Due _____
Label the parts of the neuron and tell what they mean.
Axon, Cell Body, Dendrites, Myelin, Node of Ranvier, Nucleus, Synaptic Terminal
Below is a list of different parts of a neuron. On the lines following each word, write out what that structure does for the neuron (its function) and where it is located on the neuron.

Axon:__________________________________________________________
______________________________________________________________
______________________________________________________________

Cell Body:______________________________________________________
______________________________________________________________
______________________________________________________________

Dendrites:_______________________________________________________
______________________________________________________________
______________________________________________________________

Myelin:________________________________________________________
______________________________________________________________
______________________________________________________________

Node of Ranvier:_______________________________________________
______________________________________________________________
______________________________________________________________

Nucleus:_______________________________________________________
______________________________________________________________
______________________________________________________________

Synaptic Terminal:_____________________________________________
______________________________________________________________
______________________________________________________________
Psychology 101
Synapse Worksheet

Label and define the parts of a synapse
Neurotransmitter:

Vesicles:

Receptors:

Axon Terminal Button (pre synaptic receptor):

Dendrite (post synaptic receptor):

Axon:

Synaptic Gap
1. Neurotransmitters are the chemical ____________ that neurons use to ____________.

2. Neurotransmitters can be:
   • ____________ (cause something to happen)
   • ____________ (stopping a process)

3. When neurotransmitters are released into the synaptic gap, they bind to ____________ which cause the next neuron to create an ____________ ____________, starting the whole process over again.

4. Nt’s we will discuss:
   • **Dopamine**- present in feelings of ____________ or feeling high. Also activates the ____________ ____________ in the brain.
   • **Serotonin**- responsible for ____________, ____________.
   • **Endorphins**- responsible for ____________ ____________.

5. The Binding Process:
   When the sending neuron releases Nt’s across the synaptic gap, the Nt’s fit into receptors like a key fits in a lock.

6. Stopping the Process:
   When the next neuron creates an action potential (after enough Nt’s have attached to receptors) the Nt’s are stopped in one of three ways.
   • **Diffusion**:
   • **Reuptake**:
   • **Enzymes**:
The reward system:

Cocaine:
  - Neurotransmitter Involved:
  - Area Affected:
  - Why is cocaine so dangerous and addictive?
  - What does a person’s PET scan look like on cocaine?

Opiates:
  - Neurotransmitter/receptors Involved:
  - Areas Affected

Marijuana:
  - Neurotransmitter/receptor involved:
  - Area Affected:

Ecstasy:
  - Neurotransmitter involved:
  - Ecstasy is a derivative of a ________________.
  - What do we know about ecstasy?
    - Short term:
Long term:

- Areas affected:
  - Neocortex-
  - Hypothalamus-
  - Amygdala-
  - Hippocampus-
- Neurotransmitter involved:
- Where does ecstasy bind to the neuron?

**Effects of Ecstasy:**
- Acute effects of ecstasy:
  - Adverse effects of ecstasy:
  - Life threatening effects of ecstasy:
  - Short term effects after ecstasy is gone:

**Brain Structure Changes:**

<table>
<thead>
<tr>
<th></th>
<th>control</th>
<th>2 weeks after ecstasy</th>
<th>7 years after ecstasy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Psychology 101
Reaction Time Demo

For this demo, you will be in groups. One person in the group who has not had any stimulants or nicotine in the last few hours will drink a mountain dew.

Instructions:
Each person in the group will drop a meter stick, without warning, between the thumb and index finger, which should be extended about an inch apart. (it is important to keep the gap between thumb and index finger constant on each trial.) Reaction time - the amount of time it takes to grab the stick - is translated into centimeters.

1. At the beginning of this experiment, test the reaction time of everyone in your group. Record how far the stick drops before the subject catches it between thumb and index finger.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>1\textsuperscript{st} trial</th>
<th>2\textsuperscript{nd} trial</th>
<th>3\textsuperscript{rd} trial</th>
<th>4\textsuperscript{th} trial</th>
<th>5\textsuperscript{th} trial</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td>3</td>
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<td>4</td>
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<tr>
<td>5</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2. Select one group member to get a Mountain Dew from the instructor. The subject should drink the pop as quickly as is comfortable.

