Special Senses - Eye

Photoreceptors:

1. Rods
    a. Allows us to see _____
    b. More abundant in periphery of eye
    c. Provides us with _____
    d. _____ – when rods function is impaired
2. Cones
    a. Allows us to see _____
    b. Different types picks up different wavelengths of light - _____ types
    c. _____ at center of retina
    d. Fovea centralis – contains only _____ and gives us the place of sharpest vision
    e. _____ (or partial) – lack of cones or certain types of cones

Eye Sight:

1. Light is _____ differently as it passes through parts of the eye
    a. All refraction is constant except through the _____, which can change shape depending on what you are focusing on
2. Light needs to be focused on the retina in order for us to see things clearly
    a. Hyperopia – _____
        i. When parallel light rays from distant objects are focused behind the retina
        ii. Due to flat (lazy) lens or short eyeball
    b. Myopia – _____
        i. When parallel light rays from distant objects are focused in front of the retina
        ii. Due to a strong lens, long eyeball, or cornea that is too curved
3. _____ – is the reversed left to right, and upside down image that forms on the retina
4. Binocular vision – Each eye sees a _____ view, but the visual fields overlap
5. Light travels through the parts of the eye, to the optic nerve, to the optic chiasma (where part of the fiber switch to the _____ side of the brain), to the _____ (which contains fibers from both eyes), and finally to the _____ lobe of the brain

Special Senses – Ear, Nose, and Tongue

Two functions of the ear:

1. Hearing
    a. Involves _____ ear (pinna), middle ear (eardrum and ossicles), and inner ear (_____)

b. Organ of Corti – contain _____ receptors
c. Air must pass through air, membrane, and fluid
d. _____ membrane is stimulated by vibrations and causes receptors to be stimulated
    i. Signal is sent from cochlear nerve to auditory cortex of _____ lobe
e. Sound hits ours ears at different times, so we hear in stereo which helps us maintain our homeostasis and react to our environment

2. Equilibrium
    a. Involves the _____ (where semicircular canals meet with the cochlea) for static equilibrium and the _____ for dynamic equilibrium
    b. Static = tells position of the head due to gravity using _____
    c. Dynamic = responds to angular or rotational movement of the head using _____

Sense of Smell:

1. _____ on the roof of the nasal cavity are stimulated by various chemicals
2. Receptors rest in layer of _____ and chemicals get dissolved into mucus
3. Nerve impulse is sent down olfactory nerve to the _____ and then to the olfactory cortex of the temporal lobe
4. Most air goes into nasal cavity and makes a sharp turn into your respiratory passage, but _____ moves more air superiorly and the sense of smell can intensify.

<u>Taste:</u>

1. Taste receptors are monitored by many of the _____ and can detect not only taste but texture and _____ of things we place in our mouths
2. Impulses are sent to the medulla oblongata, then to the thalamus, and then to the sensory cortex of parietal lobe.
3. Sweet–salty receptors are _____ and sour–bitter are _____
    a. There is some evidence for differences in distribution of tastes along the tongue
    b. Other taste sensations include:
        i. Umami – detects pleasant taste that is characteristic of beef broth, chicken broth, or parmesan cheese
        ii. Water receptors – in pharynx that, when stimulated during a long drink, can cause minor reduction in ADH levels
4. Taste can be beneficial in _____ because liking sugar and salt will satisfy our bodies need for carbohydrates and minerals and poisons and spoiled foods have a bitter taste which might cause us to spit them out.

Special Senses Tests:

Station 1:

Colorblindness Test

1. Each circle contains colored dots with a hidden number that is shown as another color.
2. **What is a positive test for color blindness?** _____
   _____
3. **What are different types of colorblindness?** _____
   _____
4. **Explain how colorblindness can occur.** _____
   _____

Station 2:

Snellen Eye Chart

1. Stand 20 feet away from the chart. This is the distance at which the light entering your eye is parallel to the floor. Read each line and record the last completed line read.
2. Record your vision in each eye (Ex: 20/40)

   Right _____ Left _____

3. **Is your vision good, fair, or bad? _____**
4. **Describe the difference between near sighted and far sighted? _____**
   _____

Station 3:

Two-Point Discrimination Test

1. This test measures the abundance of touch receptors on your palm versus the back of the upper arm by using the calipers.
2. Have your partner close their eyes, and starting with the caliper ends very close together **gently** touch the ends of the caliper on the person's palm and remove. Your partner will report if they felt 1 or 2 points.
3. Repeat this procedure but widen the ends of the calipers by 1 mm each time until your partner says they can feel 2 points on their palm. **Record the distance between the points: _____**
4. Repeat the procedure for the back of the upper arm and **measure the distance between the points: _____**
5. Switch partners and repeat the procedure.
6. **Which area has more touch receptors? _____ Why do you think there are more receptors in that area? _____**
   _____
7. **What is the specific name for the receptors responsible for sensing touch?**
   _____
8. **What type of neuron AND parts of the brain are being used during the activity?**
   _____

Station 4:

Balance and Equilibrium

1. Rope Walk
    a. Walk down the length of rope with your eyes open and count how many steps you take without stepping off. **Use your regular walking speed**.
    b. Record the number of steps to the end of the rope or until you step off _____
    c. Carefully walk down the length of rope with your eyes closed and have a partner spot you and count the number of steps before falling off the rope.
    d. Record the number of steps _____

2. Balance and Vision
    a. Pick a preferred leg to stand on. Hold the other leg with one hand and keep the opposite hand at your side.
    b. Time yourself (up to 60 seconds) with eyes **open**. **Record how long you can balance: _____**
    c. Repeat **with your eyes closed and record time _____**
    d. Switch to your non preferred leg and repeat the above procedure with eyes open and eyes closed. **Open _____ Closed _____**
    e. **Does vision have an impact on balance? _____ Why? _____**
    _____

3. Balance and Fatigue
    a. Stand with both feet on each end of the wobble board. Practice balancing a few times before you begin the test. When ready, balance until one of the sides touches the floor.
    b. **Record the time you were able to balance: _____**
    c. Complete a leg fatiguing exercise. The exercise needs to be strenuous enough to fatigue your muscles. Repeat the balance test and stop the timer when one side of the board touches the ground.
    d. **Record the time you were able to balance: _____**
    e. **Does fatigue have an impact on balance? _____ Explain your answer (If you were able to balance longer after fatigue, explain those results) _____**
    _____
    _____