Prostrations

Respectful greetings

Namo Buddhaya

Enlightened persons

Namo Dharmaya

Way, path, method

Namo Sanghaya

Pure hearts

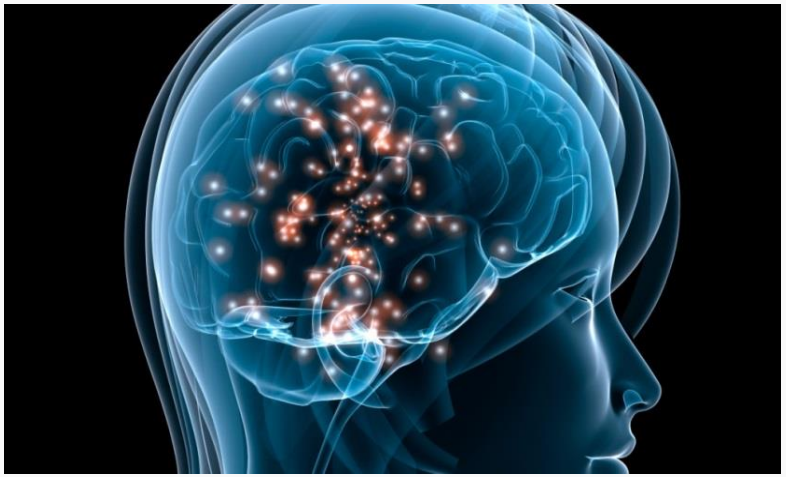
Dedication of Intent (Gatha)

The unsurpassed, profound and intricate dharma is difficult to encounter, even over hundreds and thousands of kalpas.
Now that I have seen and heard the dharma.
I behold and uphold what the dharma offers.
I wish to understand the true meaning of "Tathagata"

PERCEPTION OF REALITY

The objective:

- **Explore the mystery of life**
- **Understand the 5 aggregates processing**
- **Awareness of the human imperfect perception**



How does perception work?

Mechanics of nervous system

Biology ➡ Chemistry ➡ Physics

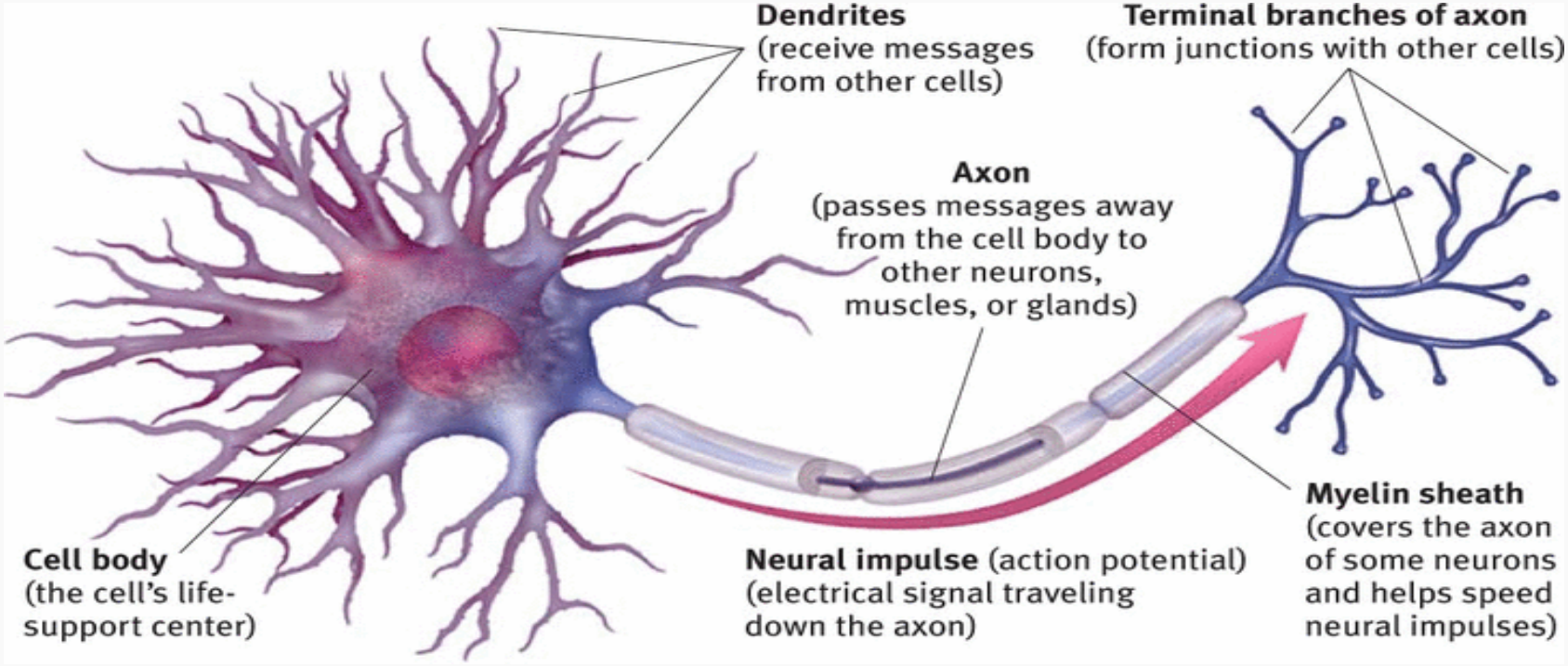
Microscopic dimensions:

Neurochemistry

Electrochemistry

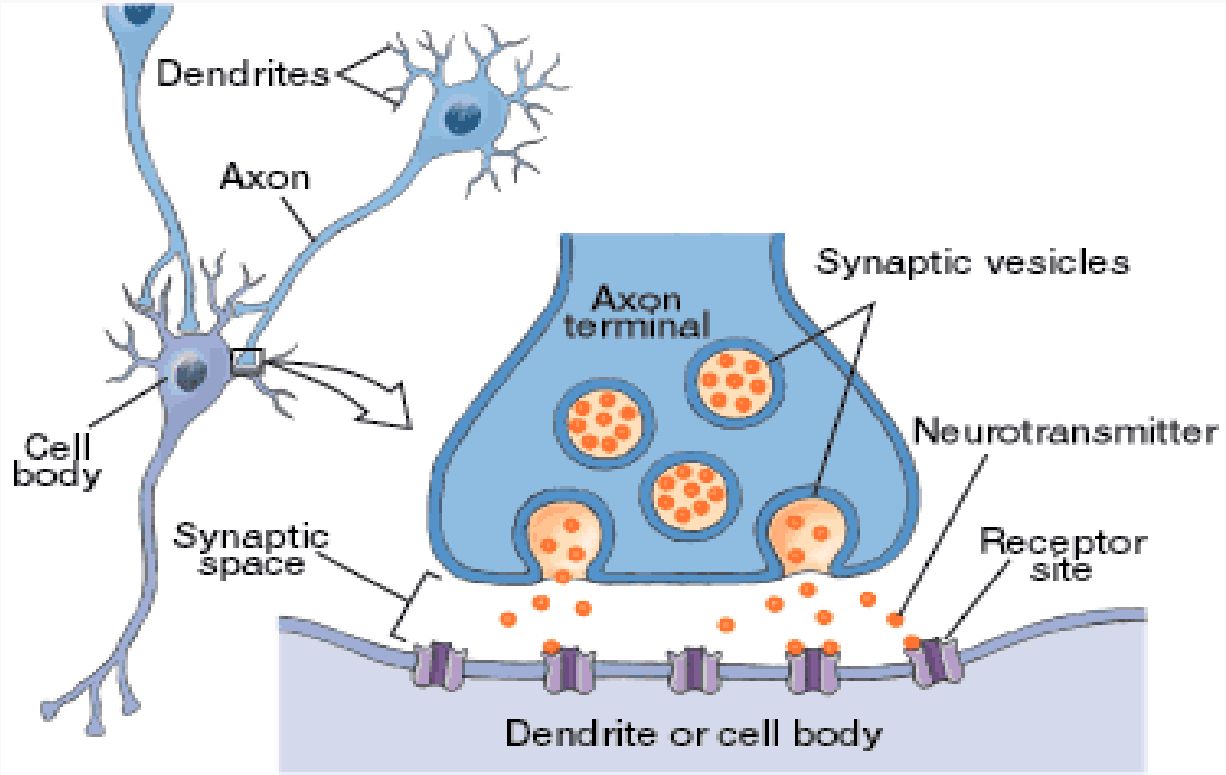
Neurons and Synapses

- **The basic computational unit in the nervous system is the nerve cell (a neuron):**
- **A neuron has: dendrites (input zone), cell body and axon(output zone)**



Neurons and Synapses

- **A synapse is the site of functional contact between two neurons which an electric impulse is transmitted from one neuron to another.**

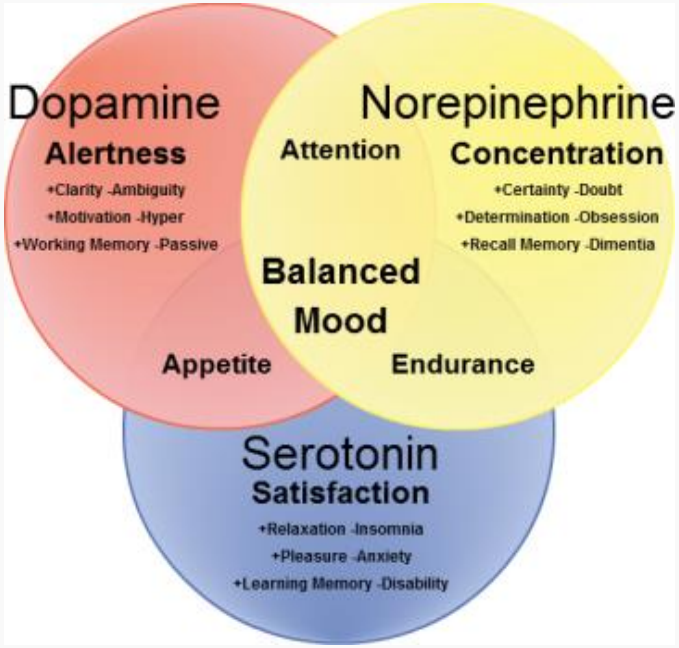


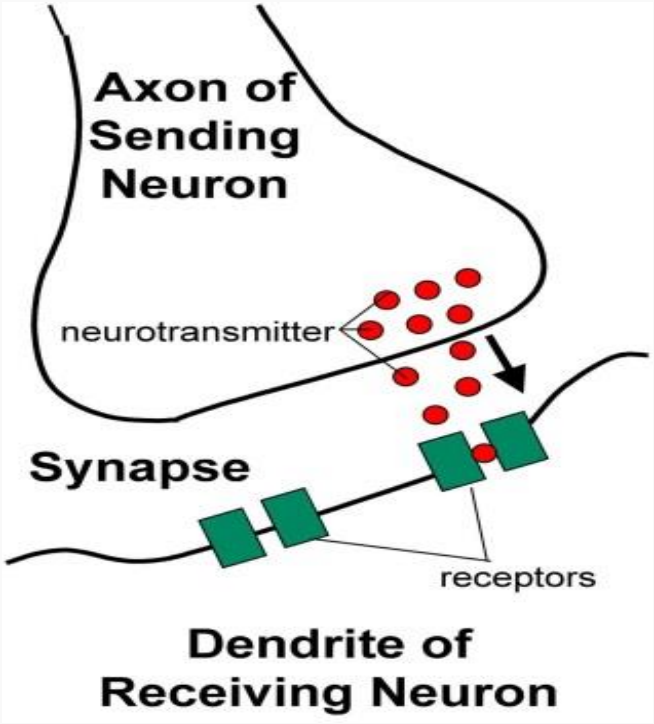
https://socratic.org/questions/what-is-the-differeence-between-synapse-and-synaptic-cleft

