

Learning Process and Motivation

Unit 2 • Detailed Study & Master Revision Notes (With Illustrated Diagrams)

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★ The Cognitive Flow of Human Learning & Motivation:

Learning begins when environmental stimuli stimulate our Receptors (Sensation), followed by mental focusing (Attention), meaningful interpretation (Perception), cognitive encoding and mental processing (Memory & Thinking), overcoming obstacles (Problem Solving), and directed goal-seeking action driven by inner drives (Motivation).

2.1 Sensation: Definition and Sensory Process

All knowledge of the external world reaches our conscious mind through our sense organs: *vision, hearing, taste, touch, smell*, and deep body senses. Sensation is triggered when environmental energy (stimuli) is captured by specialized biological structures called receptors located throughout the eye, ear, nose, tongue, skin, and muscles.



Standard Definitions of Sensation:

- *Dr. A. Jean Ayres (Ayree): "Sensation is the process of detecting and encoding stimulus energy in the world."*
- *Seema Singh: "The state of awareness which results when a sense organ is stimulated and which cannot be analyzed into any elements."*
- *Douglas & Holland: "The term sensation is used to describe the simplest of all conscious experiences."*

1. Nature of Sensation

- **Simplest Form of Cognition:** A sensation is the most elementary impression produced in the mind by an external or internal stimulus.
- **Neural Conduction Pathway:** Physical stimulation of a receptor initiates nerve impulses conducted via sensory nerves to specialized sensory projection areas in the brain, where it is experienced as a raw sensation.
- **Elementary Impression:** Sensations are unanalyzable, fundamental impressions of raw sensory qualities (e.g., pure redness, sweetness, coolness).
- **Foundation of All Higher Cognitive Processes:** Sensation serves as the primary raw building block for attention, perception, memory, and reasoning.

2. Attributes / Characters of Sensation

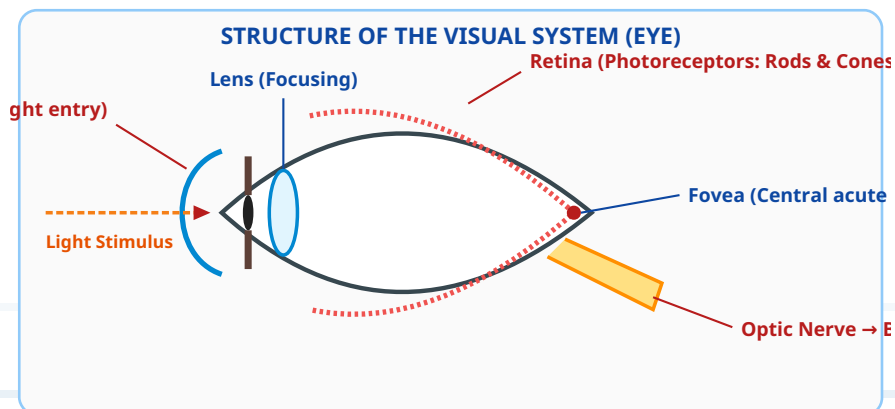
General properties possessed by sensations are known as their attributes or characters:

Attribute	Detailed Description & Distinguishing Features
1. <i>Quality</i>	The fundamental qualitative difference that distinguishes one type of sensation from another (e.g., sound vs. color, sweet vs. bitter, warmth vs. cold). Sensations differ primarily in quality across and within modalities.
2. <i>Intensity</i>	The quantitative strength or magnitude of a sensation of the same quality (e.g., dim vs. blinding light, whisper vs. loud roar, mild warmth vs. burning heat). Greater stimulus intensity produces greater sensory intensity.
3. <i>Duration (Protensity)</i>	Every sensation has a sensible lifespan in consciousness. It is the period a sensation lingers in the mind. A sound lasting 5 seconds feels distinct when it ceases compared to a 20-second sound. Also termed protensity or protensive magnitude.
4. <i>Extensity</i>	The spatial spread or perceived volume of a sensation, prominent in visual and tactual modalities. <i>Extensity vs. Extension:</i> Extension is an attribute of physical matter (measured in cm, inches), whereas extensity is an internal sensory attribute (called extensiveness, voluminousness, diffusion, or spreadoutness).
5. <i>Local Sign</i>	The specific attribute that allows the brain to localize where on an extended sense organ stimulation occurred (also called local signature or local colouring). While extensity depends on the total area stimulated, local sign depends on the exact anatomical locality.

