

Unit 3: Sensation and Perception

Topic 3.1 Principles of Sensation

1. What is the difference between sensation and perception? **Sensation is raw data, information that we receive from our five senses, information comes from a person's sensory receptors. Perception is the process of interpreting the information that is obtained through a person's five senses**

2. Complete the table below.

Gestalt Principle	Description	Example
Figure & Ground	The tendency of the visual system to simplify what it sees into two categories (Figures = objects of focus / ground = background)	When talking with a friend their face is in focus and the room behind them is blurry
Continuation	When looking at an object a person will continue to view the entire object and continue over to the next one	When reading an exit sign you continue to move in the direction of the arrow
Closure	When looking at an incomplete object the brain will fill in missing information	When looking at a picture of lines we see an airplane (See video)
Similarity	Objects that are grouped or put in a specific pattern will appear as one object	When looking at the logo of a company the design has shared characteristics giving the illusion of one item
Proximity	Objects that are placed close to each other will appear as one object, while objects that are separated appear as separate	If you put large spaces in the NBC logo it will not longer appear to be one object
Symmetry	Objects that are symmetrical to each other are perceived to be as one object	When looking at the bike ad the image had a manhole and a bike tire combined into one object (See video)

3. What is the difference between binocular cues and monocular cues? **Binocular cues require two eyes. When objects are near a person the eyes move inward, and when the object is farther away the eyes will straighten. Monocular cues only use one eye and can be broken up into 6 different cues.**

4. Compare convergence and retinal disparity. **Convergence is when objects are near someone the person's eyes will move inward, and when the object is farther away the eyes will straighten. Retinal disparity is when looking at an object each eye is seeing a different part of the object, which gives a person a degree of depth**

5. Complete the table below.

Monocular Cues	Description	Example
Relative Size	Allow a person to determine how close an object is	Objects that are closer to a person will appear larger, while objects that are farther away will appear smaller
Interposition	Allows a person to understand how close an object is by seeing which objects are obstructed	Objects that are blocked by another object are most likely farther away, while objects that are not obstructed are closer
Relative height	Allows a person to understand the distance of an object by using the height of the object	Objects that are higher appear to be farther away compared to objects that are lower

Topic 3.1 Principles of Sensation (Continued)

5. Complete the table below. (Continued)

Monocular Cues	Description	Example
Shading & contour	Allows a person to understand the distance of an object by looking at the form of an object	Objects that are hazy and have less detail appear to be farther away, while objects that are more clear and in focus are closer
Texture & gradient	Allows a person to understand the distance of an object by looking at the clarity and detail of the object	Objects that have richer textures, details, and clarity are closer, compared to objects that have less texture, details, and clarity
Linear perspective	Allows a person to understand the distance of an object by using parallel lines	Parallel lines appear to converge at a point in the distance, this helps a person understand their positioning and understand depth
Motion parallax	Allows a person to understand the distance of an object by using motion	Objects that are moving quicker are closer to a person, compared to objects that appear to be moving slower which are farther away

6. Define sensory transduction. The process of taking outside stimulus in through a person's senses, which activates a person's neurons causing a sensation

7. What is the absolute threshold? The minimum amount of stimulation needed to experience a stimulus

8. Complete the table below.

	Respond Yes	Responds No
Signal present	Hit	False Alarm
Signal absent	Miss	Correct Rejection

9. Compare sensory adaptation and habituation. Sensory adaptation happens when a person has a stimulus that is continuous, it does not change. (The person becomes used to the stimulus) Habituation is when a person is repeatedly exposed to a stimulus and starts to have a reduced response to the stimulus (The person is learning)

10. Define the difference threshold. This is the minimum change between two stimuli that causes an individual to detect the change

11. Explain Weber-Fechner law. This is the idea that for a person to notice a difference between two stimuli, the two stimuli must differ by a constant percent, not a constant amount

Topic 3.2 Principles of Perception

1. What is perceptual constancy? This is when you perceive objects and stimuli with familiar standard shape, size, color, and lightness even when changes are occurring.

