Unit Two Homework
C13 Spinal Cord

Spinal Reflex Arc (31 sec)
1. Where is the information processed in a reflex arc?
2. What is important to understand about the role of the brain in a reflex arc?

Flexor Reflex (5 min)
1. How many synapses are involved in this reflex? Called?
2. What type of sensor is activated by stepping on a tack?
3. What muscle flexes the leg at the knee?
4. What root is the pathway for the sensory signal to enter the spinal cord?
5. How many spinal nerves are involved in this example? Why?
6. What phrase describes this flexor reflex?
7. What type of nerve makes this possible?
8. How many motor spinal nerves are used in this reflex? Why?
9. What happens because of reciprocal innervation?

Stretch Reflex (5 min)
1. Why is this called a monosynaptic reflex?
2. What type of nerve is not used in this reflex?
3. What is the function of the muscle spindle? Location?
4. In this example, how is the muscle spindle "stretched"?
5. What two terms are used to describe the reflex arc to the quadriceps muscle?
6. What happens when the sensory nerve branches in the posterior horn?
    a. What type of nerve will this synapse on?
    b. Is this pathway monosynaptic or polysynaptic?
    c. What is the purpose for this pathway?
    d. What muscle will this pathway influence? Significance?

Cross Extensor Reflex (5 min)
1. What must happen when you move one leg after stepping on a tack?
2. What sensory impulse is used to activate the extensor muscle ?
3. What happens to the contralateral leg?
4. What type of nerve is stimulated by the inter-neuron on the contralateral side?
5. How is the crossed extensor reflex described?

Spinal Cord: Golgi Tendon Organ Reflex (20 min)
1. What type of muscle fiber connects to the tendon?
2. What structure is woven into the collagen fibers of the tendon?
    a. What type of nerve fiber is attached to this structure?
    b. What is the name of this sensor? Function?
3. What type of force is the Golgi tendon measuring?
4. What type of gated ion channel is activated by the GTO? What ion passes through these channels?
    a. In the axon, what type of gated ion channel is activated? What ion passes through these channels?
    b. What type of potential is created in the axon?
5. What happens to the sensory neuron when it enters the posterior horn?
    a. Type of interneurons?
    b. What type will go the bicep muscle? Why?
    c. What type of muscle contracts to reduce tension in the GTP? Muscle type called?

6. What neurotransmitter is released to cause inhibition?
    a. What type of potential is created?
    b. What two types of ions may move across the membrane?
7. What neurotransmitter will cause an EPSP?

TED Talk by Dr. David Eagleman:
Can We Create New Senses for Humans? (20 min)
1. How much of the electromagnetic radiation are we able to detect?
2. Why are we not able to detect most of this radiation?
3. How is the reality of different types of animals different than human reality?
4. What is the German word to describe this?
5. What is the "big secret"? What is the brain seeing?
6. What is the PH Model of evolution? Significance?
7. What is sensory substitution? Significance?
8. What is the key as we move into the future?

TED Talk by Dr. Robert Sapolsky
Our Best And Worst Self (15 min)
1. How does Sapolsky describe himself when it comes to violence?
2. As a specie, do we hate violence? Explain
3. What is the hard part about understanding behavior?
4. What is true about any type of behavior? Simple or complex? Explain.
5. What brain region plays a key role in the second before a "behavior"?
6. How will the environment influence events that occur seconds before the behavior? Examples
7. What part of the brain is suppose to get to the amygdala before it may dictate the behavior?
    a. What may slow down this event?
8. How may the hours to days influence the behavior ?
    a. What mediates this period related to the behavior?
    b. How will elevated levels of testosterone influence how you recognize a face?
9. How may the weeks to months influence behavior?
    a. What mediates this?
    b. What type of events may do this?
    c. What two brain region changes to influence the behavior?
10. How may the behavior be influenced by events occurring years before the behavior?
    a. When is the frontal cortex fully "mature"?
    b. How may experiences during adolescence affect the frontal cortex?
11. How may going back to childhood, experiences years to decades before the experience be significant?
    a. What type of brain changes may occur at this age?
    b. As a consequence, what things may be turned off or turned on?
    c. When you were a fetus, if your mother was under a lot of stress then what be the size of your amygda la? Significance?
    d. Do genes really tell us anything about behavior?
12. How may events centuries old influence your behavior?
13. If we talk about genes as having the ability to influence a behavior, then what is the time scale going back?
14. What can we conclude about behavior?
15. Are humans able to have great changes in our behavior? Why, what changes? Example

Please Note: If you liked this talk then there is a more in-depth one hour lecture about this subject. You may find the link in the C14 resource section.