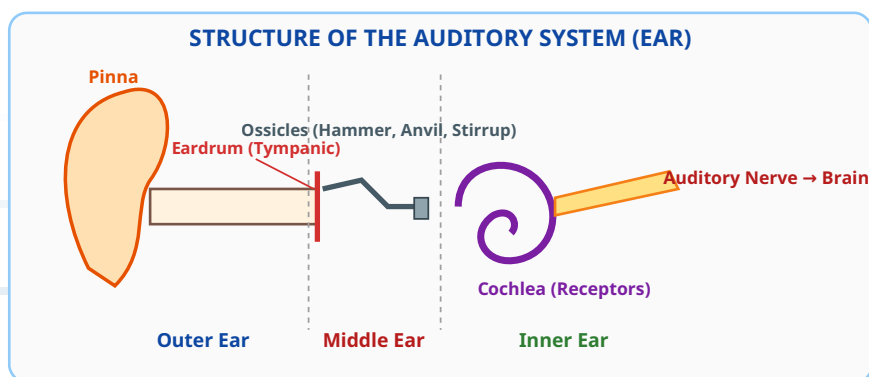
3. Types of Sensation & Sensory Systems (With Anatomical Diagrams)

The human brain constantly processes sensory data during waking hours. Posture and spatial orientation are maintained by the kinesthetic sense. Scientists classify sensations into 5 primary systems:

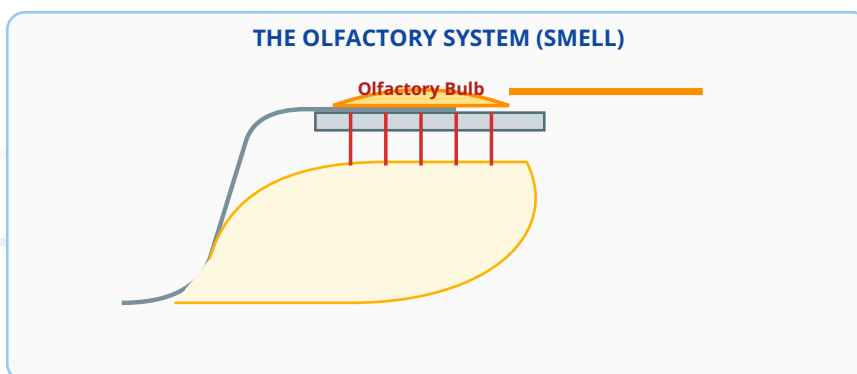
1. **The Visual System (Eye):** Receptors in the retina allow us to experience an intricate visual world consisting of shapes, sizes, motion (stationary vs moving), and illumination (black/white and rich color wavelengths).



2. *The Auditory System (Ear): Sound waves provide 360-degree environmental awareness. Unlike vision (which requires stimuli to be directly in front of us), hearing enables detection of sounds behind us or in adjacent rooms. Crucial for human spoken communication.*



3. *The Olfactory System (Nose):* Receptors are embedded within the upper nasal passages. Sensory signals travel through the cribriform plate to the olfactory bulb situated below the frontal lobes of the cerebral cortex. Smell works in intimate synergy with gustation to produce flavor perception.



4. *The Gustatory System (Tongue):* Taste receptors consist of ~10,000 taste buds distributed across specific zones:

- *Tip:* Highly sensitive to sweet and salty tastes.
- *Sides:* Sensitive to sour and saline tastes.
- *Back:* Sensitive to bitter tastes.