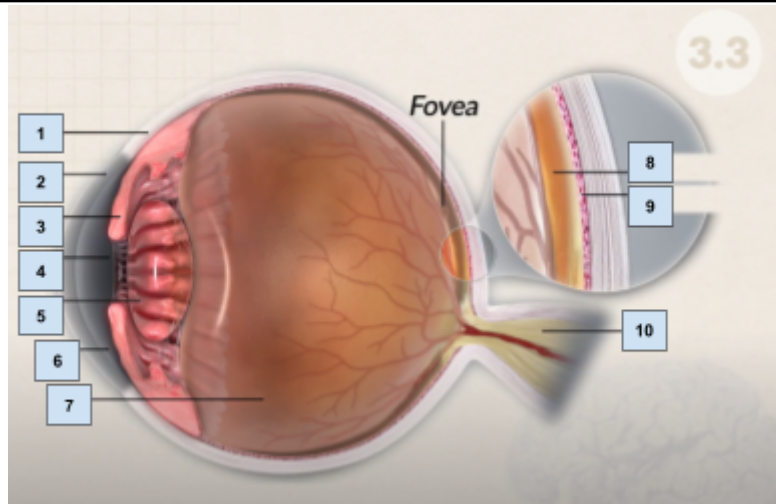
2. Complete the table below.

Perceptual Constancy	Description
Size constancy	Tendency of the brain to perceive objects as the same size
Color constancy	The perception of the color of an object remaining the same even if the lighting changes
Shape constancy	Tendency of the brain to perceive an object to have the same shape when moving
Lightness constancy	The perception of the blackness, whiteness, and grayness of an object

Topic 3.2 Principles of Perception (Continued)

3. How does a perceptual set impact information we process? **They influence certain aspects of images, objects, scenarios and lead us to ignore other aspects of the same stimuli.**
4. Identify an example of how perceptual sets can influence an individual's perception. **Answers will vary. Example: Individuals who work with numbers are more likely to quickly identify numbers in images, while individuals who read more will identify words first.**
5. Define schema. **A cognitive framework based on an individual's experiences that helps guide an individual's perceptual set and organize the world around them.**
6. Identify an example of a schema you have. **Answers will vary. Example: If you have gone to a birthday party you understand what normally will happen**
7. Identify two ways in which culture, experiences, or an individual's emotions impact an individual's perceptual process. **Answers will vary. Examples: 1) Western countries are more likely to see right angles, since they are common in society 2) Individuals in a positive mood are more likely to see positive stimuli**
8. Describe the Muller-Lyer illusion. **An optical illusion that has three lines with different arrows, causing an individual to perceive the lines as different lengths**

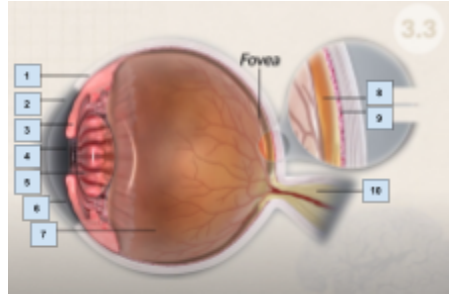
Topic 3.3 Visual Anatomy



1. Complete the table below using the diagram above.

Part of the Eye	#	Description
Sclera	1	The outside layer of the eye, which is white fibrous tissue (Protects the eye)
Cornea	2	Transparent part of the outside layer of the eye. Protects the eye and allows for light to bend
Aqueous Humor	6	Made up of water and salt and helps maintain pressure within the eye and provides nourishment to the cornea and lens
Iris	3	A ring-shaped muscular membrane located behind the cornea, this determines a person's eye color and controls how much light enters the eye
Pupil	4	The dark part of your eye, located between the iris. This is where light will pass through upon entering the eye
Lens	5	Allows for the eye to change focus, located behind the pupil and iris

Topic 3.3 Visual Anatomy (Continued)



1. Complete the table below using the diagram above (Continued)

Part of the Eye	#	Description
Vitreous Humor	7	Clear gel-like fluid in the vitreous cavity. It gives the eye support and shape
Retina	8	Located in the back of the eye and is made up of layers of light sensitive cells, known as photoreceptors. Which convert the light into neural impulses that allow for the brain to process what the eye is seeing
Choroid Layer	9	Blood vessels that help keep the retinal cells and the other cells in the eye healthy by providing oxygen and nutrients from the blood vessels, also absorbs stray light
Optic Nerve	10	Located in the back of the eye, it is made up of the retinal ganglion axon, neural impulses travel in the optic nerve from the eye to briefly stop at the thalamus, then travel to the primary visual cortex where the information will be processed in the occipital lobe

2. Explain the difference between rods and cones. Cones are what help you see fine details, allow you to have clear vision, and allow you to see color. Rods are visual receptors that allow you to see in dim light

3. Identify what is located in front of the rods and cones and describe their function. Bipolar cells and ganglion cells. Bipolar cells send visual information from the rods and cones to the ganglion cells, which help relay information from the retina to the brain through the optic nerve.

