UNIT 4: SENSATION AND PERCEPTION

BASIC PRINCIPLES OF SENSATION AND PERCEPTION

OBJECTIVE 1: Contrast sensation and perception, and explain the difference between bottom-up and top-down processing.
1. The perceptual disorder in which a person has lost the ability to recognize familiar faces is __________________________.
2. The process by which we detect physical energy from the environment and encode it as neural signals is __________________________. The process by which sensations are organized and interpreted is __________________________.
3. Sensory analysis, which starts at entry level and works up, is called __________________________ - __________________________.
   Perceptual analysis, which works from our experience and expectations is called __________________________ - __________________________.

OBJECTIVE 2: Discuss how our perceptions are directed and limited by selective attention, noting how we may or may not be affected by unattended stimuli.
4. When we focus our conscious awareness on a particular stimulus, we are using __________________________.
5. Your ability to attend to only one voice among many is called the __________________________ __________________________. Failing to see a visible object when our attention is directed elsewhere is called __________________________.
6. When researchers distracted participants with a counting task, the participants displayed __________________________ and failed to notice a gorilla-suited assistant who passed through. Two specific forms of this phenomenon are __________________________ __________________________. Another result of distraction involves not noticing that different people are speaking, called __________________________ __________________________.
7. Some stimuli are so powerful they demand our attention, causing us to experience __________________________ - __________________________.

OBJECTIVE 3: Distinguish between absolute and difference thresholds, and discuss whether we can sense and be affected by subliminal or unchanging stimuli.
8. The study of relationships between the physical characteristics of stimuli and our psychological experience of them is __________________________.
9. The __________________________ refers to the minimum stimulation necessary for a stimulus to be detected __________________________ percent of the time.
10. According to __________________________ __________________________ theory, a person’s experience, expectations, motivation, and alertness all influence the detection of a stimulus.
11. Some entrepreneurs claim that exposure to “below threshold,” or __________________________, stimuli can be persuasive, but their claims are probably unwarranted.
12. Some weak stimuli may trigger in our sensory receptors a response that is processed by the brain, even though the response doesn’t cross the threshold into __________________________ awareness.
13. Under certain conditions, an invisible image or word can __________________________ into a person’s response to a later question. This illustrates that much of our information processing occurs __________________________.
14. The minimum difference required to distinguish two stimuli 50 percent of the time is called the __________________________ __________________________. Another term for this value is the __________________________ __________________________.
15. The principle that the difference threshold is not a constant amount, but a constant proportion, is known as __________________________ __________________________. The proportion depends on the __________________________.
16. After constant exposure to an unchanging stimulus, the receptor cells of our senses begin to fire less vigorously; this phenomenon is called __________________________ __________________________.

VISION

OBJECTIVE 4: Describe the characteristics of visible light, and explain the process by which the eye converts light energy into neural messages.
1. Stimulus energy is __________________________ (transformed) into __________________________ messages by our eyes.
2. The visible spectrum of light is a small portion of the larger spectrum of __________________________ energy.
3. The distance from one light wave peak to the next is called __________________________. This value determines the wave’s color, or __________________________.
4. The amount of energy in light waves, or __________________________, is determined by a wave’s __________________________, or height, influences the __________________________ of a light.
5. Light enters the eye through the __________________________, then passes through a small opening called the __________________________; the size of this opening is controlled by the colored __________________________.
6. By changing its curvature, the __________________________ can focus the image of an object onto the
OBJECTIVE 5: Discuss the different levels of processing that occur as information travels from the retina to the brain's cortex.

14. Visual information percolates through progressively more ___________ levels. In the brain, it is routed by the ___________ to the cortex. Hubel and Wiesel discovered that certain neurons in the occipital lobe's ___________, ___________ respond only to specific features of what is viewed. They call these neurons ___________.

15. Feature detectors pass their information to higher-level cells in the brain, which respond to specific visual scenes. Research has shown that in monkey brains such cells specialize in responding to a specific ___________, ___________, ___________, or ___________. In many cortical areas, teams of cells ( ___________, ___________, ___________) respond to complex patterns.

OBJECTIVE 6: Define parallel processing, and discuss its role in visual information processing.

16. The brain achieves its remarkable speed in visual perception by processing several subdivisions of a stimulus ___________ (simultaneously/sequentially). This procedure, called ___________ ___________, may explain why people who have suffered a stroke may lose just one aspect of vision.