Developmental Note: Taste buds decrease with age; adult tongues partly lose central taste sensitivity.

5. *The Coetaneous System (Skin / Cutaneous Receptors):* The skin protects internal tissues and houses specialized receptors producing sensations of pressure, pain, warmth, and cold. Separate cold and warm spots respond to thermal changes. Continuous stimulation leads to rapid sensory adaptation.



Factors That Affect Sensation:

- *Illness & Pathology:* Infections, sensory organ damage, or neural diseases impair sensitivity.
- *Developmental Stage:* Maturation of receptor cells; gradual loss of taste buds and sensory acuity with age.
- *Medications & Drugs:* Anesthetics, stimulants, or sedatives alter nerve thresholds and signal transduction.
- *Stress & Arousal:* High physiological stress alters sensory thresholds and vigilance.
- *Lifestyle & Environment:* Dietary habits, prolonged noise exposure, and physical health habits.

2.2 Attention: Definition and Affecting Factors

In daily life, attention is requested constantly ("pay attention to the blackboard", "attention please" at railway stations). Psychologically, attention is the conscious focusing and directing of mental energy toward specific stimuli while filtering out background noise.



Standard Definitions of Attention:

- **Dumville (1938):** "Attention is the concentration of consciousness upon one subject rather than upon another."
- **Ross (1951):** "Attention is the process of getting an object of thought clearly before the mind."

Precedence over Perception: Attention is a central selective process. Perception cannot occur without attentional mechanisms; thus,

Attention precedes Perception.

1. Four Core Functions of Attention

Function	Psychological Mechanism & Classroom/Real-life Example
1. Alerting Function	A state of focused readiness and general vigilance to respond promptly to upcoming stimuli. Distraction happens when sudden interfering stimuli (e.g., loud noise) interrupt the active task.
2. Selective Function	Acts as a cognitive filter: prioritizing stimuli of ongoing interest while screening out unwanted or irrelevant background inputs.
3. Limited Capacity Channel	The human mind has limited attentional resources. Tasks requiring focused attention cannot be performed in parallel without loss of accuracy. We process attentional tasks one at a time via serial processing.
4. Vigilance (Sustained Attention)	The ability to maintain continuous attentional focus on a specific task over an extended duration (e.g., radar monitoring, air traffic control, listening to a lecture).

2. Determinants / Factors of Attention

Factors determining which stimuli capture our attention are divided into External (Objective) and Internal (Subjective):

A. External Factors (Stimulus Attributes)

- **Intensity:** Louder sounds, brighter lights, and stronger smells force attention over weak stimuli.
- **Size of Stimulus:** Larger objects naturally dominate over smaller ones (e.g., full-page billboard).
- **Striking Quality:** Peculiar colors, unusual fonts, or unique sounds stand out distinctly.
- **Movement:** Moving objects capture attention rapidly compared to static objects (e.g., animated displays).
- **Contrast:** Sharp differences against the surroundings (e.g., red word on white paper).
- **Repetition:** Repeated stimuli reinforce focus and draw consciousness.

B. Internal Factors (Individual Attributes)

- **Interest:** The primary determinant; we automatically attend to subjects aligning with our passions.
- **Novelty:** New, unfamiliar items arouse curiosity (e.g., child captivated by a brand-new toy).
- **Rareness:** Rare and majestic monuments (e.g., Taj Mahal) evoke interest and sustained focus.
- **Instincts & Needs:** Biological drives guide attention (e.g., hungry cat instantly spots mice).
- **Emotions & Mindset:** Lovers notice positive virtues; rivals attend to faults.
- **Habit & Education:** Prior training and habituated routines guide effortless attention.