4. Compare astigmatism and cataracts. Astigmatism happens if the cornea is irregularly shaped and could impact a person's ability to focus. While cataracts happens when the lens of your eye becomes cloudy, causing vision to become blurry

5. Explain the trichromatic theory and opponent-processing theory. Trichromatic theory states that individuals are able to see color because different wavelengths of light stimulate combinations of three color receptors. (Photoreceptors work in teams of three, red, green, and blue) While the opponent-processing theory compliments the trichromatic theory. Here information that is received from the cones is sent to ganglion cells, this causes some neurons to become excited and others inhibited.

6. What colors have a shorter wavelength and which ones have a longer? Cooler colors have a short wavelength and warmer colors have a longer wavelength.

7. Complete the table below.

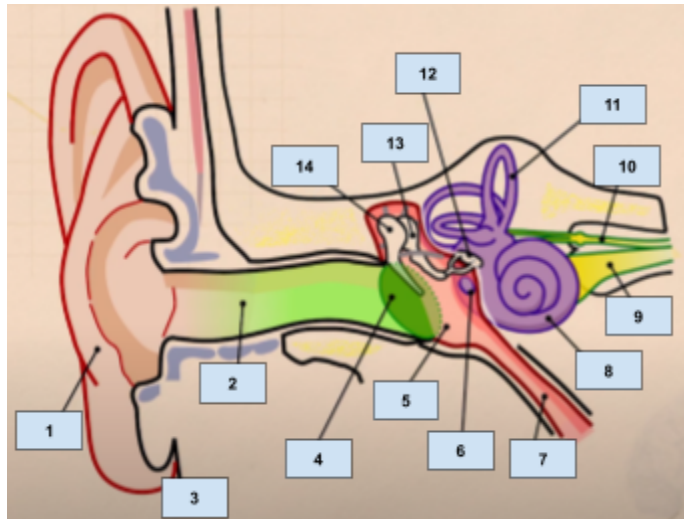
Color blindness	Description
Achromatism	People can only see black, white, and gray because they lack retinal cones
Dichromatism	Individuals possess only two or the three types of retinal cones. Which leads to confusion between certain colors. Most common type is red-green color blindness
Trichromatism	Individuals with the ability to see all of the colors

8. Describe how synesthesia impacts a person. This is a neurological condition where when one of an individual's senses is stimulated it will result in stimulating another sense at the same time.

Topic 3.4 Visual Perception

1. What is the difference between top-down and bottom-up processing? **Top-down processing is when you use prior knowledge and information to interpret information. Bottom-up processing is when you process information by taking in the incoming stimuli and organizing it as it comes. This is often when you interpret information that is complex and unfamiliar to you**
2. How can perceptual sets influence top-down processing? **When we use prior knowledge to evaluate new information or situations our prior knowledge can influence our perception of the new information.**
3. Identify an example of an individual using bottom-up processing. **Answers will vary. Example: You are trying to put a puzzle together without ever seeing the completed puzzle.**
4. Identify an example of an individual using top-down processing. **Answers will vary. Example: You are trying to put a puzzle together and use the picture on the box to complete the puzzle.**
5. Explain how top-down processing and proofreaders illusion impact your ability to proofread a paper you wrote. **This is when you read a paper and your brain does not notice errors in spelling or grammar. Since you are familiar with the paper you use top-down processing, your brain skips the errors because you know what the paper is supposed to sound like.**

