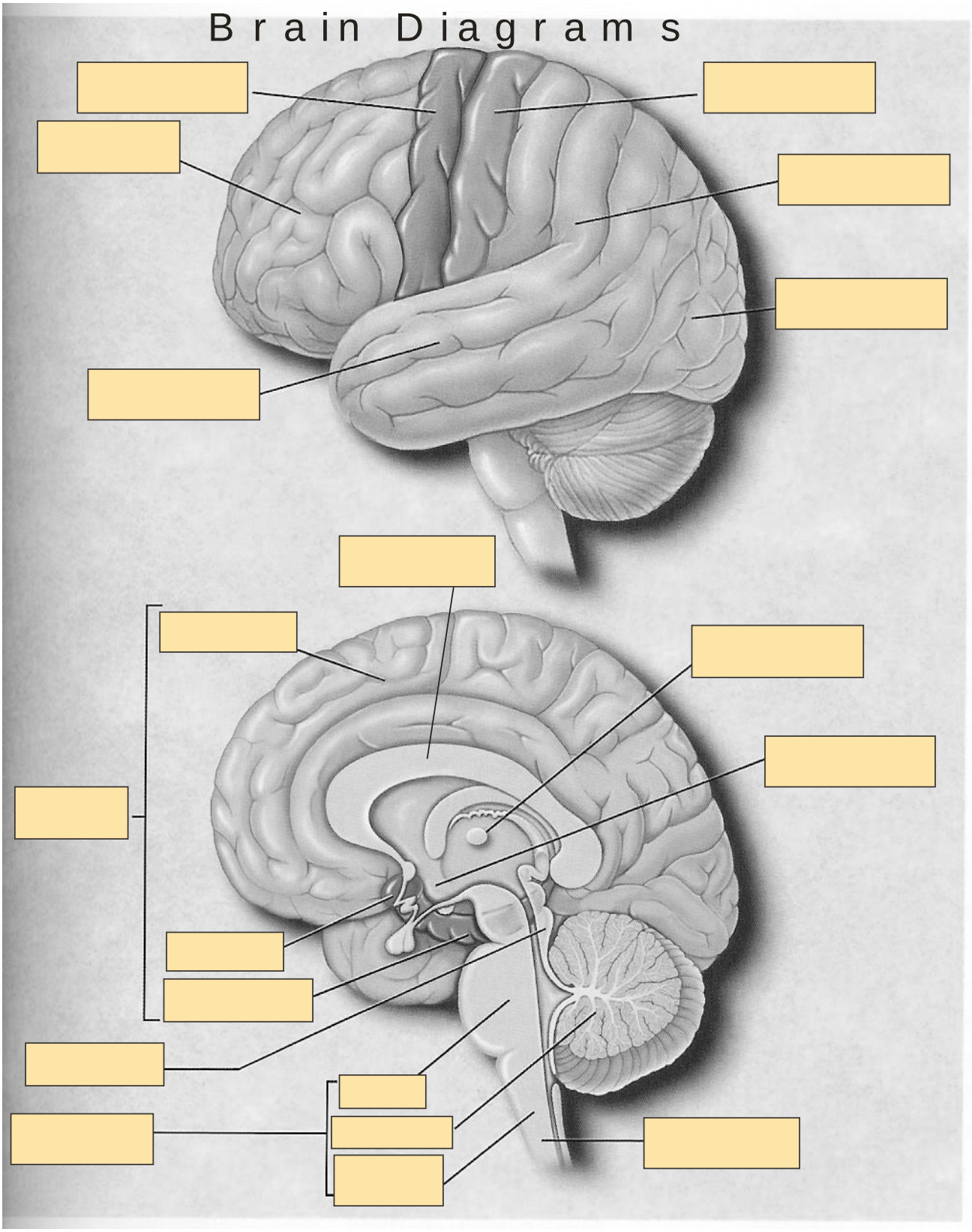
10. What is the function of the Sensory Cortex?

11. What is the function of the Broca's Area?

12. What is the function of the Wernicke's Area?

13. Teens don't have fully developed frontal lobes. Using evidence from your own life, explain why this is true.

Brain Diagrams



Word Bank for Brain Diagrams

<u>Diagram 1</u>
Parietal Lobe
Frontal Lobe
Sensory Cortex
Occipital Lobe
Motor Cortex
Temporal Lobe

<u>Diagram 2</u>
Cerebral Cortex
Cerebellum
Hypothalamus
Corpus Callosum
Medulla
Thalamus
Forebrain
Amygdala
Midbrain
Pons
Spinal Cord
Hippocampus
Hindbrain

Brain Injury Review Activity

Metea psychology students were on their way to the zoo for a field trip. In the excitement to get there 1st and hear the animal trainers talk, all the buses got into a fender-bender outside the school. Everyone survived the crash, but many students had minor injuries.