3. While waiting for the caffeine to take effect, each remaining group member will serve as subjects in another part of the experiment. Their first five trials investigated the pathways from the eyes to the brain and spinal cord to the hand - eyes $\rightarrow$ CNS $\rightarrow$ hand. The next series of trials will investigate other pathways.

A. Test one subject with eyes closed to eliminate the visual pathway to the brain. The experimenter drops the stick between thumb and forefinger and at the same time says, “NOW!” Record 5 trials.

B. Test another subject with closed eyes, but this time use a tactile signal. Tap the subjects other hand as the stick is dropped. Do 5 trials.

C. Similarly, test the next subject by using a tap on the foot as a signal that the stick is being dropped. Record 5 trials.

D. Try other subjects, using the same or other pathways. Identify the pathways and record the trials.
Subjects | 1st trial | 2nd trial | 3rd trial | 4th trial | 5th trial | Avg | Pathway
---|---|---|---|---|---|---|---
1 |  |  |  |  |  |  | Ears/cns/hand
2 |  |  |  |  |  |  | Hand/cns/hand
3 |  |  |  |  |  |  | Toe/cns/hand
4 |  |  |  |  |  |  | 
5 |  |  |  |  |  |  | 

1. Which route seemed to take the longest?

2. Which route was apparently the quickest?

3. Now- recheck the coffee drinker under the original eyes-open conditions. What is his or her average for 5 trials under the influence of caffeine?

4. Was the response shorter? longer? The same? (circle one)

5. What conclusions can you draw from your data regarding the following:

   A. Caffeine and reaction time:
   
   B. The different pathways of the CNS:
Label, define and color. Use the color for each part of the brain and shade over the term. This will help you remember- the brain likes contrasting colors.

Cerebellum-

Corpus Callosum-

Frontal Lobe-
1. When you look at the images that make up Set #1, how do the four images differ from each other?

2. Why are four images shown in each set of PET images? Why would scientists need to examine more than one PET image taken of a subject’s brain?

3. When comparing the images in Set #1 to the images in Sets #2, 3, 4, 5, and 6, how is the activity of the brain in each of these sets different from Set #1?

<table>
<thead>
<tr>
<th>Set Number</th>
<th>Identify the image that shows the greatest change (a,b,c or d)</th>
<th>Describe the change in brain activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. The PET images shown in Set #1 show brain activity in a resting brain. The images in Sets #2-6 show activity in the brains of humans who are doing different tasks. When you look at the PET scans and the chart in question #3, what generalizations can you make about the activity of the brain when different tasks are performed?

5. Compare the tasks that the subject performed during each of the PET scans (as shown on the overhead transparency) to the individual’s brain activity. Use the information from the over-head and from the PET images to complete the following chart.

<table>
<thead>
<tr>
<th>Set Number</th>
<th>Name of the brain region that is more active in the PET image</th>
<th>This part of the brain is involved in processing information related to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>auditory cortex</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>primary visual cortex</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>frontal cortex</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>hippocampus</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>motor cortex</td>
<td></td>
</tr>
</tbody>
</table>
### Psychology 101