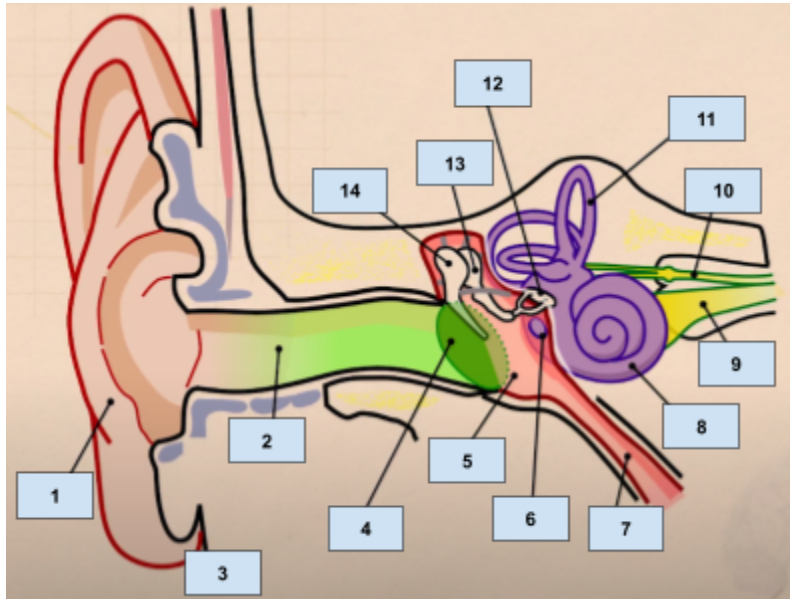
Topic 3.5 Auditory Sensation and Perception



1. Complete the table using the following diagram.

Part of Ear	#	Description
Pinna	1	Outer part of the ear that is made up of cartilage and directs sound into the ear
Auditory Canal	2	Entrance to the ear, this tube funnels sound into the ear from the pinna to the eardrum
Eardrum	4	As air in the auditory canal vibrates it causes the eardrum to vibrate and transform the sound vibrations into mechanical vibration of bones of the middle ear
Malleus	14	Also called the hammer due to the bone's shape, helps with amplifying sound sent from the eardrum to the inner ear
Incus	13	Also known as the Anvil, helps with amplifying sound sent from the eardrum to the inner ear
Stapes	12	Also known as the stirrup, helps with amplifying sound sent from the eardrum to the inner ear

Topic 3.5 Auditory Sensation and Perception (Continued)

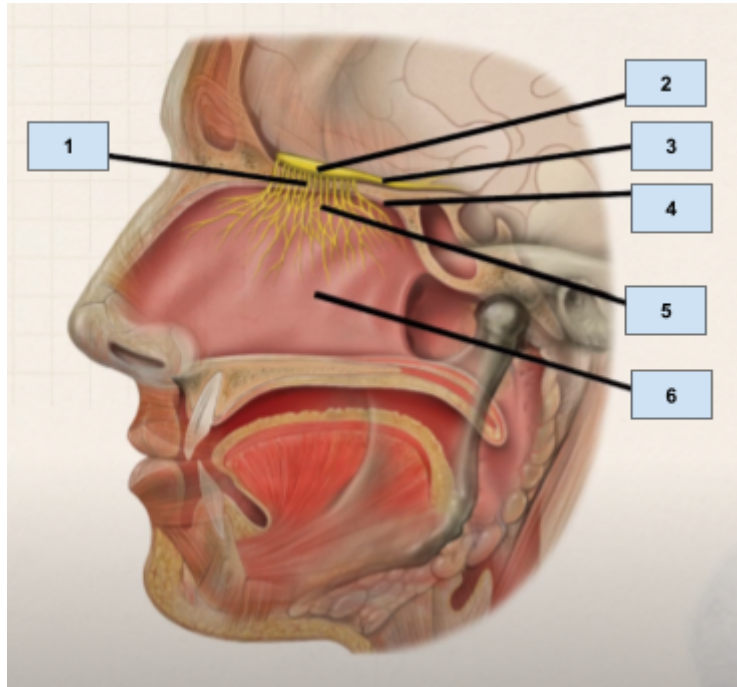


1. Complete the table using the following diagram.

Part of Ear	#	Description
Oval Window	6	Located in the opening in the wall of the cochlea it is covered with a membrane that helps with the amplification of the sounds and sends waves into the inner ear
Cochlea	8	One of the first structures in the inner ear, this structure is filled with a fluid and has 3 canals
Organ of Corti	8	Located inside the cochlea. Contains sensory receptors for hearing
Semicircular Canals	11	Located above the cochlea and filled with fluid. Helps with balance, when an individual tips their head the fluid shifts causing the nerves to become stimulated which sends signals to your brain about your movement and head position