Using the description of each person's symptoms, determine the probable location(s) of the damage and explain their function(s).

	Area of Damage	Function
1. Katie had problems coordinating her movement and keeping her balance.		
2. David lost the ability to move his right arm.		
3. Lauren and Toni suffered from an impaired ability to plan, and make good judgments.		
4. Sara often kept falling asleep at odd times and in odd places.		
5. Jeremy and Drew seemed to always be hungry and their temperatures ran high.		
6. Danielle suffered from an inability to form new memories.		
7. Tyler and Hayden both often flew into a rage and started picking fights with each other.		

	Area of Damage	Function
8. Natalie could no longer respond to her teacher because she didn't understand what she was asking.		
9. Sammy's speech was choppy, slow, and a grammatical mess.		
10. Amanda experienced irregularities in heartbeat and respiration rates.		

Test Yourself!
Are you right-brained or left-brained?

In each item, different styles of learning or thinking are described. Circle the letter that best describes your strength or preference.

1.
a. Not good at remembering faces.
b. Not good at remembering names.
c. Equally good at remembering names and faces.

2.
a. Respond best to verbal instructions.
b. Respond best to instruction by example.
c. Equally responsive to verbal instruction and instruction by example.

3.
a. Able to express feelings and emotions freely.
b. Not easily able to express feelings and emotions.

4.
a. Prefer classes where I have one assignment at a time.
b. Prefer classes where I am studying many things at once.
c. I have equal preference for the above type classes.

5.
a. Preference for multiple-choice tests.
b. Preference for essay tests.
c. Equal preference for multiple-choice, essay tests.

6.
a. Good at thinking up funny things to say and/or do.
b. Poor at thinking up funny things to say and/or do.
c. Moderately good at thinking up funny things to say and/or do.

7.
a. Prefer classes in which I am moving and doing things.
b. Prefer classes in which I listen to others.
c. Equal preference for above type classes.

8.
a. Use factual, objective information in making judgments.
b. Use personal experiences and feelings in making judgments.
c. Make equal use of factual information and personal experiences.

9.
a. Almost always use whatever tools are available to get work done.
b. At times am able to use whatever is available to get work done.
c. Prefer working with proper materials for use they are intended for.

10.
a. Like classes or work to be planned, know exactly what I am to do.
b. Like classes or work to be open-ended, allowing for different interpretations.
c. Equal preferences for classes or work to be planned or open-ended.

11.
a. Very inventive.
b. Occasionally inventive.
c. Never inventive.

12.
a. Preference for intuitive approach in solving problems.
b. Preference for logical approach in solving problems.
c. Equal preference for intuitive, logical approaches.

13.
a. Like classes where the work has clear and immediate applications (such as mechanical drawing, shop, home economics).
b. Like classes where the work does not have a clearly practical application (such as literature, algebra, history).
c. Equal preference for both types of classes.

14.
a. Responsive to emotional appeals.
b. Responsive to emotional and verbal appeals.

15.
a. Think best when lying flat on back.
b. Think best while sitting upright.

16.
a. Preference for solving problems logically.
b. Preference for solving problems through experience.
c. Equal preference for using logic, experience in problem-solving.

17.
a. Skilled in giving verbal explanations.
b. Skilled in showing by movement and action.
c. Equally able to explain verbally and through actions.

18.
a. Learn best from teaching that uses verbal explanation.
b. Learn best from teaching that uses visual presentation.
c. Equal preferences for verbal explanation, visual presentation.

19.
a. Easily lost even in familiar surroundings.
b. Easily find directions even in strange surroundings.
c. Moderately skilled in finding directions.

20.
a. Like to be in noisy place where lots of things are happening.
b. Like to be where I can concentrate on one activity to my best ability.
c. Sometimes like both of the above, have no preference.

21.
a. Prefer to learn details and specific facts.
b. Prefer a general overview of a subject, looking at the whole picture.
c. Prefer overview intermixed with specific facts and details.