2.3 Perception: Definition and Types

We inhabit a rich three-dimensional world of objects with distinct forms, colors, depths, and motions. Although our perceptions are usually accurate, we occasionally encounter illusions. Information is gathered through 10 sense organs:

- **8 External Senses:** Vision, Audition, Smell, Taste, Touch, Warmth, Cold, and Pain.
- **2 Internal / Deep Senses:** Vestibular sense (balance and gravity) and Kinesthetic sense (muscle movement and body positioning).



Standard Definition of Perception:

"Perception may be defined as a process of interpretation of a present stimulus on the basis of past experience."

It is the cognitive stage where sensory input is recognized, categorized, interpreted, and transformed into meaningful psychological experience.

1. Perception of Shapes & Figure-Ground Relationship

Figure-Ground Relationship: Any perceived object (the *Figure*) stands out clearly against a meaningful backdrop (the *Ground*). The figure cannot be separated from its background (e.g., white chalk letters on a blackboard, or the classic Rubin reversible goblet-faces illusion).

FIGURE-GROUND RELATIONSHIP: REVERSIBLE CONFIGURATION

Face Profile 1 →



← Face Profile 2

White Center = Vase / Goblet

2. Gestalt Principles of Perceptual Grouping (With Diagrams)

- **Proximity (Nearness):** Objects close to each other are perceived together as a unified group (e.g., letters 'M-a-n' grouped into 'Man').
- **Similarity:** Stimuli sharing physical properties (shape, color, size) are grouped together, even when separated.
- **Continuity:** The mind prefers smooth, unbroken contours and follows lines in an established direction.
- **Closure:** Tendency to mentally fill in gaps in an incomplete figure to perceive a whole, coherent shape.
- **Symmetry:** Symmetrically arranged shapes are readily perceived as grouped pairs or balanced figures (e.g., bracket pairs []).

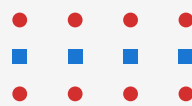
GESTALT LAWS OF PERCEPTUAL GROUPING

1. Proximity (Nearness)



Perceived as 3 pairs

2. Similarity



Grouped by shape/type

3. Continuity



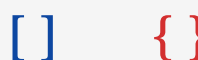
Seen as continuous lines

4. Closure



Brain mentally closes gaps

5. Symmetry

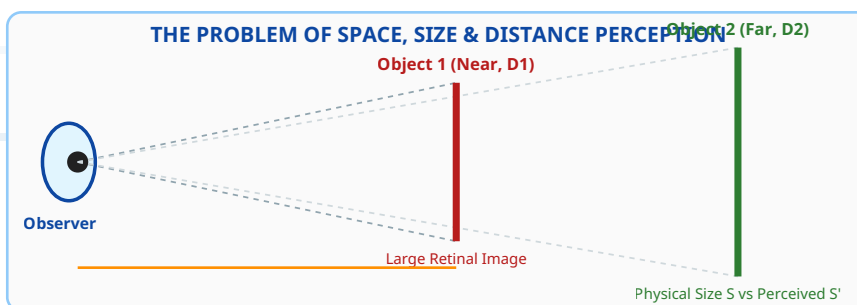


Paired as unified figures

3. Perception of Space (Size, Depth, and Distance)

The Core Problem of Space Perception: How does a two-dimensional retinal image allow us to perceive a three-dimensional world?

- **Distance (D):** Absolute spatial extent between observer and object.
- **Depth:** Relative spatial extent between two objects as seen by the observer.
- **Size:** Physical objective size (S) vs. psychological perceived size (S').



Category of Depth Cues	Mechanism & Function
1. <i>Non-Visual Cues</i>	Physiological feedback from eye muscles rather than retinal images: • Accommodation: Adjustments in eye lens curvature to focus on near/far objects. • Convergence: Inward neuromuscular turning of both eyeballs when viewing close objects.
2. <i>Binocular Cues</i>	Depth information resulting from two eyes viewing an object from slightly different angles (retinal disparity / binocular parallax), fused by the brain into stereoscopic 3D depth.
3. <i>Monocular / Pictorial Cues</i>	Depth cues accessible to a single eye, utilized extensively by artists in paintings and photographs: linear perspective, relative size, texture gradients, interposition, and light/shadow.