Neurotransmitters

- **Neurotransmitters are the chemicals which allow the transmission of signals from one neuron to the next across synapses.**
- **They are also found at the axon endings of motor neurons,**

http://webspace.ship.edu/cgboer/genpsyneurotransmitters.html



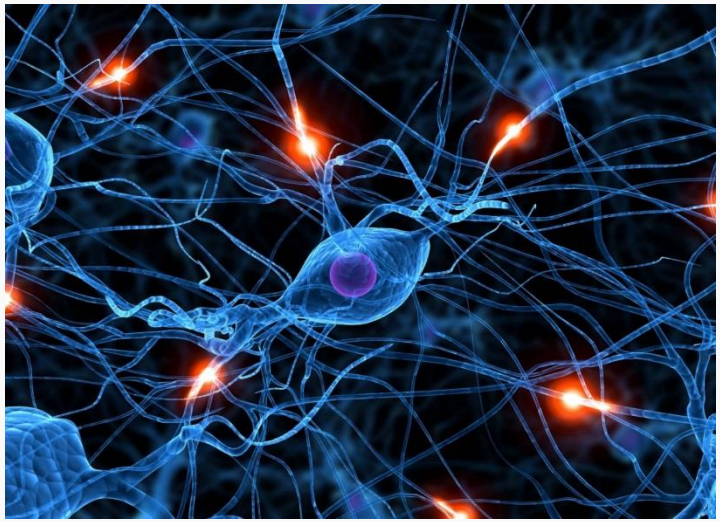


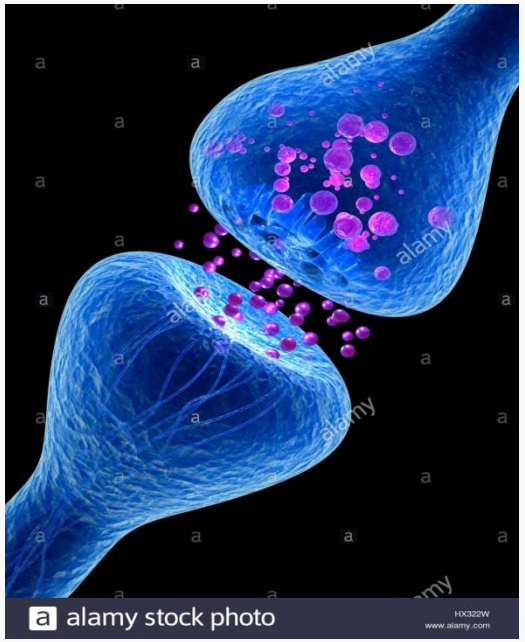
Neurotransmitters

- **Dopamine**: arousal, mood and emotion (reward and pleasure); physical movement
- **Serotonin**: “feel good” chemical
- **Norepinephrine**: alertness and energy
- **Endorphin**: pain perception and relief
- **GABA**: main inhibitory neurotransmitter (motor control; vision)
- **Glutamate**: main excitatory neurotransmitter (learning and memory)

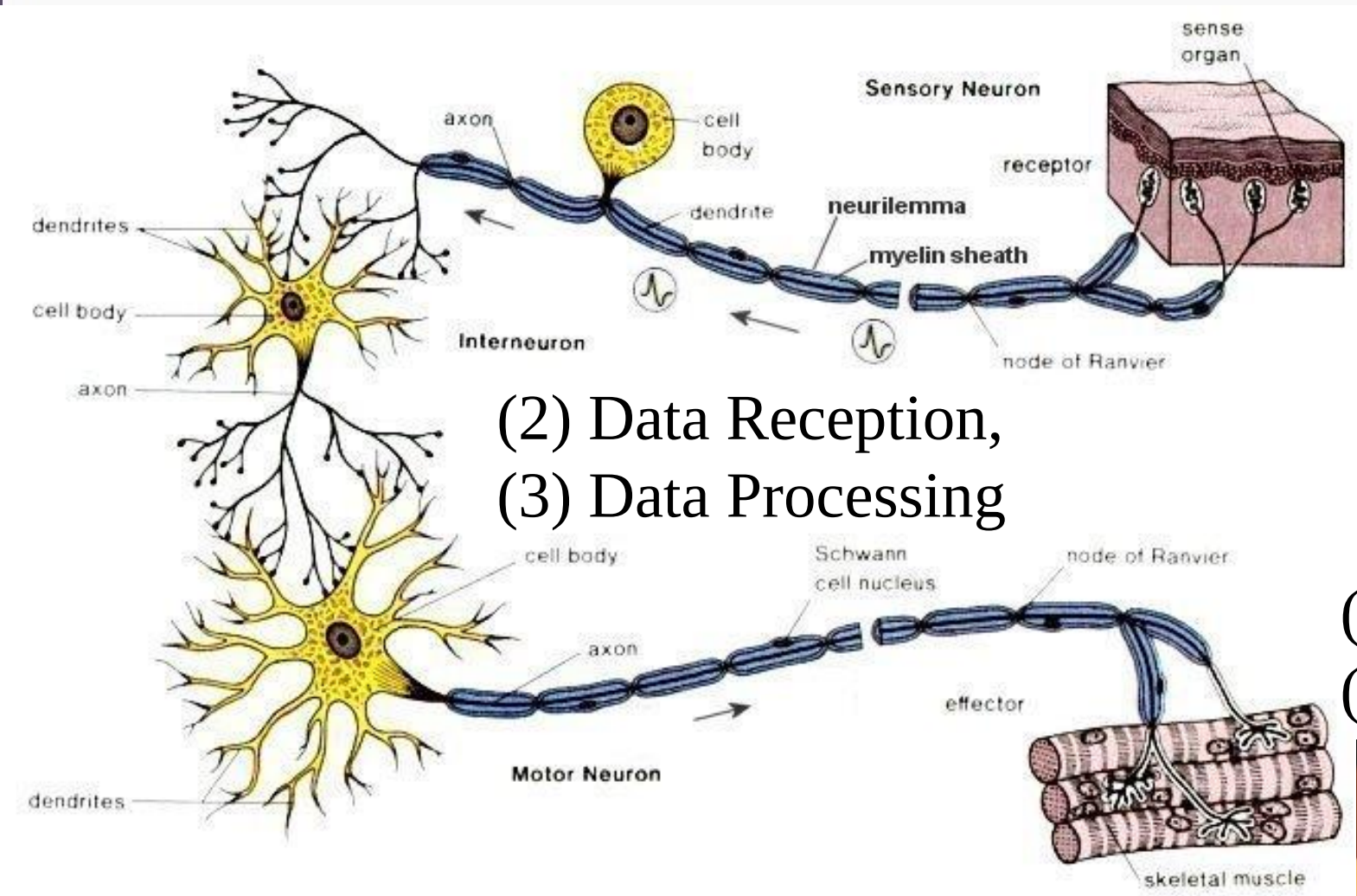
Neuron Firing (electrochemistry)

An action potential is part of the process that occurs during the **firing** of a **neuron**. During the action potential, part of the neural membrane opens to allow positively charged ions inside the cell and negatively charged ions out.