17. Other brain-damaged people may demonstrate ___________ by responding to a stimulus that is not consciously perceived.

OBJECTIVE 7: Explain how the Young-Helmholtz and opponent-process theories help us understand color vision.

18. An object appears to be red in color because it ___________ the long wavelengths of red and because our mental ___________ of the color.

19. One out of every 50 people is color deficient; this is usually a male because the defect is genetically ___________ - ___________.

20. According to the ___________ theory, the eyes have three types of color receptors: one reacts most strongly to ___________, one to ___________, and one to ___________.

21. After staring at a green square for a while, you will see the color red, its ___________ color, as an ___________.

22. Hering's theory of color vision is called the ___________ - ___________ theory. According to this theory, after visual information leaves the receptors it is analyzed in terms of pairs of opposing colors: ___________ versus ___________, ___________ versus ___________, and ___________ versus ___________.

Summarize the two stages of color processing.

HEARING

OBJECTIVE 8: Describe the auditory process, including the stimulus input and the structure and function of the ear.

1. The stimulus for hearing, or ___________, is sound waves, created by the compression and expansion of ___________.

2. The amplitude of a sound wave determines the sound's ___________.

3. The frequency of a sound wave determines the ___________ we perceive.

4. Sound energy is measured in units called ___________. The absolute threshold for hearing is arbitrarily defined as ___________ such units.
5. The ear is divided into three main parts: the ___________________ ear, the ___________________ ear and the ___________________ ear.
6. The outer ear channels sound waves toward the ___________________, a tight membrane that then vibrates.
7. The middle ear transmits the vibrations through a piston made of three small bones: the ___________________, ___________________, and ___________________.
8. In the inner ear, a coiled, bony, fluid-filled tube called the ___________________ contains the receptor cells for hearing. The incoming vibrations cause the ___________________ to vibrate the fluid that fills the tube, which causes ripples in the ___________________ ___________________ that line its surface. This movement triggers impulses in the adjacent nerve fibers that converge to form the auditory nerve, which carries the neural messages (via the ___________________) to the ___________________ lobe's auditory cortex.
9. The brain interprets loudness from the ___________________ of hair cells a sound activates.

OBJECTIVE 9: Contrast place and frequency theories, and explain how they help us to understand pitch perception.

10. One theory of pitch perception proposes that different pitches activate different places on the cochlea's basilar membrane; this is the ___________________ theory. This theory has difficulty accounting for how we hear ___________________-pitched sounds, which do not have such localized effects.
11. A second theory proposes that the frequency of neural impulses, sent to the brain at the same frequency as sound waves, allows the perception of different pitches. This theory fails to account for the perception of ___________________-pitched sounds because individual neurons cannot fire faster than ___________________ times per second.
12. For the higher pitches, cells my alternate their firing to match the sound's frequency, according to the ___________________ principle.

OBJECTIVE 10: Describe how we pinpoint sounds, and contrast the two types of hearing loss.

13. We locate a sound by sensing differences in the ___________________ and ___________________ with which it reaches our ears.
14. A sound that comes from directly ahead will be ___________________ (easier/harder) to locate than a sound that comes from off to one side.
15. Problems in the mechanical conduction of sound waves through the outer or middle ear may cause

16. Damage to the cochlea's hair cell receptors or their associated auditory nerves can cause ___________________ hearing loss. It may be caused by disease, but more often it results from the biological changes linked with ___________________ and prolonged exposure to ear-splitting noise or music.

OBJECTIVE 11: Describe how cochlear Implants function, and explain why Deaf culture advocates object to these devices.

17. An electronic device that restores hearing among nerve-deafened people is a ___________________.
18. Advocates of ___________________ object to the use of these implants on ___________________ before they have learned to ___________________. The basis for their argument is that deafness is not a ___________________.
19. Sign language ___________________ (is/is not) a complete language, ___________________ (with/without) its own grammar, syntax, and semantics. People who lose one channel of sensation (such as hearing) ___________________, (seem to/do not seem to) compensate with a slight enhancement in their other sensory abilities.
20. (Close-Up) Deaf children raised in a household where sign language is used express higher ___________________ and feel more ___________________.

