Graduate Attributes as PLOs

- **Engineering Knowledge:** An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of **complex engineering problems.**
- **Problem Analysis:** An ability to identify, formulate, research literature, and analyze **complex engineering problems** reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- **Design/Development of Solutions:** An ability to design solutions for **complex engineering problems** and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations

Graduate Attributes as PLOs

- **Investigation**: An ability to investigate **complex engineering problems** in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.
- **Modern Tool Usage:** An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to **complex engineering activities**, with an understanding of the limitations.
- **The Engineer and Society:** An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the responsibilities relevant to professional engineering practice and solution to **complex engineering problems**.

Graduate Attributes as PLOs

- **Environment and Sustainability:** An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- **Individual and Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

Graduate Attributes as PLOs

- **Communication:** An ability to communicate effectively, orally as well as in writing, on **complex engineering** activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **Project Management:** An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.
- **Lifelong Learning:** An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

Sample Solution Case – Example PEOs

- **PEO-1:** Demonstrate necessary knowledge and skills in Civil Engineering profession.
- **PEO-2:** Work and communicate effectively in team.
- **PEO-3:** Undertake professional practice considering ethical, societal and environmental implications.
- **PEO-4:** Be engaged in lifelong learning and continued professional growth.

Mapping of PLOs and PEOs --- Example Case

PLOs	PEO-1	PEO-2	PEO-3	PEO-4
Engineering Knowledge	X			
Problem Analysis	X			
Design/Development of Solutions	X			
Investigation	X			
Modern Tool Usage	X			
The Engineer and Society			X	
Environment and Sustainability			X	
Ethics			X	
Individual and Team Work		X		
Communication		X		
Project Management		X		
Lifelong Learning				X

Domains of Bloom's Taxonomy

Bloom's Taxonomy employs three distinct domains: the cognitive, the affective, and the psychomotor, which are described as follows:

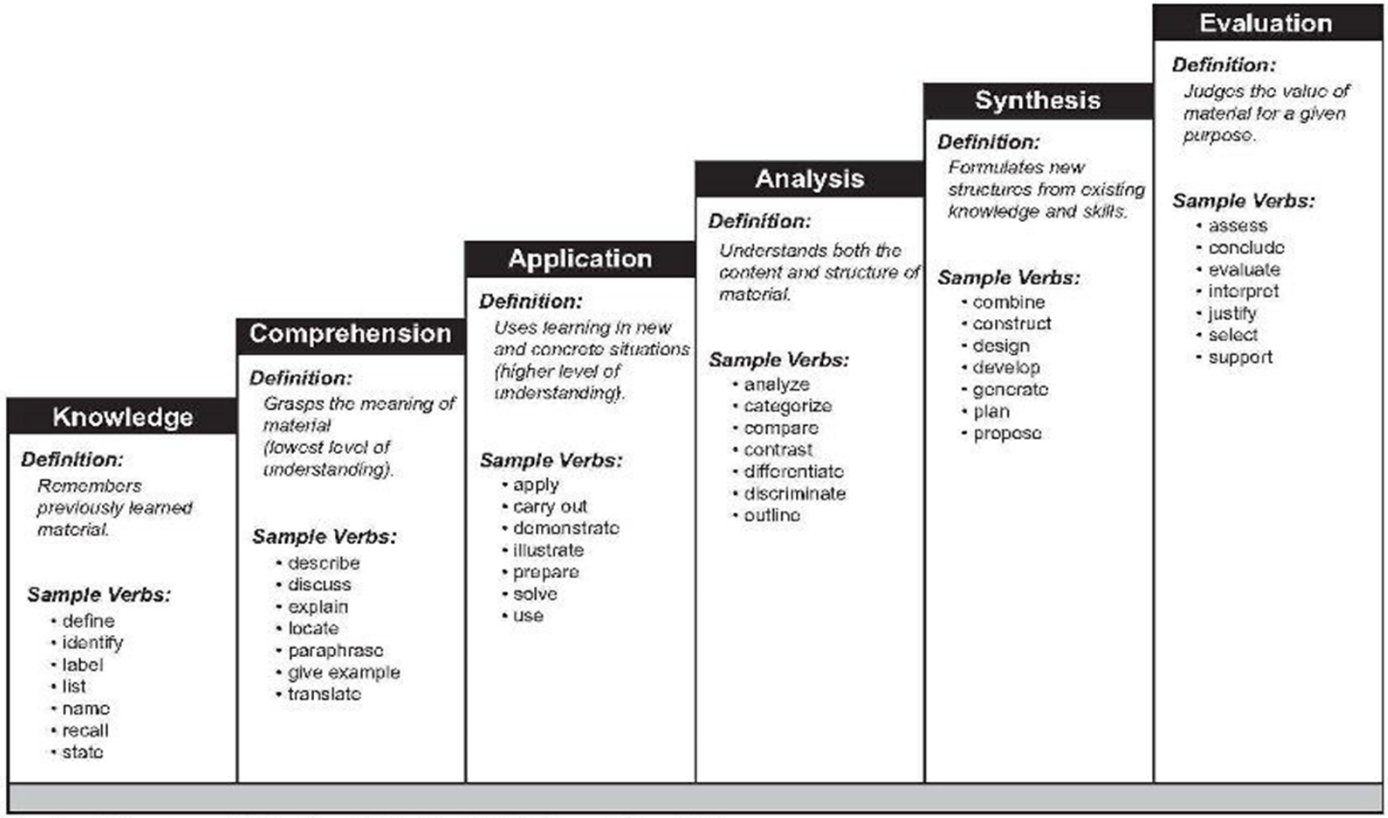
- "the cognitive domain … includes those objectives [that] deal with the recall or recognition of knowledge and the development of intellectual abilities and skills."

