

# HUMAN PERCEPTIONS

## MAKING ORDER OUT OF CHAOS

### SOME KEY TERMS:

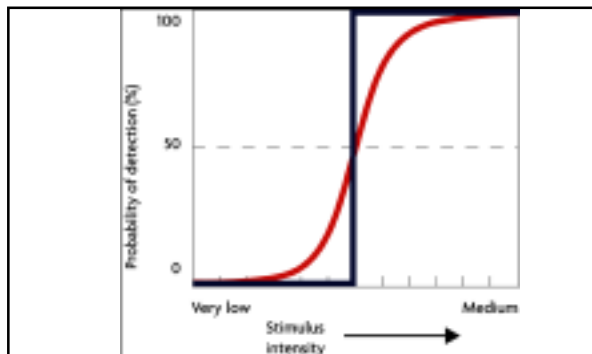
- Sensation
- Perception
- Absolute threshold
- Just noticeable difference
- Difference Threshold
- Weber's Constant
- Fechner's Law
- Signal Detection Theory
- Physics of waves: pitch, hue, etc.
- Sensory adaptation
  - Sensitization
  - Desensitization
- Afterimage (p. 169)
- Primary colors: cannot be created by mixing other colors (Red, Blue, Yellow)

### More Terms

- Colors, as LIGHT = ROYGBIV
- Additive vs. Subtractive
- Top down Processing
- Bottom up Processing
- Phi phenomenon
- Monocular
- Binocular
- All the cues on p. 180
- Hearing, Taste, Smell
- 6th & 7th sensations???

◆ TABLE 6.1 Absolute Thresholds

SENSORY MODALITY	ABSOLUTE THRESHOLD
Vision	Candle flame seen at 30 miles on a clear, dark night
Hearing	Tick of a watch under quiet conditions at 20 feet
Taste	1 teaspoon of sugar in 2 gallons of water
Smell	1 drop of perfume diffused into a three-room apartment
Touch	A bee's wing falling on your cheek from 1 centimeter above



There really isn't an ABSOLUTE threshold, or vision would go from 0% to 100% as shown by the black line. Rather, it is the level at which "there is a 50% probability of detection".

### Just Noticeable Difference and Weber's Constant

- \* \*
- \* \*
- \* \*
- \* \*
- \* \*

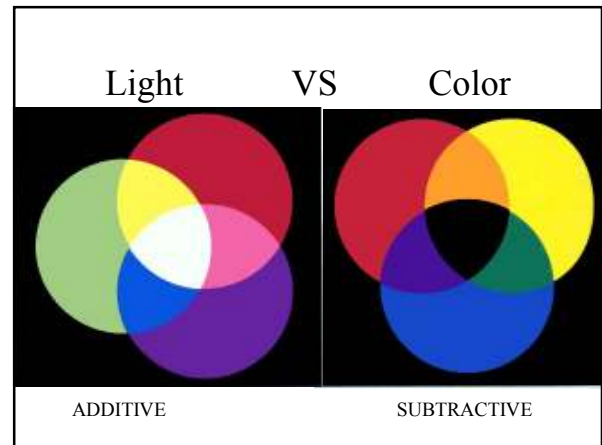
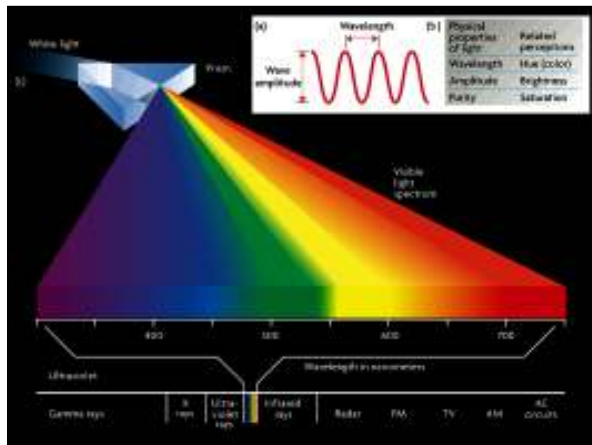
Signal Detection Theory. Which one is best if a weak signal is present or absent?