Are You Right-Brained or Left-Brained?

Count up how many "R"'s, "L"'s, and "I"'s you have. The letter with the highest number is your answer!

R = RIGHT BRAIN, L = LEFT BRAIN, I = BOTH SIDES OF BRAIN ARE INTERACTIVE

KEY

1. A=L, B=R, C=I
2. A=L, B=R, C=I
3. A=R, B=L
4. A=L, B=R, C=I
5. A=R, B=L, C=I
6. A=R, B=L, C=I
7. A=R, B=L, C=I
8. A=L, B=R, C=I
9. A=R, B=I, C=L
10. A=L, B=R, C=I
11. A=R, B=I, C=L
12. A=R, B=L, C=I
13. A=R, B=L, C=I
14. A=R, B=L
15. A=R, B=L
16. A=L, B=R, C=I
17. A=L, B=R, C=I
18. A=L, B=R, C=I
19. A=L, B=R, C=I
20. A=R, B=L, C=I
21. A=L, B=R, C=I

Evaluating Brain Imaging Techniques

Name of Test	**What I can see** -Structure (parts)? -Function (activity)? -Describe how well for each test…	**What I can't see** -Structure (parts)? -Function (activity)? -Describe how well for each test…	**Rate usefulness 1-5 for determining brain information** You should only have one #1, one #2, etc.

Usefulness Rating Scale:
1= this test is not very helpful at seeing what is going on in the brain.
2= this test is not very helpful but it gives some detail on the certain structures in areas of the brain.
3= this test allows me to see the brain structures well, but I need more information about how different parts function.
4= this test is good for seeing activity in the brain but not good for structures of the brain.
5 = this test allows me to see how the brain structures are interacting and it is very useful in determining where there may be a problem.

Name:_____

SLEEP & DREAMS – CHOOSE YOUR OWN ADVENTURE!

Part 1: Sleep Stages Slides

1. On last night's homework, add in the special phenomena to the sleep stages chart. You will need to know these for the test!
2. When looking at the graph, what two trends do you notice about the stages of sleep as a night progresses?

Part 2: Dream Dictionaries

Write down a dream you would like to know the meaning of. What symbols/themes does this dream have that you could look up in a dream dictionary?

Using the theme/symbol from above, go to the two different dream dictionaries online. Write down their interpretations of what was actually happening in your dream (the latent content!).

WEBSITE	Dream Moods www.dreammoods.com/dreamdictionary/	The Curious Dreamer http://www.thecuriousdreamer.com/dreamdictionary/
EXPLANATION OF SYMBOL(S)		

How consistent are the interpretations from the dream dictionaries?

In the context of your life, do either of these interpretations connect with what you're currently experiencing (or were experiencing at the time when you had the dream)?

Part 3: Healthy Amounts of Sleep OR Napping

If you choose sleep - http://tinyurl.com/yenlf7o

1. What is *basal sleep need*?
2. How does getting too little sleep affect your health?
3. How many hours of sleep does the website recommend for teenagers?
4. Name at least 1 sleep tip you would want to use to better your sleeping habits.

If you choose naps - http://tinyurl.com/3bggyln

1. Which type of nap do you most commonly take?
2. List 2 negative effects of taking naps.
3. Name at least 1 nap tip you would want to use.

Part 4: Lucid Dreaming OR Déjà vu

If you choose lucid dreams - http://tinyurl.com/ccjkybk

1. What are lucid dreams?

2. What scientific understandings do we have of lucid dreaming?

If you choose déjà vu - http://tinyurl.com/lv3oqkr

1. What is déjà vu?

2. What explanation does the author give for this feeling?

Part 5: Teens & Sleep OR Technology & Sleep

If you choose Teens & Sleep - http://tinyurl.com/lytyjmr

Circle the one you choose!!!

If you choose Technology & Sleep - http://tinyurl.com/25hy2ps

1. What is the author's claim?

2. Do you agree or disagree with the author's claim? Why or why not? (use evidence to support your answer!)

Part 6: Sleep Paralysis OR Sleep Walking

If you choose Sleep Paralysis - http://tinyurl.com/y4kgq2a

Circle the one you choose!!!