Each of the Six Senses Undergo



(1) Data Entry

(2) Data Reception,

(3) Data Processing

(4) Action

(5) Memory

5 aggregates processing is a brain function

1) Data entry (hardware/ sensory faculties) - information is received by sensory faculty. (sensory nerve receptor) – nerve receptor from inner ear converts the mechanical wave to nerve impulse, which is transmitted to auditory cortex

i.e.: a sound wave comes into the outer ear, eardrum, middle ear and inner ear.

2) Data reception auditory cortex has a threshold filter mechanism, which either filter out the impulse as noise or receive the impulse as signal.

3) Data processing (mental process) - information is perceived and recognized.

i.e.: hearing is identified. (music)

4) Action (emotional/ volitional response) - action and reaction are carried out.

i.e.: this music sounds pleasant. I like it.

5) Memory (Database) – experience (processed information) is stored.

i.e.: this pleasant experience (sound of the music) is stored in the memory.

Flowchart of 5 aggregates

(1) data entry (2)data reception (3)data processing (4)action (5) memory

Stimuli

Non-fragment information
Electromagnetic spectrum
Wholeness/oneness

6 Sense organs

eye
ear
mouth
nose
body
mind

6 senses

Sight
Sound
Taste
Smell
Touch
thought

perception

7th sense ego

8th sense

Seeing
Hearing
Tasting
Smelling
Touching
thinking

Un-enlighten beings – perceive stimuli without correct knowledge and without awareness