		Actual stimulus condition	
		Present	Absent
Subject's response	"Present"	Hit	False alarm
	"Absent"	Miss	Correct rejection

The Mind wants the world to make sense

• Vision:

- Light
- Color
- Perception



Theories

- Trichromatic: 3 types of cones
  - Red
  - Blue
  - Green
- Opponent Process: 3 types of cones
  - Red/Green
  - Blue/Yellow
  - Light intensity

PROBLEMS:

- Color blindness helps prove the "Opponent Process Theory" (really dichromats):
  - Red/Green (weak in both or 1)
  - Blue/Yellow (weak in both or 1)
- Weak GR is most common
- Weak RD is 2nd
- Weak BL is RARE



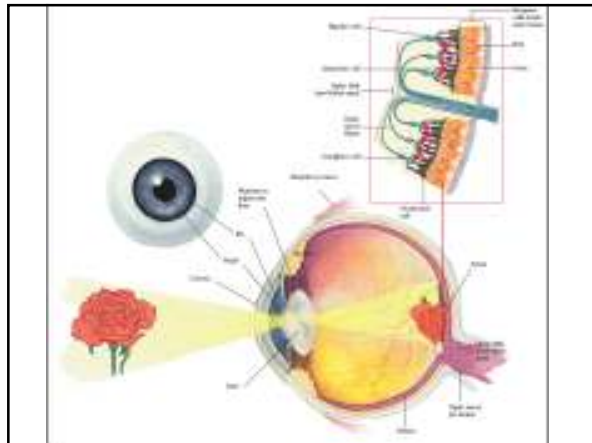
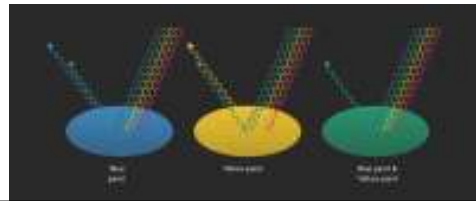
### 3 values of Light

- Wavelength and **hue**
- Purity and **saturation**
- Amplitude and **brightness**
  - Amplitude is measured in candelas per meter square (cd/m<sup>2</sup>)

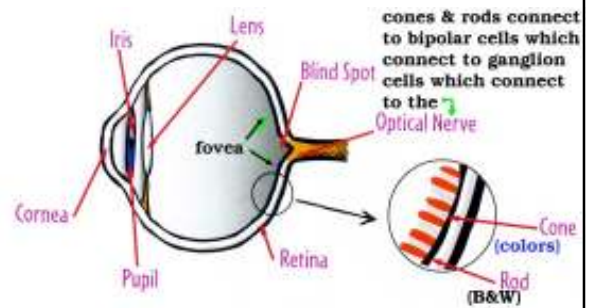
The word HUE above is VIOLET, I then increased its saturation, And its brightness

### Light

- Speed of light - 186,000 miles/sec
- Light tends to travel in straight lines
- Light is very abundant
  - Interacts w/ surface molecules of objects - reflects & absorbing