If you choose Sleep Walking - http://tinyurl.com/6d4fcke

1. What are symptoms of sleep paralysis or sleep walking?

2. What are the causes behind sleep paralysis or sleep walking?

How Dreams Work

by Lee Ann Obringer

Introduction to How Dreams Work

Our dreams combine verbal, visual and emotional stimuli into a sometimes broken, nonsensical but often entertaining story line. We can sometimes even solve problems in our sleep. Or can we? Many experts disagree on exactly what the purpose of our dreams might be. Are they strictly random brain impulses, or are our brains actually working through issues from our daily life while we sleep -- as a sort of coping mechanism? Should we even bother to interpret our dreams? Many say yes, that we have a great deal to learn from our dreams.

In this article, we'll talk about the major dream theories, from Freud's view to the hypotheses that claim we can control our dreams. We'll find out what scientists say is happening in our brains when we dream and why we have trouble remembering these night-time story lines. We'll talk about how you can try to control your dreams -- both what you're dreaming about and what you do once you're having the dream. We'll also find out what dream experts say particular scenarios signify. Finding yourself at work naked may not mean at all what you think it does!

Perchance to Dream

For centuries, we've tried to figure out just why our brains play these nightly shows for us. Early civilizations thought dream worlds were real, physical worlds that they could enter only from their dream state. Researchers continue to toss around many theories about dreaming. Those theories essentially fall into two categories:

- The idea that dreams are **only physiological stimulations**
- The idea that dreams are **psychologically necessary**

Let's take a closer look at these theories.

Dreams: The Theoretical Divide

Physiological theories are based on the idea that we dream in order to exercise various neural connections that some researchers believe affect certain types of learning. Psychological theories are based on the idea that dreaming allows us to sort through problems, events of the day or things that are requiring a lot of our attention. Some of these theorists think dreams might be prophetic. Many researchers and scientists also believe that perhaps it is a combination of the two theories. In the next section, we'll look at some of the major dream theorists and what they say about why we dream.

Dream Theories

First and foremost in dream theory is **Sigmund Freud**. Falling into the psychological camp, Dr. Freud's theories are based on the idea of **repressed longing** -- the desires that we aren't able to express in a social setting. Dreams allow the unconscious mind to act out those unacceptable thoughts and desires. For this reason, his theory about dreams focuses primarily on **sexual desires and symbolism**. Freud lived during the sexually repressed Victorian era, which in some way explains his focus. Still, he did once comment that, "**Sometimes, a cigar is just a cigar.**"

Carl Jung studied under Freud but soon decided his own ideas differed from Freud's to the extent that he needed to go in his own direction. He agreed with the psychological origin of dreams, but rather than saying that dreams originated from our primal needs and repressed wishes, he felt that dreams allowed us to **reflect on our waking selves** and **solve our problems or think through issues**.

More recently, around 1973, researchers **Allan Hobson** and **Robert McCarley** set forth another theory that threw out the old psychoanalytical ideas. Their research on what was going in the brain during sleep gave them the idea that dreams were simply the result of **random electrical brain impulses** that pulled imagery from traces of experience stored in the memory. They hypothesize that these images don't form the stories that we remember as our dreams. Instead, our **waking minds**, in trying to **make sense of the imagery**, create the stories without our even realizing it -- simply because the brain wants to make sense of what it has experienced.

While this theory, known as the **activation-synthesis hypothesis**, created a big rift in the dream research arena because of its leap away from the accepted theories, it has withstood the test of time and is still one of the more prominent dream theories.

Dreaming and the Brain

When we sleep, we go through **five sleep stages**. The first stage is a very light sleep from which it is easy to wake up. The second stage moves into a slightly deeper sleep, and stages three and four represent our deepest sleep. Our brain activity throughout these stages is gradually slowing down so that by deep sleep, we experience nothing but delta brain waves -- the slowest brain waves (see "Brain Waves" sidebar). About 90 minutes after we go to sleep and after the fourth sleep stage, we begin REM sleep.

Rapid eye movement (REM) was discovered in 1953 by University of Chicago researchers Eugene Aserinsky, a graduate student in physiology, and Nathaniel Kleitman, Ph.D., chair of physiology. **REM sleep** is primarily characterized by movements of the eyes and is the fifth stage of sleep.

During REM sleep, several physiological changes also take place. The heart rate and breathing quickens, the blood pressure rises, we can't regulate our body temperature as well and our brain activity increases to the same level (alpha) as when we are awake, or even higher. The rest of the body, however, is essentially **paralyzed** until we leave REM sleep. Because REM sleep is the sleep stage at which most dreaming takes place, this paralysis could be nature's way of making sure we don't act out our dreams. Otherwise, if you're sleeping next to someone who is dreaming about playing kickball, you might get kicked repeatedly while you sleep.