4. Extrasensory Perception (ESP)

Perception occurring without physical sensory stimulation (commonly called the "sixth sense"):

Telepathy: Direct mind-to-mind thought transfer between persons at different locations.

Clairvoyance: Perception of distant events, objects, or people without physical sensory involvement.

Telekinesis (Psychokinesis): Mental influence or movement of physical objects without physical contact.

5. Factors Affecting Perception & Perceptual Errors

Determinants of Perception:

Context & Set-Effects: Immediate context creates top-down expectations (e.g., hearing "...eel is moving" is perceived as "wheel"). **Perceptual set** is our mental predisposition to perceive what we expect.

Needs & Motives: Internal states bias perception (e.g., a hungry person quickly notices food on a menu; a thirsty person notices drinks).

Socio-Cultural Factors: Cultural learning, background socialization, and acquired cognitive schemas shape interpretation.

Two Major Errors in Perception:

Illusion (False Perception): Misinterpretation of an actual, real stimulus present in the environment (e.g., mistaking a coiled rope for a snake in dim light; Müller-Lyer illusion). A universal phenomenon across all humans.

Hallucination: Perceiving vivid sensory events in the total absence of an external physical stimulus (e.g., hearing voices or seeing figures when nothing is physically present).

GEOMETRICAL ILLUSION: MÜLLER-LYER ILLUSION

**Both central horizontal shafts are physically equal in length.*

2.4 Memory, Thinking, and Problem Solving

PART A: MEMORY

Learning is the acquisition of knowledge; Memory is the cognitive process whereby information is encoded, retained, and reproduced for long-term functional utility. Essential for names, habits, language, and intellectual capabilities.



Definitions of Memory:

- **Woodworth & Marquis:** "Memory is mental power which consists in learning, retaining and remembering what has previously been learnt."
- **Levin:** "Memory is a giant filing cabinet in the brain."

Four Sequential Components of Memory:

1. **Learning:** Modification of behavior through experience and training.
2. **Retention (Storage):** Active preservation of learned experiences in neural pathways.
3. **Recall (Retrieval):** Bringing stored material back into conscious awareness when needed.
4. **Recognition:** Conscious awareness and error-free familiarity of previously encountered stimuli.

Information Processing Model & Memory Systems Diagram

INFORMATION PROCESSING MODEL OF MEMORY (ATKINSON-SHIFFRIN)

SENSORY MEMORY

Fleeting Buffer
($< 0.5 - 1$ sec)
Decay if unattended

Classification of Long-Term Memory Systems:

Implicit Memory: Unconscious, non-declarative retention without active recall efforts (e.g., motor habits, driving route).

Remote Memory: Long-standing memories from years or decades earlier, stored across specialized cortical circuits.

Rote Memory: Memorization of factual data through mechanical repetition without deep comprehension or emotional meaning.

Episodic Memory: Declarative memory for personal autobiographical events and firsthand life experiences.

PART B: THINKING

Thinking is a higher mental process that enables individuals to model the world and solve problems in accordance with their goals, plans, and desires. Related terms include cognition, sentience, consciousness, ideas, and imagination.



Definitions of Thinking:

Ross: "Thinking is a mental activity in its cognitive aspect or mental activity with regard to psychological aspects."

Garrett: "Thinking is a behaviour which is often implicit and hidden and in which symbols are ordinarily employed."