### Physical Structures



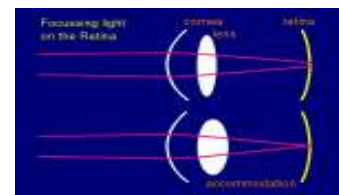
### STRUCTURE OF THE EYE

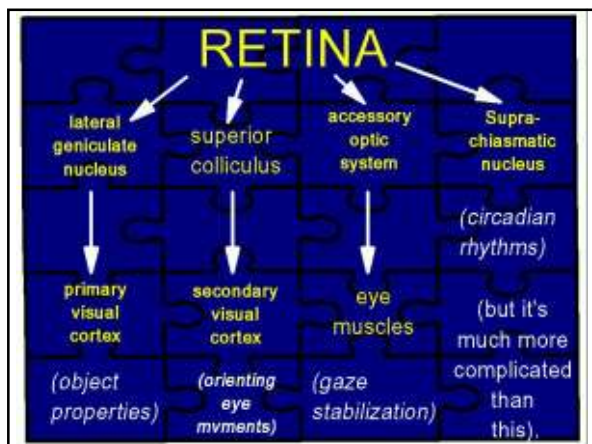
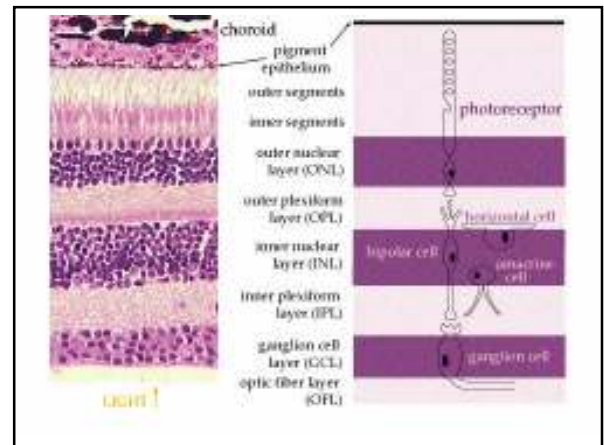
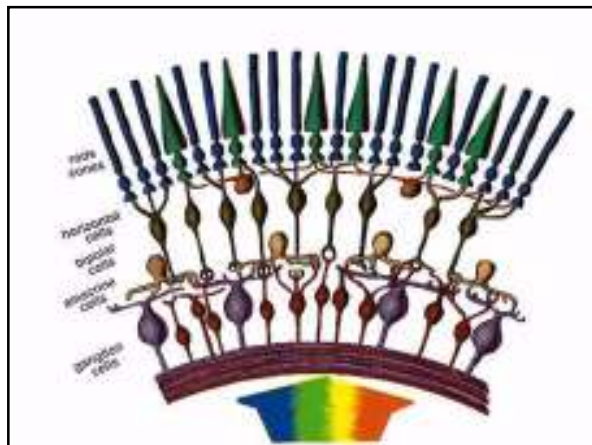
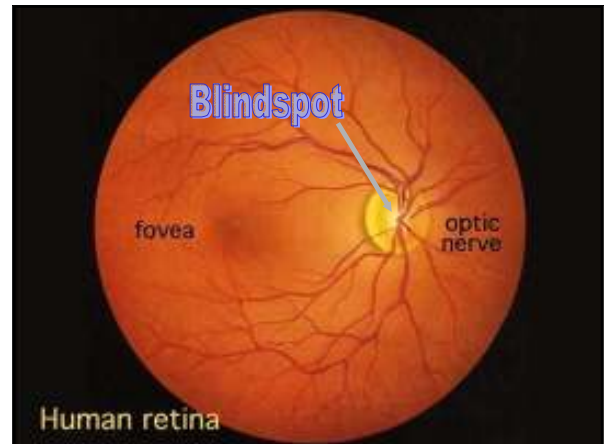
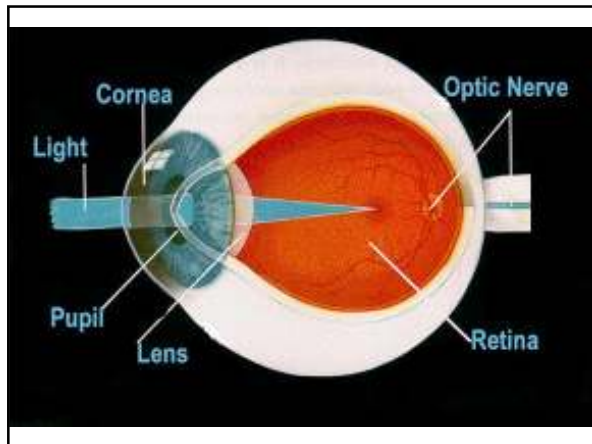
- Sclera
- Iris
- Pupil
  - Affected by autonomic nervous system



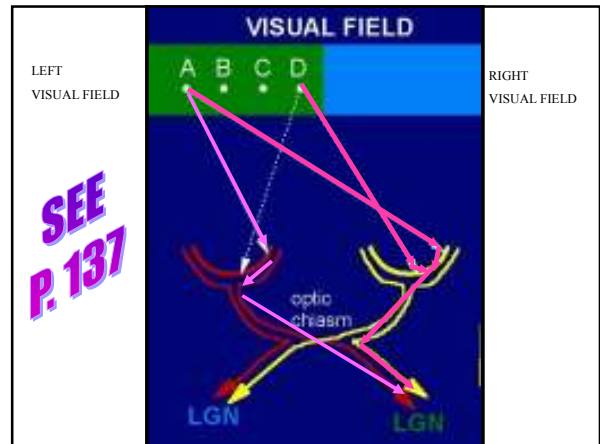
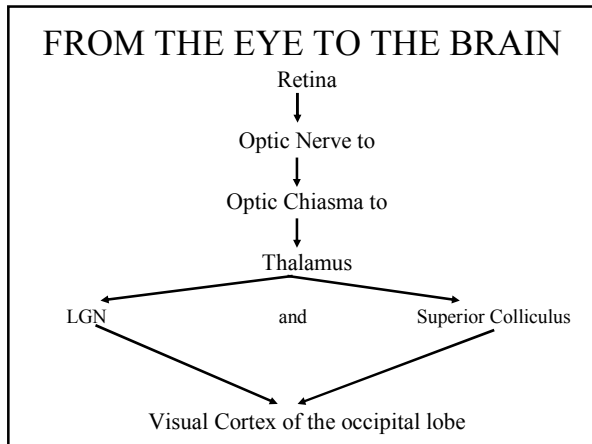
### Internal Structure of the Eye