- "the affective domain … includes objectives [that] describe changes in interest, attitudes, and values …"

- the psychomotor domain includes "the manipulative or motor-skill area.

Cognitive Domain

(thinking, knowledge)

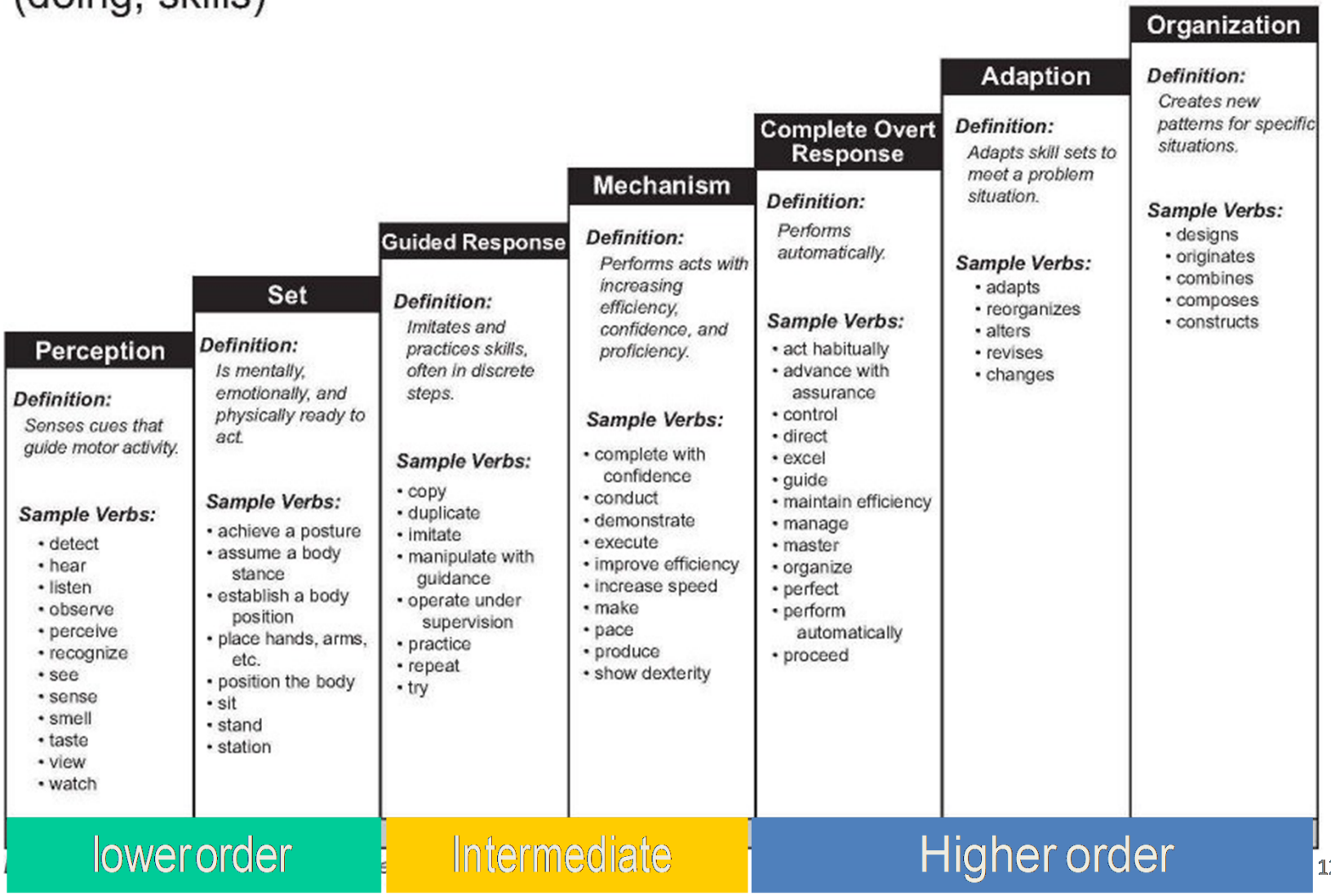


Based on "Taxonomy of Educational Objectives", B.S. Bloom Editor. 1956

lower order | Intermediate | Higher order

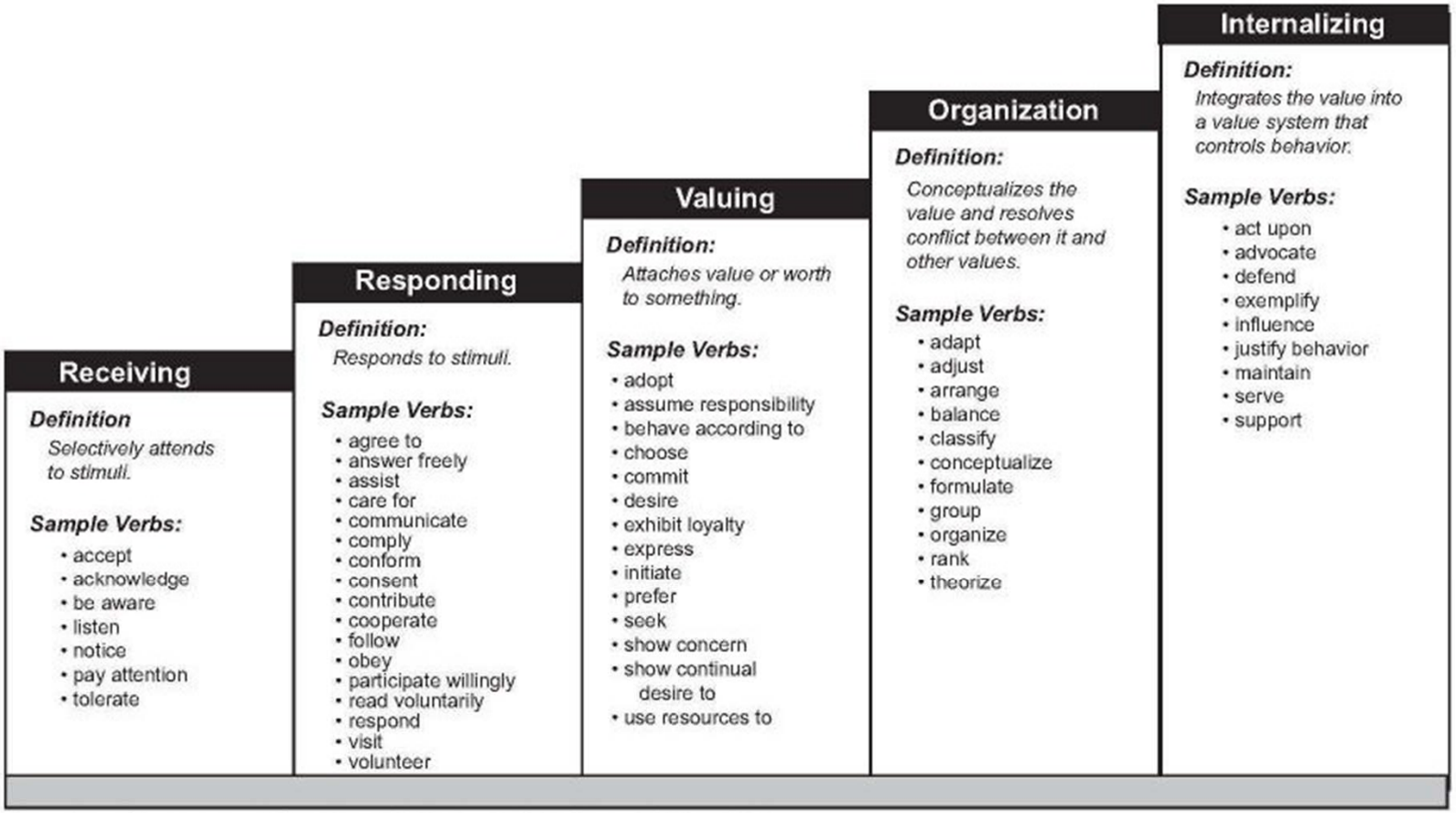
Psychomotor Domain

(doing, skills)



Affective Domain

(feeling, attitudes)



Based on "Taxonomy of Educational Objectives", B.S. Bloom Editor. 1956

Course Learning Outcome (CLO)	Taxonomy Level	Program Learning Outcome (PLO)	Assessment Tool
Apply concept and skills for quantity take off for different civil engineering works.	C-3	Engineering Knowledge	Mid-Term 01 question : Workout no of blocks, and cost of Reinforcement for columns.
Carry out rate analysis, productivity and pricing.	C-3	Problem analysis, Investigation	Mid-Term question 2:s Workout cost of Door and Window Panels.
Discuss concepts related to legal and contractual aspects of cost of construction projects.	C-2	Engineering knowledge, Project management	Quiz 1: What are the contract documents?