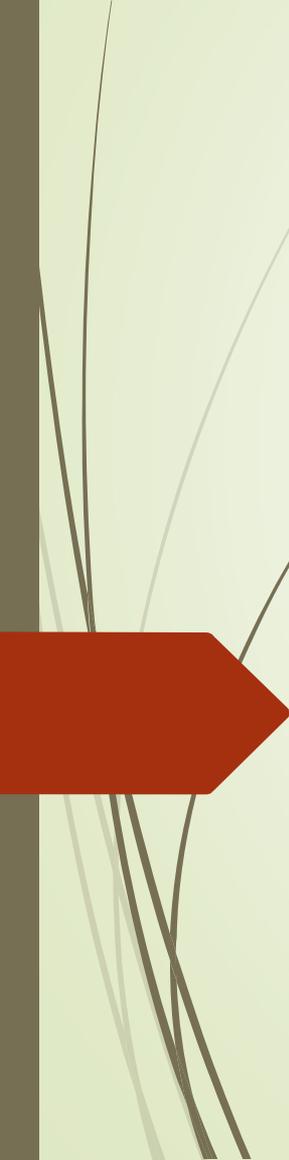# Bloom & Beyond

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Presentation Goals

- List the 3 domains of Bloom's Taxonomy

- List and define the 6 levels of Cognition according to Bloom

- Make comparisons among Bloom's Original taxonomy, Bloom's Revised Taxonomy & Webb's Depths of Knowledge

- Identify key words and question stems used at each level of Cognition

- Apply Bloom's Taxonomy to craft SLOs and assessments

Bloom

- Benjamin S. Bloom [1913 – 1999]

- American Educational Psychologist

- Chicago University

- Influenced by Ralph W. Tyler

- What Bloom had to offer his students was a model of an inquiring scholar, someone who embraced the idea that education as a process was an effort to realize human potential, indeed, even more, it was an effort designed to make potential possible. [E. W. Eisner, 2000]

- Development of specifications through which educational objectives could be organized according to their cognitive complexity.

Bloom's Taxonomy

- **Affective Domain**
    - Includes the manner in which we deal with things emotionally
    - Such as feelings, values, appreciation, enthusiasms, motivations, and attitudes

Bloom's Taxonomy

- **Psychomotor Domain**
  - Includes physical movement, coordination, and use of the motor-skill areas.
  - Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.
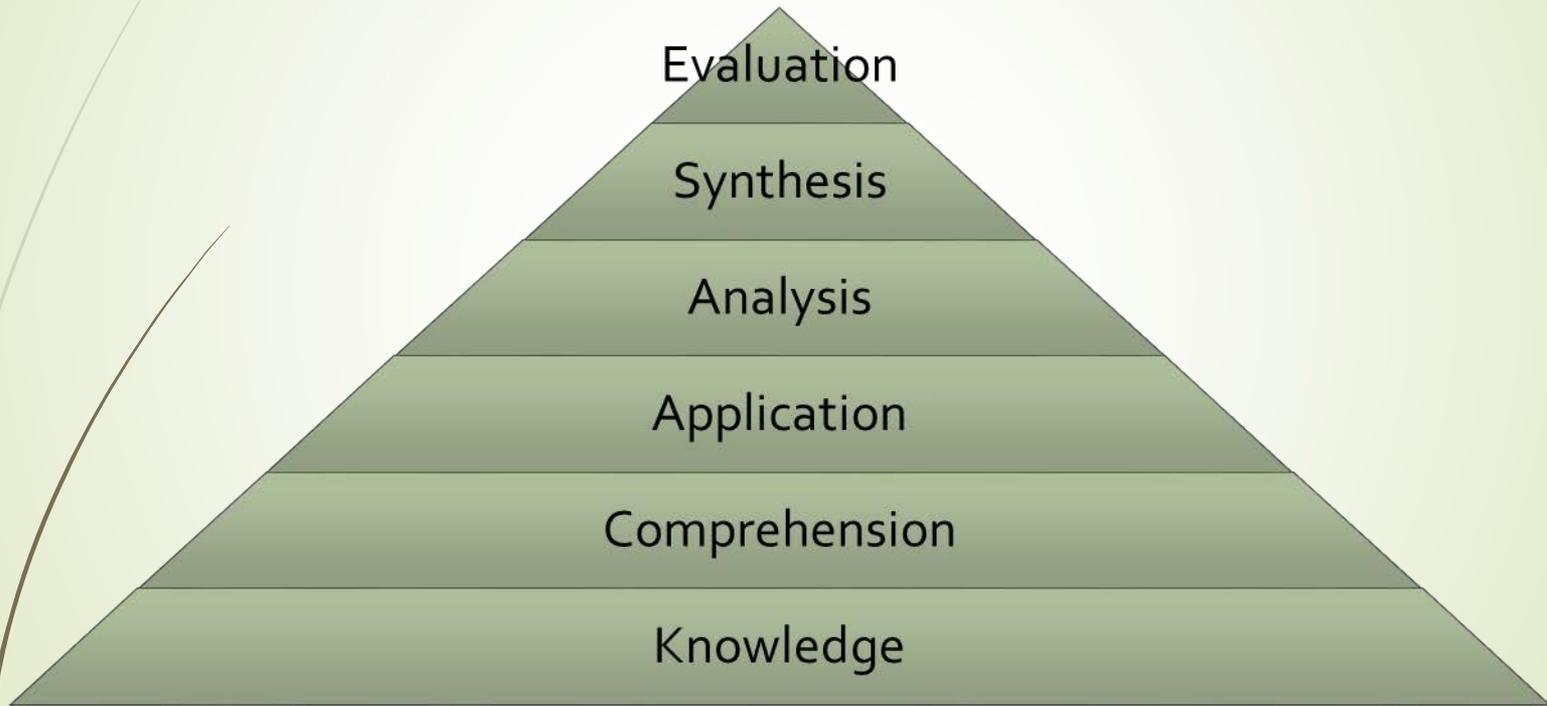
Bloom's Taxonomy