OTHER SENSES

OBJECTIVE 12: Describe the sense of touch, and distinguish between kinesthesia and the vestibular sense.

1. The sense of touch is a mixture of at least four senses: ___________________, ___________________, and ___________________. Other skin sensations, such as tickle, itch, hot, and wetness are ___________________ of the basic ones.
2. The ___________________ - ___________________ influence on touch is illustrated by the fact that a self-produced tickle produces less activation in the ___________________ of someone else's tickle. This influence is also seen in the ___________________ - ___________________ illusion.
3. The system for sensing the position and movement of body parts is called ___________________. The receptors for this sense are located in the ___________________, ___________________, ___________________, and ___________________, as well as in your skin.
4. The sense that monitors the position and movement of the head (and thus the body) is the ___________________. The receptors for this sense are located in the
OBJECTIVE 13: State the purpose of pain, and describe the biopsychosocial approach to pain.

5. People born without the ability to feel pain may be unaware of experiencing severe _______________.
   More numerous are those who live with _______________ pain in the form of persistent headaches and backaches, for example.
6. Pain is a property of our _______________ as well as our _______________ and _______________. Our surrounding _______________.
7. The pain system _______________ (is/is not) triggered by one specific type of physical energy. The body has specialized _______________ that detect hurtful stimuli.
8. Melzack and Wall have proposed a theory of pain called the _______________ theory, which proposes that there is a neurological _______________ in the _______________. It may be opened by activation of _______________ (small/large) nerve fibers and closed by the activation of _______________ (small/large) fibers or by information from the _______________.
9. Pain-producing brain activity may be triggered with our without _______________.
10. A sensation of pain in an amputated leg is referred to as _______________. Another example is _______________, experienced by people who have a ringing-in-the-ears sensation.

List some pain control techniques used in health care situations.

OBJECTIVE 14: Describe the senses of taste and smell, and comment on the nature of sensory interaction.

11. The basic taste sensations are _______________. _______________, _______________, and a meaty taste called _______________.
12. Taste, which is a _______________ sense, is enabled by the 200 or more _______________ on the top and sides of the tongue. Each contains a _______________ that catches food chemicals.
13. Taste receptors reproduce themselves every _______________. As we age, the number of taste buds _______________ (increases/decreases/remains unchanged) and our taste sensitivity _______________.

OBJECTIVE 15: Describe Gestalt psychology’s contribution to our understanding of perception, and identify principles of perceptual grouping in form perception.

1. According to the _______________ school of psychology, we tend to organize a cluster of sensations into a _______________, or form.
2. When we view a scene, we see the central object, or _______________, as distinct from surrounding stimuli, or the _______________.
3. Proximity, similarity, closure, continuity, and connectedness are examples of Gestalt rules of _______________.
4. The principle that we organize stimuli into smooth, continuous patterns is called _______________. The principle that we fill in gaps to create a complete, whole object is _______________. The grouping of items that are close to each other is the principle of _______________; the grouping of items that look alike is the principle of _______________. The tendency to perceive uniform or attached items as a single unit is the principle of _______________.

OBJECTIVE 16: Explain the binocular and monocular cues we use to perceive depth.

5. The ability to see objects in three dimensions despite their two-dimensional representations on our retinas is called _______________. It enables us to estimate _______________.
6. Gibson and Walk developed the _______________ to test depth perception in infants. They found that each species, by the time it is _______________, has the perceptual abilities it needs.
Summarize the results of Gibson and Walk’s studies of depth perception.

For questions 7-15, identify the depth perception cue that is defined.
7. Any cue that requires both eyes: ________________.
8. The greater the difference between the images received by the two eyes, the nearer the object: ________________  ________________. 3-D movies simulate this cue by photographing each scene with two cameras.
9. Any cue that requires either eye alone: ________________.
10. If two objects are presumed to be the same size, the one that casts a smaller retinal image is perceived as farther away: ________________  ________________.
11. An object partially covered by another is seen as farther away: ________________.
12. Objects lower in the visual field are seen as nearer: ________________.
13. As we move, objects at different distances appear to move at different rates: ________________  ________________.
14. Parallel lines appear to converge in the distance: ________________.
15. The dimmer of two objects seems farther away: ________________.

