

The Five Senses

SP-HO1-121907

Sense The ability to detect stimuli	Receptors Specialized cells that allow us to experience this sense	Objective Stimulus Energy or chemicals that cause these receptors to fire	Subjective Experience What we experience when these receptors fire	Subjective - Objective Relationship How our subjective sensory experience (i.e., our inner, mental world) is influenced by the objective range of the energy or chemicals (i.e., the outer world) that cause our receptors to fire
Vision	Rods and cones in the retina	Electromagnetic energy (EME) between 400 and 700 nm	Light	Hue (i.e., color) is determined by the wavelength of EME that causes our cones to fire. Brightness is determined by the amplitude of the EME that causes our rods or cones to fire. Saturation is determined by the complexity (i.e., wavelength mixture) of the EME that causes our cones to fire.
Hearing	Hair cells in the basilar membrane	Molecules that vibrate between 20-20,000 cps	Sounds	Pitch is determined by the length of the wave of vibrating molecules in the air (produced by the source of the sound) that causes our hair cells to fire. Loudness is determined by the amplitude of the wave of vibrating molecules in the air (produced by the source of the sound) that causes our hair cells to fire. Timbre is determined by the complexity of the wave of vibrating molecules in the air (produced by the source of the sound) that causes our hair cells to fire.
Taste	Taste buds on the tongue	Molecules of substances dissolved in saliva	Tastes	Sweet is sensed when our sweet-sensitive taste buds (TBs), which are concentrated on the tip of the tongue, come into contact with a naturally occurring sugar (e.g., sucrose) or an artificial sweetener. Salty is sensed when our salty-sensitive TBs (concentrated on the front sides of the tongue) come into contact with a salt (e.g., sodium chloride). Sour is sensed when our sour-sensitive TBs (concentrated on the back sides of the tongue) come into contact with an acid. Bitter is sensed when our bitter-sensitive TBs (concentrated on the base of the tongue) come into contact with an alkaline chemical. Hot or Spicy is sensed when the nociceptors (i.e., pain receptors) in our mouth come into contact with a chemical that irritates them (e.g., the oil from a hot chili pepper).
Smell	Olfactory cells in the walls (the olfactory epithelium or OE) of the passageway between the nose the throat	Molecules of substances diffused in the air	Smells	Floral is produced when molecules from flowering plants (e.g., roses) came into contact with cells in the OE. Minty is produced when molecules from spearmint oil come into contact with cells in the OE. Ethereal is produced when molecules from ether of ether-like substances (e.g., dry cleaning fluid) come into contact with cells in the OE. Camphoraceous is produced when molecules from substances such as camphor or mothballs come into contact with cells in the OE. Musky is produced when molecules from musky-smelling substances (e.g., musk perfume) come into contact with cells in the OE. Pungent is produced when molecules from acids (e.g., vinegar) come into contact with cells in the OE. Putrid is produced when molecules from spoiled or decaying substances (e.g., rotten eggs) come into contact with cells in the OE.
Touch	Mechanoreceptors in the skin which respond to skin deformation Thermoreceptors in the skin which respond to changes in temperature Nociceptors in the skin which respond to painful stimuli	Skin indentation, vibrations, and hair movements; changes in temperature; mechanical or thermal stimuli that begin near levels which can produce tissue damage	Pressure Temperature Pain	Pressure is produced when the mechanoreceptors are subjected to compression when either an object is placed on or pressed against the skin or the skin is pressed against an object. Temperature (warmth and cold) is produced when thermoreceptors come into contact with substances that are either above or below approximately 72 degrees Fahrenheit. Pain is produced when the nociceptors are stimulated as a result of tissue damage or when the mechanoreceptors or thermoreceptors are overstimulated.