Distorted perception

PERCEPTION OF REALITY

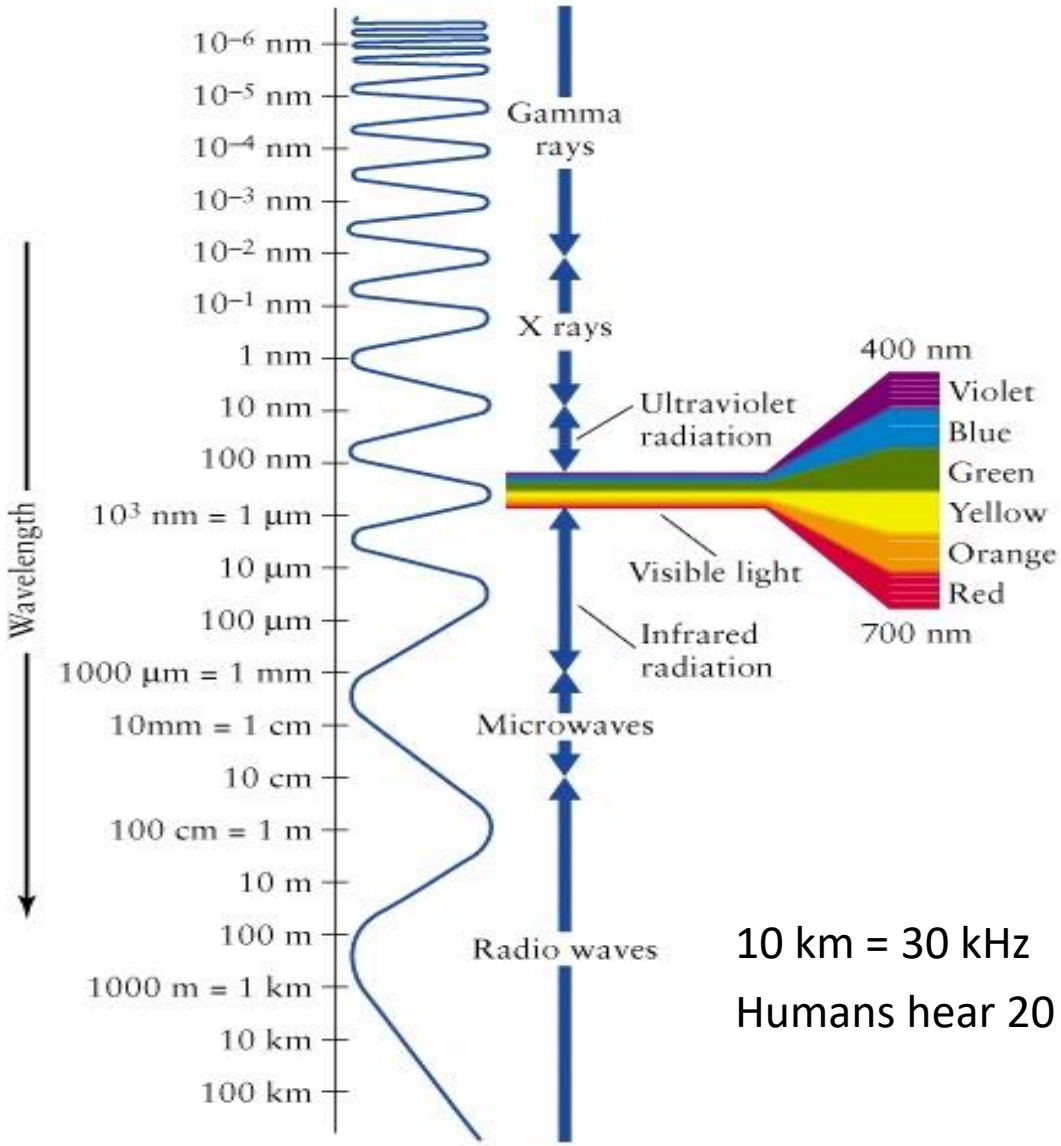
5 aggregates processing

How the mind works

Mechanism of EGO formation

Limitations of the 6 Senses

Limitations of the 6 Senses



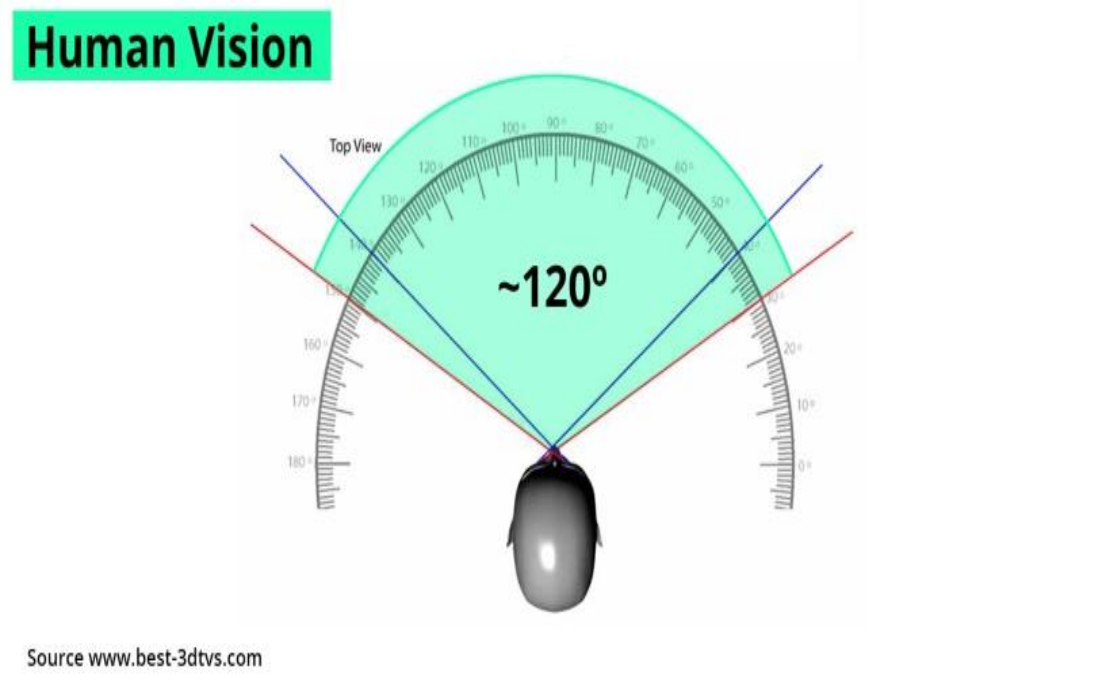
- The narrow spectrum of perceptions

10 km = 30 kHz

Humans hear 20 Hz to 20 kHz

Vision limitation

- Field of view
- Blind spot
- Narrow spectrum (visible wavelength)
- Color blind



Hearing limitation

- **Hearing range 20 – 20,000 Hz (decrease with age)**
- **Absolute threshold of hearing.**

Absolute Threshold of Hearing

Your absolute threshold of hearing is the quietest sound your ears are capable of picking up when there are no other sounds around to mask its perception. This threshold varies from person to person, changes with age, and is largely dependent on the frequency of the noise being perceived. It's also quieter than you might think.

https://io9.gizmodo.com/5926643/10-fundamental-limits-to-human-perception----and-how-they-shape-your-world

Taste and smell limitation

- As we get older, taste buds don’t get replaced.
- Sense of taste and smell work closely together. They help us to sense the most. If sense of smell is lost, sense of taste dramatically diminishes.

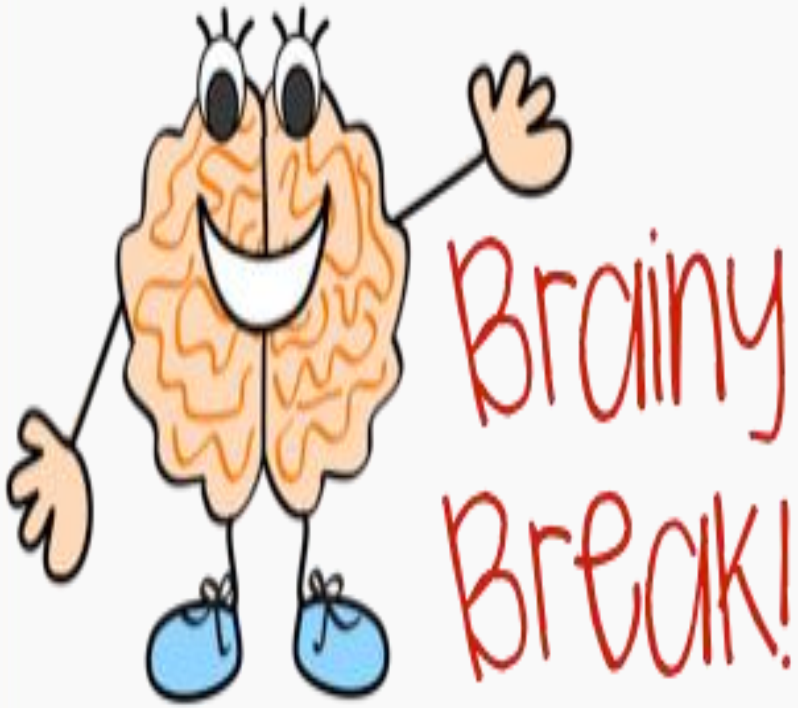
Touch limitation

- Different parts of body have different sensory.
- Temperature sensors are most found on the back.
- Touch sensors are most found on fingers and face (lip).