OBJECTIVE 17: State the basic assumption we make in our perceptions of motion, and explain how these perceptions can be deceiving.
16. Our brain normally computes motion based partially on the assumption that shrinking objects are ________________ (approaching/retreating) and enlarging objects are ________________ (approaching/retreating). Sometimes we are fooled because larger objects seem to move ________________ (faster/more slowly) than smaller objects.
17. The brain interprets a rapid series of slightly varying images as _________________. This phenomenon is called ________________.
18. The illusion of movement that results when two adjacent stationary spots of light blink on and off in quick succession is called the ________________ ________________.

OBJECTIVE 18: Explain how perceptual constancies help us to organize our sensations into meaningful patterns.
19. Our tendency to see objects as unchanging while the stimuli from them change in size, shape, and lightness is called ________________  ________________.
20. Due to shape and size constancy, familiar objects ________________ (do/do not) appear to change shape or size despite changes in our ________________ images of them.
21. Several illusions, including the ________________ and ________________ illusions, are explained by the interplay between perceived ________________ and perceived _________________. When distance cues are removed, these illusions are ________________ (diminished/strengthened).
22. The brain computes an object’s brightness ________________ (relative to/independent of) surrounding objects.
23. The amount of light an object reflects relative to its surroundings is called ________________.
24. The experience of color depends on the surrounding ________________ in which an object is seen. In an unvarying context, a familiar object is seen. In an unvarying context, a familiar object will be perceived as having consistent color, even as the light changes. This phenomenon is called ________________.
25. We see color as a result of our brains’ computations of light ________________ by any object relative to its ________________  ________________.

PERCEPTUAL INTERPRETATION
OBJECTIVE 19: Describe the contributions of restored vision, sensory deprivation, and perceptual adaptation research to our understanding of the nature-nurture interplay in our perceptions.
1. The idea that knowledge comes from inborn ways of organizing sensory experiences was proposed by the philosopher ________________.
2. On the other side were philosophers who maintained that we learn to perceive the world by experiencing it. One philosopher of this school was ________________.
3. Studies of cases in which vision has been restored to a person who was blind from birth show that, upon seeing tactilely familiar objects for the first time, the person ________________ (can/cannot) recognize them.
4. Studies of sensory restriction demonstrate that visual experiences during ________________ are crucial for perceptual development. Such experiences suggest that there is a ________________ ________________ for normal sensory and perceptual development.
5. Humans given glasses that shift or invert the visual field ________________ (will/will not) adapt to the distorted
perception. This is called _________________
_________________.

6. Animals such as chicks _________________ (adapt/do not adapt) to distorting lenses.

OBJECTIVE 20: Define perceptual set, and explain why the same stimulus can evoke different perceptions in different contexts.

7. A mental predisposition that influences perception is called a _________________ _________________.

8. How a stimulus is perceived depends on the concepts, or _________________ _________________, we form and the _________________ in which the stimulus is experienced.

9. The context of a stimulus creates a _________________ (top-down/bottom-up) expectation that influences our perception as we match our _________________ (top-down/bottom-up) signal against it.

10. Our perception is also influenced by _________________ about gender and the _________________ context of our experiences.

11. To best understand perception, we need multiple levels of analysis because perception is a _________________ phenomenon.

IS THERE EXTRASENSORY PERCEPTION?

OBJECTIVE 21: Identify the three most testable forms of ESP, and explain why most research psychologists remain skeptical of ESP claims.

1. Perception outside the range of normal sensation is called _________________ _________________.

2. Psychologists who study ESP are called _________________.

3. The form of ESP in which people claim to be capable of reading others’ minds is called _________________.

   A person who “senses” that a friend is in danger might claim to have the ESP ability of _________________.

   An ability to “see” into the future is called _________________.

   A person who claims to be able to levitate and move objects is claiming the power of _________________.

4. Analyses of psychic visions and premonitions reveal _________________ (high/chance-level) accuracy.

   Nevertheless, some people continue to believe in their accuracy because vague predictions often are later _________________ to match events that have already occurred. In addition, people are more likely to recall or _________________ dreams that seem to have come true.

5. Critics point out that a major difficulty for parapsychology is that ESP phenomena are not consistently _________________.

6. Researchers who tried to reduce external distractions between a “sender” and a “receiver” in an ESP experiment reported performance levels that _________________ (beat/did not beat) chance levels.

Follow-up studies _________________ (failed to replicate the results/found equally high levels of performance).