The four stages outside of REM sleep are called **non-REM sleep** (NREM).

Throughout the night, we go through these five stages several times. Each subsequent cycle, however, includes more REM sleep and less deep sleep (stage three and four). By morning, we're having almost all stage one, two and five (REM) sleep.

Let's look at what happens if you don't get any REM sleep.

Dreams and REM Sleep

What happens if you don't get any REM sleep? Originally, researchers thought that no REM sleep meant no dreams. They theorized that dreams were a sort of safety valve that helped your brain let off steam that you couldn't let off during the day. William Dement, MD, now at Stanford University School of Medicine, did a study in 1960 in which subjects were awakened every time they entered REM sleep. His findings included mild psychological disturbances such as anxiety, irritability and difficulty concentrating. He also noted an increase in appetite. While some studies backed up these ideas, more and more studies did not.
Additional studies tried to make a connection between difficulty remembering things and lack of REM sleep, but those studies too have been disproven with more research. An indisputable snag in the loss-of-memory-function theory was a man who had experienced a brain injury that resulted in him experiencing no REM sleep. He completed law school and had no problems in his day-to-day life.

The latest ideas on REM sleep are associated with **learning**. Researchers are trying to determine the effects that REM sleep and the lack of REM sleep have on learning certain types of skills -- usually physical skills rather than rote memory. This connection seems strong in some respects due to the fact that infants and toddlers experience much more REM sleep than adults.

Dream Facts

- Most dreams last anywhere from five to 20 minutes.
- People *don't* only dream in black and white, as was once believed.
- Even though they may not remember them, everyone dreams several times a night. In fact, during a typical lifetime, we spend about six years dreaming.
- People who have been blind from birth have dreams that are formed from their other senses (e.g., touch, smell, sound).
- When people are snoring, they're not dreaming.
- Elephants (and some other animals) sleep standing up during non-REM sleep, but lie down for REM sleep.

Dream Recall


Photo courtesy Morguefile

It is said that five minutes after the end of a dream, we have forgotten 50 percent of the dream's content. Ten minutes later, we've forgotten 90 percent of its content. Why is that? We don't forget our daily actions that quickly. The fact that they are so hard to remember makes their importance seem less.

Theories

Freud theorized that we forget our dreams because they contain our repressed thoughts and wishes and so we shouldn't want to remember them anyway. Other research points to the simple reason that other things get in the way. We are forward-thinking by nature, so remembering something when we first wake up is difficult.

L. Strumpell, a dream researcher of the same era as Freud, believed that several things contribute to our not being able to remember dreams. For one, he said that many things are quickly forgotten when you first wake up, such as physical sensations. He also considered the fact that many dream images are not very intense and would therefore be easy to forget. Another reason, and probably the strongest of his theories, is that we traditionally learn and remember both by **association and repetition**. As dreams are usually unique and somewhat vague to begin with, it stands to reason that remembering them could be difficult. For example, if someone speaks a phrase to you that doesn't immediately click with anything in your experience, you might need the person to repeat it in order to remember it or even understand it. Since we can't go back to our dreams to experience something again, details that are out of our realm of experience often escape us.

How to Improve Your Dream Recall

There are many resources both on the Web and in print that will give you tips on how to improve your recall of dreams. Those who believe we have a lot to learn about ourselves from our dreams are big proponents of **dream journals**. Here are some steps you can take to increase your dream recall:

- When you go to bed, tell yourself you will remember your dreams. (Author's note: In researching this article, I found that thinking about dreams before I fell asleep actually made me remember having them, so this step did work in my experience.)
- Set your alarm to go off every hour and half so you'll wake up around the times that you leave REM sleep -- when you're most likely to remember your dreams. (Or, drink a lot of water before you go to bed to ensure you have to wake up at least once in the middle of the night!)
- Keep a pad and pencil next to your bed.
- Try to wake up slowly to remain within the "mood" of your last dream.

Controlling Dreams

Lucid Dreaming

There is a lot of research being done in dream control, particularly in the areas of lucid dreaming and dream incubation. Lucid dreaming is a learned skill and occurs when you are dreaming, you realize you are dreaming and you are able to then control what happens in your dream -- all while you're still asleep.