Perception of Limited Reality

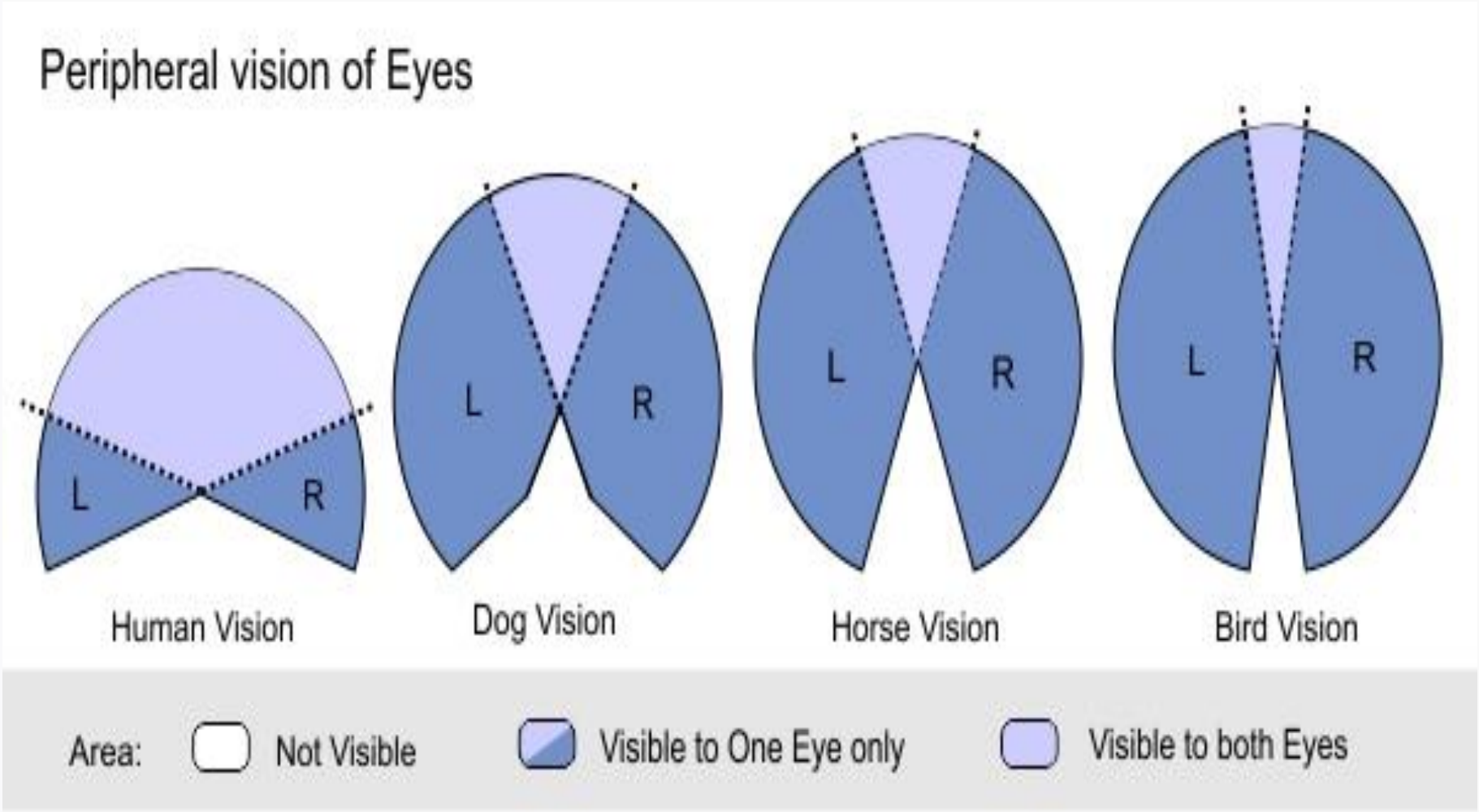
- Limited perception is coupled with survival instincts.
- Human ancestors used eyes and ears for hunting.
- Today, these senses are diminished due to noise levels, and short view of sight (people stay inside mostly).
- Survival contributes a small factor to our limitation.

Bio-break, Discussions



- **The inferior spectrum of perceptions**

Compare Vision

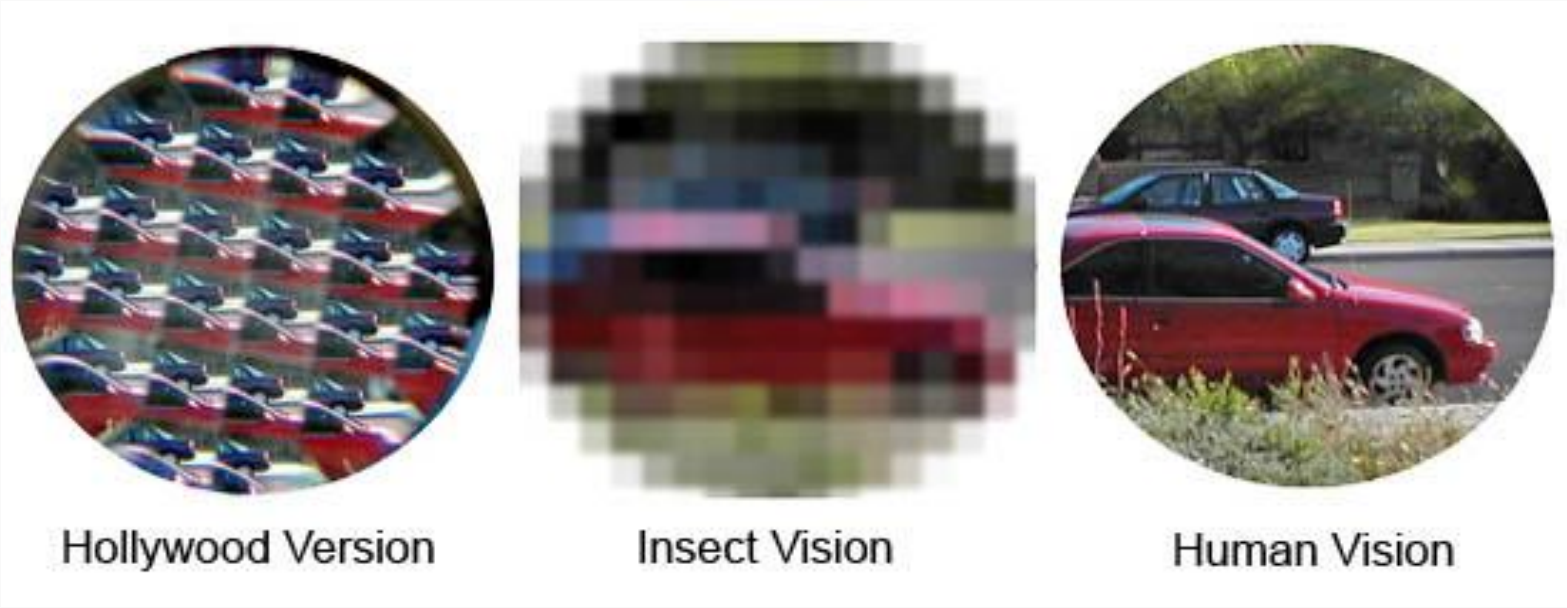


Compare Vision

- Bees and many insects use **ultraviolet light** to home in on flowers.
- Among the ~900,000 animal species on earth, half are nocturnal (active at night), and have extremely sensitive eyes. Many use **infrared** surveillance.
- Snakes use **infrared** to detect the presence of warm-blooded animals.
- Goldfish can see the **infrared** beams that control our TV & videos.
- Owls night vision 50-100X greater than human (sensitivity to low light intensities).
- Hawk can spot a mouse from 1.5km high.