Type of Thinking	Characteristics & Cognitive Function
1. Perceptual (Concrete)	Simplest form; based directly on immediate perception of concrete physical objects and events.
2. Conceptual (Abstract)	Utilizes linguistic concepts, symbols, and generalized ideas. Superior and economizes cognitive effort.
3. Reflective Thinking	Aims at solving complex dilemmas by reorganizing past experiences and overcoming conceptual obstacles.
4. Creative Thinking	Generates novel, original ideas and discovers new relationships (typical of scientists, artists, and inventors).
5. Critical Thinking	Objectively steps aside from personal biases and emotional prejudices to evaluate evidence and find truth.
6. Non-Directed (Associative)	Free-flowing, undirected thoughts without conscious goals (e.g., daydreaming, reverie, nighttime dreams).

PART C: PROBLEM SOLVING

Behavior occurring in novel or difficult situations where habitual methods fail to reach the desired goal.



Definitions of Problem Solving:

- **Skinner (1968):** "Problem solving is a process of overcoming difficulties that appear to interfere with the attainment of a goal."
- **Woodworth (1948):** "Problem solving behavior occurs in novel or difficult situations in which a solution is not obtainable by habitual methods..."

6 Sequential Steps in Effective Problem-Solving:

1. **Problem Awareness:** Recognizing that a barrier or difficulty exists.
2. **Problem Understanding:** Analyzing and precisely diagnosing the nature of the difficulty.
3. **Collection of Relevant Information:** Gathering data, facts, and relevant background knowledge.
4. **Formulation of Hypotheses / Hunches:** Brainstorming possible solutions and action plans.
5. **Selection of the Correct Solution:** Choosing the optimal plan from among hypotheses.
6. **Verification:** Testing and confirming the concluded solution against practical outcomes.

2.5 Motivation: Nature, Definition and Maslow's Theory

The term Motivation is derived from the Latin root word "Motive" — an internal state of mind that activates, energizes, and directs human behavior toward a goal. It is internal to the individual and externalized through observable actions.



Standard Definitions of Motivation:

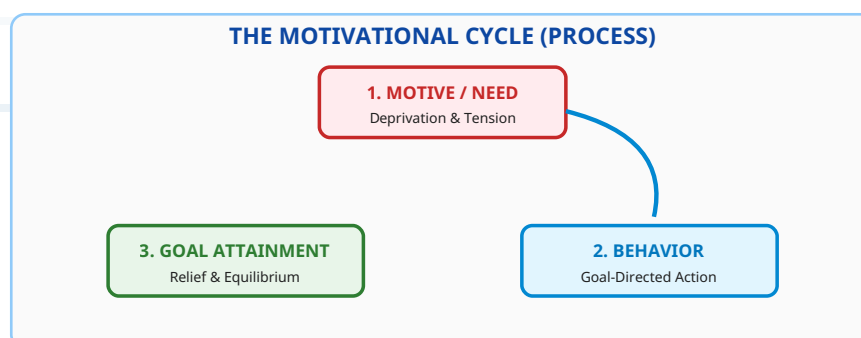
- **Fred Luthans:** "A process that starts with a physiological or psychological deficiency or need that activates behavior or a drive that is aimed at a goal or incentive."
- **Stephen P. Robbins:** "Motivation is the willingness to exert high level of efforts toward organizational goals, conditioned by the effort's ability to satisfy some individual need."

1. Five Key Characteristics of Motivation

- **1. Energy Mobilization:** Releases and directs internal physiological/psychological energy.
- **2. Persistence:** Sustains behavioral efforts over time until the goal is achieved.
- **3. Variability:** Goal-directed behavior is flexible; individuals try alternative pathways when blocked.
- **4. Restlessness for Goal Attainment:** Internal tension and drive during deprivation states.
- **5. Extinction of Restlessness:** Restoration of internal equilibrium and relief upon goal attainment.