- **Lens - final bending of light**
  - Accommodation- allows focus
    - Cataract
      - Reduced transparency
  - Ciliary muscles





- ### Other stuff in the Eye
- **Aqueous humor- fluid behind cornea in front of lens**
    - Functions similar to blood
      - Glaucoma- gunky aqueous humor
    - **Vitreous humor - behind lens**
      - floaters



### The Visual Pathway

- **Something on the left hand side is in the left visual field but processed by the right hand side of the retina, and is then processed in the right side of the brain**

### Lateral Geniculate Nucleus- LGN

- 80% come here
- Part of thalamus
- X cells and Y cells
- Shape perception
- Foveal information
- Color perception

### Organization of Sensations

- From the Primary Visual Cortex (feature detectors) p 144
- To the Secondary Visual Cortex (p. 139)
- Then on two separate paths:
  - Magnocellular (“where”)
  - Parvocellular (“what”, esp. face recognition)
- On to the parietal/temporal and then the frontal lobes

**But, there it can get confused**

Say the color of the words:

**RED, BLACK, BLUE,**  
**GREEN, ORANGE,**  
**YELLOW, PINK,**  
**SILVER, RED, BLUE,**  
**YELLOW, ORANGE,**  
**PURPLE, GREEN,**  
**BLUE, PINK, BLUE**

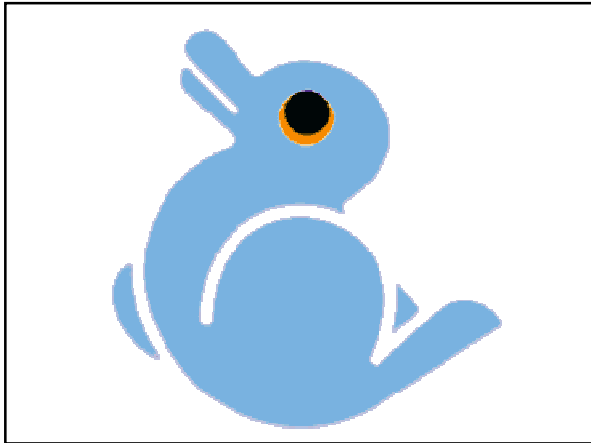
Again--the color

**VIRIDIS FULVUS CROCEUS**  
**RUBER FUCUS PUNICEUS**  
**CAERULEUS VIRIDUS FRIX**  
**FLAVUS SPADIX DORIZ**

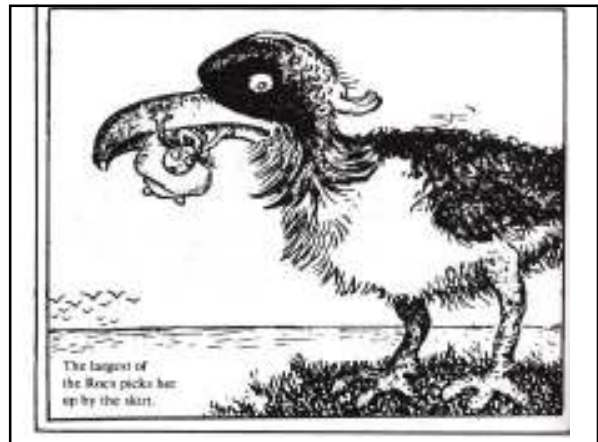
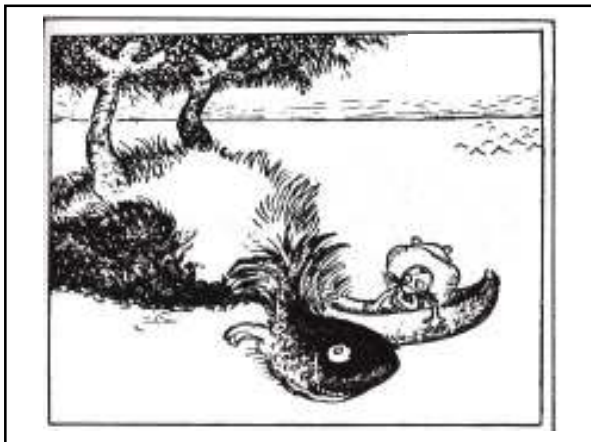
2 types of processing



1. Bottom-up processing



Which do you like more?  
Women or saxophone players?



The largest of  
the Roost picks her  
up by the skirt.