Insect See The World Very Differently

- Insects are legally blind, cannot see details, poor resolution, 100 times worse than humans.
- Insects DO NOT see a kaleidoscope of multiple images but just like computer screen pixels



Perception of Reality

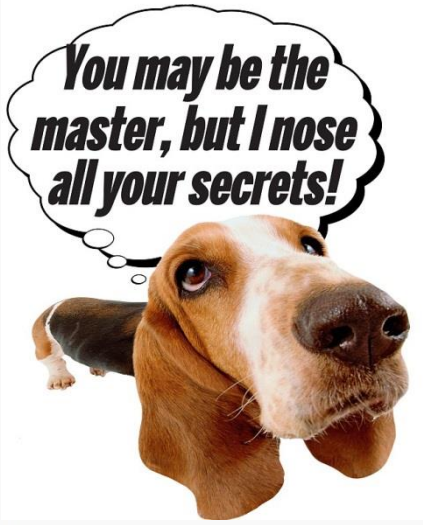
Seeing is believing? But different beings see the world differently

sound ***frequencies audible*** to

	20 Hz to 20,000 Hz
ear mobility hear sounds at 4X the distance	40 Hz to 60,000 Hz
Sonar, radar (bottlenose dolphins; hump back whales)	0.25 to 150,000 Hz
bats use echoes high frequency sound sonar	14,000 to >100,000 Hz

Sense of Smell Human Versus Dog

Bloodhound



A **dog** navigates the world with his **nose**. Like **humans** do with their **eyes**.

A dog's nose is **1000 -10,000** times **more powerful** than a human's nose.

You smell spaghetti sauce. Your dog smells each ingredient.

Dogs can find by smell:

- missing people
- explosives
- drugs
- bedbugs
- cancer
- low blood sugar

On walks let your dog explore his world.

Let him use his NOSE!

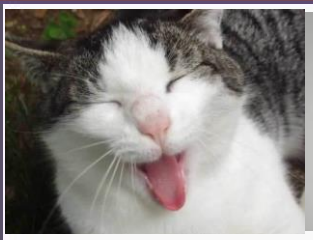
www.YaletownDogTraining.com

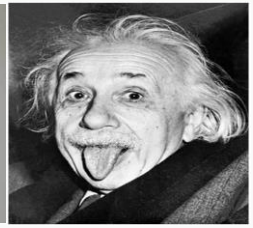
# of scent receptors

Human has 5 millions

Bloodhound has 300 millions

Different Species Perceive Tastes Differently







taste buds:

- Chicken 30
- Cat 473 (do not perceive sweet)
- Dog 1,706
- Human 10,000
- Pig/goat 15,000
- Cow 25,000
- Catfish 175,000
- Insects have the most highly developed sense of taste. They have taste organs on their feet, antennae, and mouthparts.
- Fish can taste with their fins and tail as well as their mouth.

Which animals have the best sense of touch?

- The catfish – best earthquake detector (days in advance)
- The jewel beetle – best fire detector (over 50 miles)
- The star nosed mole – most sensitive nose, which is used for feeling not smelling (6x more touch receptors than human)
- The seal – best whiskers (tracks fish swimming 180 m away)
- The spider – good vibrations (male spider vibrates in special manner to alert his mate that he is about to approach)

http://largestfastestsmartest.co.uk/animals-with-the-best-sense-of-touch-in-the-world/

Baboons can learn to recognize words

- **Baboon identifies words with an average of 75% Accuracy.**
- Four-letter words, like "**bite**" and "**kite**"
- non-words, like "**stod**."
- Press oval to identify a word
- Press a cross (**+**)for a non-word
- Learn correctly get a treat
- Baboons were truly learning and not just memorizing the word.

12Apr2012 Science, Jonathan Grainger
National Center for Scientific Research
and Université d'Aix-Marseille, France

Animal perception versus human perception

- Baboon is an animal and has no language, but it can learn and identify human language.
- It uses its senses to perceive reality as is without interpretations.
- However, human links the word with an object and we interpret the word.
- Ego interferes with human‘s interpretation.
- Human thinks we have a language. Therefore we are superior.
- We cannot do the test better than the baboon.

Kite

Human and other species' perception

- Human perceives small part of the spectrum (visible wavelength)
- Other species perceive other parts of the spectrum (snake: infrared; butterfly: ultraviolet).
- Each life form does not have all faculties to perceive the whole spectrum (reality).
- If we put all life forms together, we will have a whole perception of reality. Therefore, we are no longer fragmented.
- We are all interconnected.

Key message:

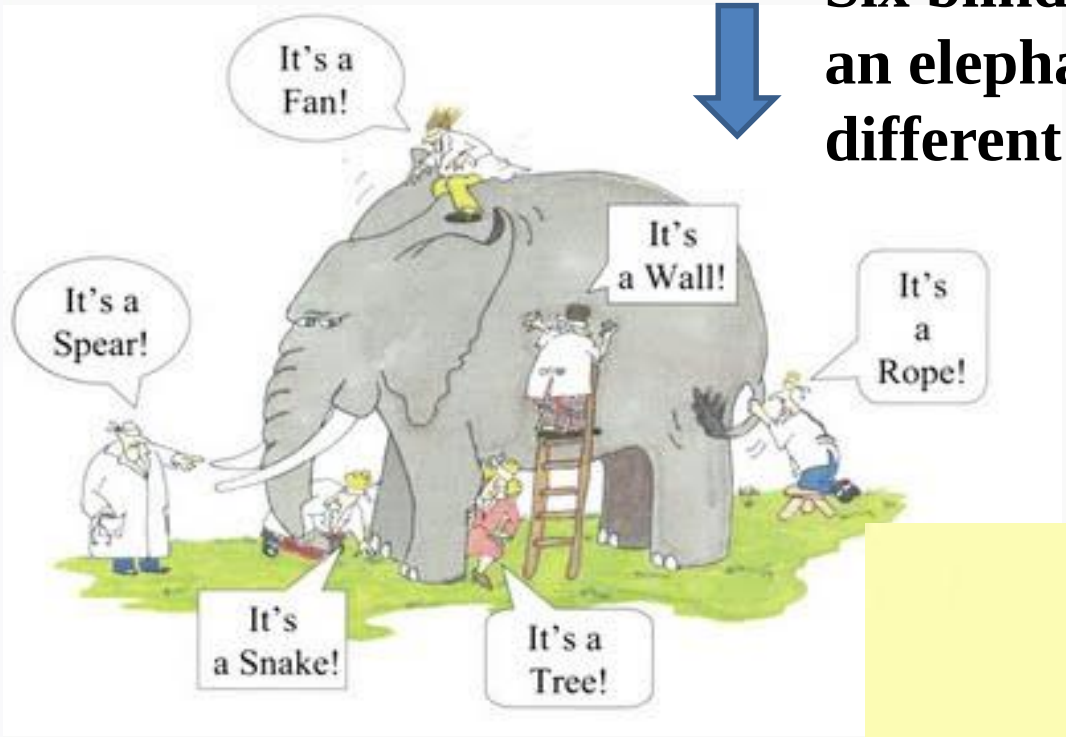
Be aware of our ignorance, limitation, thinking boxes, 5 aggregates process ⟹ have true happiness – loving kindness – equanimity – appreciative joy – Enlightenment