2. The Motivational Cycle / Process (With Diagram)

Motivation operates as a continuous cyclical process comprising three interlinked elements:

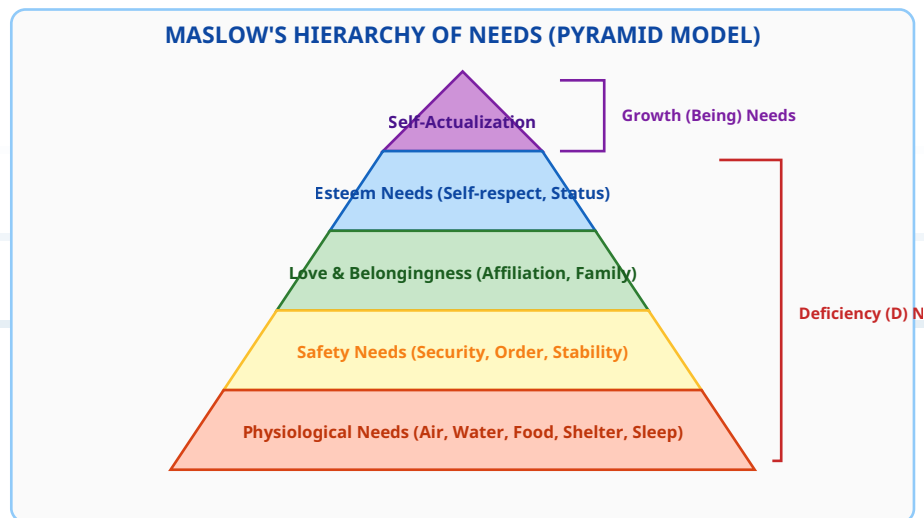


3. Maslow's Hierarchy of Needs Theory (1943, 1954)

Abraham Maslow proposed that human needs are arranged in a hierarchical order where foundational physiological survival needs must be satisfied before higher-order growth needs can motivate behavior. Needs are broadly divided into two categories:

Deficiency Needs (D-Needs)	Growth Needs (B-Needs / Being Needs)
Arise from deprivation; satisfy survival and security tensions: • Physiological: Hunger, thirst, bodily comfort. • Safety / Security: Freedom from danger and fear. • Belongingness & Love: Affiliation, acceptance. • Esteem: Competence, achievement, social approval.	Arise from the desire for personal growth and fulfillment: • Cognitive: To know, understand, and explore. • Aesthetic: Symmetry, order, balance, and beauty. • Self-Actualization: Realizing full potential. • Self-Transcendence: Connecting beyond self, helping others grow.

Maslow's Hierarchy Pyramid Diagram



The Classic 5-Stage Hierarchy Pyramid (Maslow):

Level 1 Physiological Needs: Fundamental biological requirements for survival: air, water, food, shelter, clothing, warmth, sex, and sleep. If unsatisfied, the human body cannot function; all other needs become secondary.

Level 2 Safety & Security Needs: Once physiological needs are met, security becomes salient: emotional stability, financial security (employment, social welfare), law & order, health, property, and freedom from threat/accidents.

Level 3 Love and Belongingness Needs: Social needs for interpersonal relationships: friendship, trust, intimacy, giving and receiving affection, and group belonging (family, peers, school, community).

Level 4 Esteem Needs: Divided into two tiers:

(i) Internal Esteem: Dignity, achievement, competence, mastery, independence.

(ii) External Esteem: Respect, reputation, recognition, prestige, and status.

Developmental Note: For children and adolescents, reputation and respect from peers precede authentic internal self-esteem.

Level 5 Self-Actualization Needs: Realization of an individual's highest personal potential; seeking personal growth and peak experiences. Expressed diversely across individuals (e.g., becoming an exceptional parent, a creative artist, an inventive scientist, or an accomplished scholar).

 Educational Implications for Classroom & Teaching (Maslow 1962, 1970a):

- *Holistic View of Learning: Shifts educational philosophy from mechanical stimulus-response conditioning to a holistic developmental approach.*
- *Prerequisite Fulfillment: A hungry, traumatized, anxious, or unloved child cannot effectively concentrate on cognitive academic learning.*
- *Supportive Classroom Management: Educators must ensure physical safety, emotional security, and a strong sense of peer belonging before demanding academic excellence.*