Being able to control your dreams would be a very cool thing to be able to do, but it is a difficult skill that usually takes special training. It is estimated that fewer than 100,000 people in the United States have the ability to have lucid dreams.

Although lucid dreaming is mentioned throughout history, it was not until 1959 at Johann Wolfgang Goethe University that an effective technique for inducing lucid dreams was developed, and true research into the phenomenon began taking place. In 1989, **Paul Tholey**, a German dream researcher who had been involved in the research at that university, wrote a paper about a technique he was studying to induce lucid dreams. It was called the **reflection technique**, and it involved asking yourself throughout the day if you were awake or dreaming. More research has indicated the need to practice recognizing odd occurrences, or **dream signs**, that would be a sign that "this is a dream" rather than reality.

Stephen LaBerge of Stanford University, founder of The Lucidity Institute, **Lynne Levitan** and other current dream researchers have studied lucid dreaming techniques extensively. They refer to a technique similar to

Tholey's reflection method that they call "**reality testing**." This technique and one called MILD (Mnemonic Induction of Lucid Dreams) have been among the most successful techniques for lucid dreaming.

The **MILD** technique involves similar reminders to the reality testing method but focuses those reminders at night rather than throughout the day and night. MILD begins with telling yourself when you go to bed that you'll remember your dreams. You then focus your attention on recognizing when you are dreaming and remembering that it is a dream. Then, you focus on reentering a recent dream and looking for clues that it is indeed a dream. You imagine what you would like to do within that dream. For example, you may want to fly, so you imagine yourself flying within that dream. You repeat these last two steps (recognizing when you're dreaming and reentering a dream) until you go to sleep. Using this technique, Dr. LaBerge has been able to have lucid dreams at will. Because this type of technique takes such mental training, however, LaBerge is now doing research using external stimuli to induce lucid dreams.

While lucid dreaming may just seem like a cool way to enter fantasy land, it can also help in personal development, enhancing self-confidence, overcoming nightmares, improving mental (and perhaps physical) health and facilitating creative problem solving.

Finally, lucid dreaming can function as a "world simulator." Just as a flight simulator allows people to learn to fly in a safe environment, lucid dreaming could allow people to learn to live in any imaginable world; to experience and better choose among various possible futures.

Dream Incubation

Dream incubation is learning to plant a seed for a specific dream topic to occur. For example, you might go to bed repeating to yourself that you'll dream about a presentation you have coming up or a vacation you just took..

Dream incubation is simply focusing attention on a specific issue when going to sleep. Several studies have shown this method to be successful over a period of time.

What do our dreams mean?

Those on the physiology side of the "why we dream" argument see dreams as only nonsense that the brain creates from fragments of images and memory. For centuries, however, people have looked at their dreams as both omens and insights into their own psyches. Many think dreams are full of symbolic messages that may not be clear to us on the surface. But, if we dig deeper and think about what is going on in our lives, we can usually come up with an interpretation that makes sense.

Common Dream Themes and Their Interpretations

- **Being naked in public**
  Most of us have had the dream at some point that we're at school, work or some social event, and we suddenly realize we forgot to put on clothes! Experts say this means:
  - We're trying to hide something or we're not prepared for something, like a presentation or test (and now everyone is going to know -- we're exposed!).

  If we're naked but no one notices, then the interpretation is that whatever we're afraid of is unfounded. If we don't care that we're naked, the interpretation is that we're comfortable with who we are.

- **Falling**
  You're falling, falling, falling... and then you wake up. This is a very common dream and is said to symbolize insecurities and anxiety. Something in your life is essentially out of control and there is nothing you can do to stop it. Another interpretation is that you have a sense of failure about something. Maybe you're not doing well in school or at work and are afraid you're going to be fired or expelled. Again, you feel that you can't control the situation.
- **Being chased**
  The ever-popular chase dream can be extremely frightening. What it usually symbolizes is that you're running away from your problems. What that problem is depends on who is chasing you. It may be a problem at work, or it may be something about yourself that you know is destructive. For example, you may be drinking too much, and your dream may be telling you that your drinking is becoming a real problem.
- **Taking an exam (or forgetting that you have one)**
  You suddenly realize you are supposed to be taking an exam at that very moment. You might be

running through the hallways and can't find the classroom. This type of dream can have several variations that have similar meanings. (Maybe your pen won't write, so you can't finish writing your answers.) What experts say this may mean is that you're being scrutinized about something or feel you're being tested -- maybe you're facing a challenge you don't think you're up to. You don't feel prepared or able to hold up to the scrutiny. It may also mean there is something you've neglected that you know needs your attention.