Faculty of imagining

- **Imagination** is a creative faculty of the mind, an ability to form images, ideas, and sensations in the mind without any immediate input of the senses.
- imagination is a world where thought and images are nested in the mind to "form a mental concept of what is not actually present to the senses."
- Human has the most developed imagining faculty; "manifestation of thoughts"
- Imagination is lacking in some lower animals.
- **It is human interpretation. (Ego)**

https://en.wikipedia.org/wiki/Imagination
http://csmt.uchicago.edu/glossary2004/imagination.htm

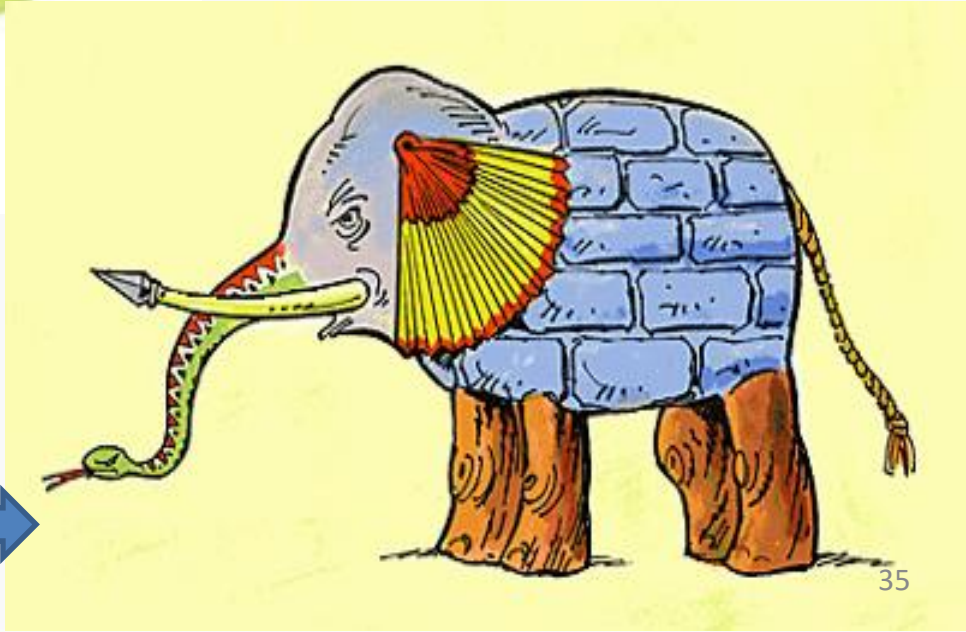
Six Blind Men and the Elephant



Six blind men, who have not known an elephant, were asked to touch different part of the elephant.

Which elephant is real?

All the answers were put together. Result



Metaphor of the elephant

Answers:

- They are both real. The top elephant is real as the whole view (un-fragmental view).
- The bottom elephant is also real at different dimensions (fragmental view). Each man perceives his reality at that specific dimension.

Blind men's limitation:

- Limited view (blind)
- All touch the **same reality** (elephant), but it is only a **partial reality**. (limited information/different dimensions).
- Each man interprets the partial reality as the whole reality. Therefore, their perception is fragmented and distorted.
- They ignore other partial reality. Duality view causes suffering.
- **Reality cannot change**; only the perception changes.
- At this dimension, this condition, and this mind set, one can only perceive a fragmented reality, and it is only real at this dimension.

Distortion of Reality

- 6^{th} sense (the mind) is not limited.
- 5 senses (sight, hearing, smell, taste, and touch) are limited.

Limitation

↓

Imperfection

↓

Fragmented/ distorted reality

↓

Suffering

(without the awareness of our own limitation)

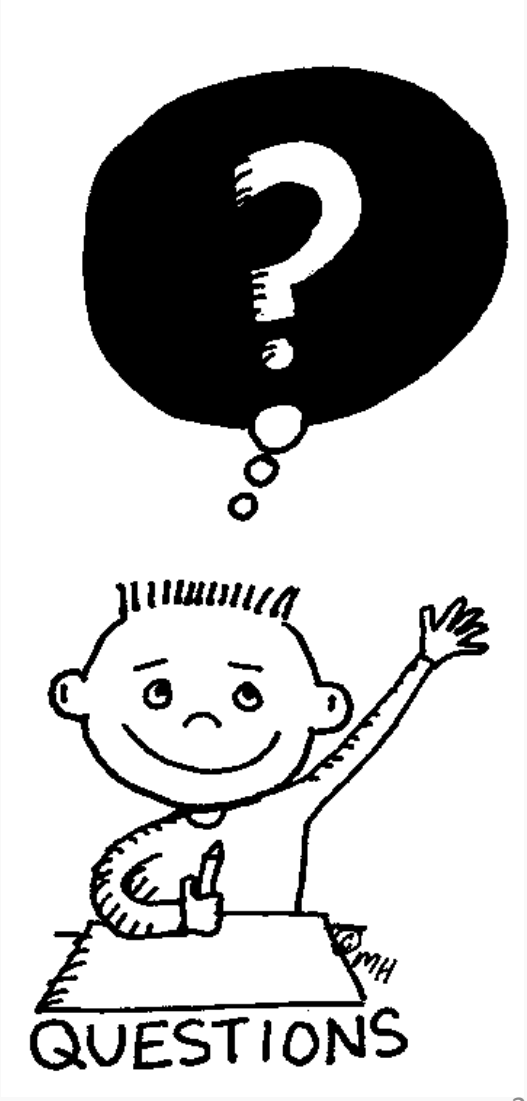
Inspirations

- **Reality is merely an illusion, albeit a very persistent one.”** – *Albert Einstein*
- **“Change Your Perception, Change Your Life.** – *Tony D. Clark*
- **Every action begins with a decision. Decide now to be in charge of your own perception of reality. – *Ching Lo***

PERCEPTION OF REALITY

To Be Continue

Thank You



Transfer of merit

By this effort, may all sentient beings be free of suffering.

May their minds be filled with the nectar of virtue.

In this way may all causes resulting in suffering be extinguished, And only the light of compassion shine throughout all realms.