**Left and Right Brain Test**

From http://www.angelfire.com/wi/2brains/test.html

**Directions:** This is a printable test to take yourself and give to your friends. Print out this page first. Get a blank sheet of lined paper. Every time you read a description or characteristic that applies to you, write down its number on the blank sheet of paper. There is no certain number of characteristics you must choose. After you are done, click here to view the key. Next to every number on your paper, write whether it was a L or an R. Count up the number of L's and R's. Whichever number is higher represents your dominance. If the numbers are close, that means you use both sides of your brain equally.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I always wear a watch</td>
</tr>
<tr>
<td>2.</td>
<td>I keep a journal</td>
</tr>
<tr>
<td>3.</td>
<td>I believe there is a right and wrong way to do everything</td>
</tr>
<tr>
<td>4.</td>
<td>I hate following directions</td>
</tr>
<tr>
<td>5.</td>
<td>The expression &quot;Life is just a bowl of cherries&quot; makes no sense to me</td>
</tr>
<tr>
<td>6.</td>
<td>I find that sticking to a schedule is boring</td>
</tr>
<tr>
<td>7.</td>
<td>I'd rather draw someone a map the tell them how to get somewhere</td>
</tr>
<tr>
<td>8.</td>
<td>If I lost something, I'd try to remember where I saw last</td>
</tr>
<tr>
<td>9.</td>
<td>If I don't know which way to turn, I let my emotions guide me</td>
</tr>
<tr>
<td>10.</td>
<td>I'm pretty good at math</td>
</tr>
<tr>
<td>11.</td>
<td>If I had to assemble something, I'd read the directions first.</td>
</tr>
<tr>
<td>12.</td>
<td>I'm always late getting places</td>
</tr>
<tr>
<td>13.</td>
<td>Some people think I'm psychic</td>
</tr>
<tr>
<td>14.</td>
<td>Setting goals for myself helps keep me from slacking off</td>
</tr>
<tr>
<td>15.</td>
<td>When somebody asks me a question, I turn my head to the left</td>
</tr>
<tr>
<td>16.</td>
<td>If I have a tough decision to make, I write down the pros and the cons</td>
</tr>
<tr>
<td>17.</td>
<td>I'd make a good detective</td>
</tr>
<tr>
<td>18.</td>
<td>I am musically inclined</td>
</tr>
<tr>
<td>19.</td>
<td>If I have a problem, I try to work it out by relating it to one I've had in the past</td>
</tr>
<tr>
<td>20.</td>
<td>When I talk, I gesture a lot</td>
</tr>
<tr>
<td>21.</td>
<td>If someone asks me a question, I turn my head to the right</td>
</tr>
<tr>
<td>22.</td>
<td>I believe there are two sides to every story</td>
</tr>
<tr>
<td>23.</td>
<td>I can tell if someone is guilty just by looking at them</td>
</tr>
<tr>
<td>24.</td>
<td>I keep a to do list</td>
</tr>
<tr>
<td>25.</td>
<td>I feel comfortable expressing myself with words</td>
</tr>
<tr>
<td>26.</td>
<td>Before I take a stand on an issue, I get all the facts</td>
</tr>
<tr>
<td>27.</td>
<td>I've considered becoming a poet, a politician, an architect, or a dancer</td>
</tr>
<tr>
<td>28.</td>
<td>I lose track of time easily</td>
</tr>
<tr>
<td>29.</td>
<td>If I forgot someone's name, I'd go through the alphabet until I remembered it</td>
</tr>
<tr>
<td>30.</td>
<td>I like to draw</td>
</tr>
<tr>
<td>31.</td>
<td>When I'm confused, I usually go with my gut instinct</td>
</tr>
<tr>
<td>32.</td>
<td>I have considered becoming a lawyer, journalist, or doctor</td>
</tr>
</tbody>
</table>

Psychology 101
Brain Models

Use your “stuff to make a model of both of the items below. You may cut your poster board in half for this activity.

Neuron: (label the following)

- Dendrites
- Axon
- Cell Body
- Terminal Buttons
- Myelin
- Node of Ranvier
- Nucleus

Show the process of how information moves down the axon to the terminal buttons (include the release of nt)

Synapse: (label and explain the following)

- Neurotransmitter
- Vesicles
- Pre-synaptic terminal
- Post-synaptic terminal
- Reuptake Channel
- Synaptic Gap
- Receptors

Explain the process of neural transmission (how a synapse works) in terms of one of the following drugs:

1. Cocaine
2. Marijuana
3. Ecstasy
4. Heroin
As you watch the movie answer the following questions.

1. What caused the brain damage to the "frozen" people in the film?

2. Why do you think Lucy could keep walking when the pattern on the floor continued?

3. How was music important to the "frozen" people?

4. What kind of music "worked"?

5. Using the ouiji board, Leonard spelled out the name of the poem "The Panther" by Karl Rainer Rilke. What is this poem about and why is it important to Leonard?

6. Why did Dr. Sayer have to stop using the drug L-Dopa on the "frozen" patients?

7. What has happened to them since 1969?