- **Flying**
  Many flying dreams are the result of lucid dreaming. Not all flying dreams are, however. Typically, dreaming that you are flying means you are on top of things. You are in control of the things that matter to you. Or, maybe you've just gained a new perspective on things. It may also mean you are strong willed and feel like no one and nothing can defeat you. If you are having problems maintaining your flight, someone or something may be standing in the way of you having control. If you are afraid while flying, you may have challenges that you don't feel up to.
- **Your teeth falling out**
  Many people have dreams that they lose all of their teeth. In this dream, they may feel something strange in their mouth and then spit teeth into their hand, eventually losing all of their teeth. According to some, our teeth are related to our sense of power and our ability to communicate. Losing our teeth not only makes us embarrassed by our appearance, which hinders our communications, but it also lessens our power because we may not speak our minds. It's also associated with feelings about our appearance.

Recurring Dreams and Nightmares

Many people have the same or a similar dream many times, over either a short period of time or their lifetime. Recurring dreams usually mean there is something in your life you've not acknowledged that is causing stress of some sort. The dream repeats because you have not corrected the problem. Another theory is that people who experience recurring dreams have some sort of trauma in their past they are trying to deal with. In this case, the dreams tend to lessen with time.

Nightmares are dreams that are so distressing they usually wake us up, at least partially. Nightmares can occur at any age but are seen in children with the most frequency. Nightmares usually cause strong feelings of fear, sadness or anxiety. Their causes are varied. Some medications cause nightmares (or cause them if you discontinue the medication abruptly). Traumatic events also cause nightmares.

Treatment for recurring nightmares usually starts with interpreting what is going on in the dream and comparing that with what is happening in the person's life. Then, the person undergoes counseling to address the problems that are presumably causing the nightmare. Some sleep centers offer nightmare therapy and counseling. Another method of treating nightmares is through lucid dreaming. Through lucid dreaming, the dreamer can confront his or her attacker and, in some cases, end the nightmares.

“HOW DREAMS WORK” QUESTIONS

1. Describe the difference between the two main categories about dreaming.

2. What was Sigmund Freud theory on dreams? How is it different from Carl Jung’s theory?

3. What do the latest ideas associate with REM sleep? Why might this be important?

4. According to more recent research, why do we forget our dreams?

5. What are some techniques to induce lucid dreams? How do they work?

6. Which of the common dream themes have you personally experienced?

7. Why might people have recurring dreams?

A BRAINTASTIC PROJECT

For this project you may work either with one partner or by yourself. You may use your textbook as a resource, but the goal of this assignment is to describe the functions of the brain structures **IN YOUR OWN WORDS**. For this reason, no outside sources may be used.

Objective:

As a new children's book author, you are to write an original story about the brain using 12 of the brain structures listed below. Your story should be entertaining, yet also educational. It should not be written as a textbook, but rather as a story about the brain (ie. *The Adventures of Billy's Brain).*

1. **You Choose:**
   You may create any of the following:
   - -Recreate a children's book
   - -Create a pop-up book
   - -Create a comic strip
   - -Create a movie

2. **Define:**
   Your story must also include the function of those 12 brain structures--
   Incorporate the definition INTO the story it should not be in definition format.

Medulla	Occipital Lobe	Cerebral Cortex
Hypothalamus	Frontal Lobe	Reticular Formation
Temporal Lobe	Corpus Callosum	Pons
Parietal Lobe	Hippocampus	Frontal Lobe
Sensory Cortex	Motor Cortex	Left Hemisphere
Reticular Formation	Midbrain	Right Hemisphere
Cerebellum	Broca's Area	Wernicke's Area
Amygdala		

3. You may ONLY include illustrations (NOT clipart)! --- Though you may trace.

4. **For full credit be sure to *highlight* the structures within your story. Remember that you must include the functions in your project!**

BRAINTASTIC Rubric

REQUIREMENTS
ACCURACY of 12 structures & functions utilized _____/24
CREATIVITY, NEATNESS, ENTHUSIASM _____/6

Layout and integration of brain structure _____/10

Total _____/40 pts

DUE DATE:_____

FOR ALL PROJECTS:

Please type a list of the 12 brain structures you included in your project in the order they appear!