2. Explain what the stereocilia do. These are tiny hairs that protrude from the hair cells of the organ of Corti along the basilar membrane. When the stereocilia start to vibrate it starts the process of converting the vibrations in the ear to electrical impulses to send them to the brain.
3. Describe the difference between frequency and amplitude of a sound wave. The frequency of the sound wave is what will determine the pitch, the sound's highness or lowness. Shorter the wave the higher the pitch will be. Amplitude is the strength of a sound wave, found by taking the distance from the peak or trough of the wave and measuring it from the equilibrium.
4. Describe place theory. Certain hair cells respond to certain frequencies. Hair cells at the base of the cochlea can detect higher pitch sounds. While hair cells near the top of the cochlea can detect lower pitch sounds, with the hair cells at the very top near the spiral detecting the lowest pitch sounds.
5. What is sensorineural hearing loss? Sensorineural hearing loss is when a person's clarity, loudness, and range of sounds are no longer able to be heard as they once were. This occurs because the cilia and the auditory nerve in both ears have been damaged.
6. What is conductive hearing loss? Conductive hearing loss is when sound waves cannot move through the outer ear to the middle ear, and inner ear. This can be because something is blocking the outer ear, or because the ear was damaged and can no longer have sound travel through the auditory canal
7. Describe the difference between a cochlear implant and a hearing aid. A cochlear implant is a device that converts sounds into electrical signals, these signals help stimulate the auditory nerve and allow for signals to be sent to the brain. A hearing aid amplifies sounds to allow an individual to hear different sounds around them

Topic 3.6 Chemical Senses



1. Complete the table below.

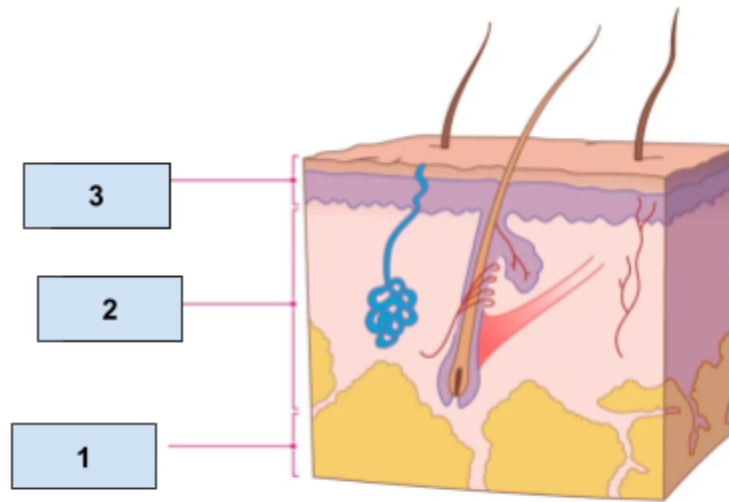
Part of the Nose	#	Description
Olfactory epithelium	4	A membranous tissue that contains olfactory receptor cells, helps with the sense of smell
Olfactory receptor cells	5	A patch of skin that has receptor cells, these neurons are what allow an individual to smell
Olfactory bulb	2	This is where transduction of smells occurs
Olfactory nerve	3	Electrical signals are sent through the olfactory nerve to the amygdala and then the hippocampus in the brain

2. What does gustation mean? This is the sensation of tasting.

3. What is the papillae? Small structures that are more commonly known as taste buds, there are four different types of papillae and these are what allow you to experience the 5 basic tastes.

4. Explain what happens when you eat food. Molecules enter your taste buds and stimulate the cells. Once that stimulation occurs signals are sent through the facial nerve to the thalamus in the brain. Then the signals are sent to the temporal lobe of the cerebral cortex

Topic 3.7 Body Senses



1. Complete the table below.

Layer of Skin	#	Description
Epidermis	3	Outside layer of your skin. This creates a barrier to protect a person, this is also what gives a person their skin color.
Dermis	2	Made up of two layers, this is connective tissue that is where your blood vessels and nerve endings are located. Here you have your sense of touch and pain
Nociceptors	2	Pain receptors located in the dermis. These sensory receptors are what detect painful stimuli, temperatures, pressure, or chemicals
Hypodermis	1	A layer of fat that helps insulate a person's tissues and absorbs shocks

2. What is phantom limb sensation? This is when individuals who have lost a body part have pain where the body part is supposed to be
3. What is kinesthesia? The perception of the position and movement of individual body parts
4. What are proprioceptors? Sensory receptors located in various muscles and tendons that allow for the brain to gain a better sense of the position and movement of our limbs
5. Describe what vestibular sense is. This is our ability to maintain our balance. This occurs when our head moves causing fluid in the vestibular canals of the inner ear to shift
6. Explain sensory interaction. This is when a person's senses interact with one another and influence each other, it allows for a person to understand the world around us.