Cognitive Domain

- Involves knowledge and the development of intellectual skills

- This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills.

- There are 6 major categories starting from the simplest behavior to the most complex.

- Hierarchy of objectives according to cognitive complexity

- Higher-level objectives include, and are dependent on lower level cognitive skills

Bloom's Taxonomy: Cognitive Domain

Adapted from Bloom, 1956, Taxonomy of educational objectives: The classification of educational goals. Handbook I, cognitive domain. NY & Toronto: Longmans, Green.

Bloom's – Lower Levels

Knowledge

- Recalling previously learned information such as facts, terminology, rules, etc.

- Answers may be memorized or closely paraphrased from assigned material.

- Define, list, name, recall

Bloom's – Lower Levels

Comprehension

- Ability to comprehend the meaning of material.

- Answers must be in the student's own words while still using terminology appropriate to the course material.

- Explain, summarize, distinguish between, restate

Bloom's – Lower Levels

- Demonstrate rote or surface learning

- Declarative or Procedural Knowledge

- Answers found in the assigned materials

- 80% of HS teachers test at these lower levels

Bloom's – Higher Levels

- **Application**
  - Requires recognizing, identifying, or applying a concept or principle in a new situation or solving a new problem.
  - May require identifying or generating examples not found in assigned materials.
  - Demonstrate, arrange, relate, adapt

Bloom's – Higher Levels

- **Analysis**
  - Ability to break material down into its component parts and to understand its underlying structure
  - May require students to compare and contrast or explain how an example illustrates a given concept or principle
  - Require students to identify logical errors or to differentiate among facts, opinions, assumptions, hypotheses and conclusions
  - Expected to draw relationships between ideas
  - Differentiate, estimate, infer, diagram

Bloom's – Higher Levels

Synthesis

- Opposite of Analysis

- Ability to combine parts to form a new whole; to synthesize a variety of elements into an original and significant whole.

- Produce something unique or original

- Solve some unfamiliar problem in a unique way

- Combine, create, formulate, construct

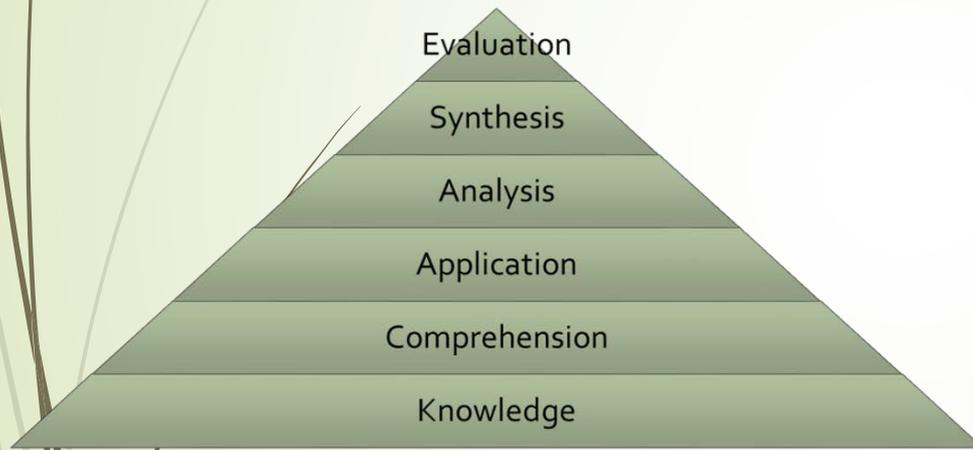# Bloom's – Higher Levels

Evaluation

- Ability to evaluate a total situation, to judge the value of material for a certain purpose, combining elements of all the other categories and also value judgments based on defined, fixed criteria.

- The most important part of the answer is the justification and rationale for the conclusion

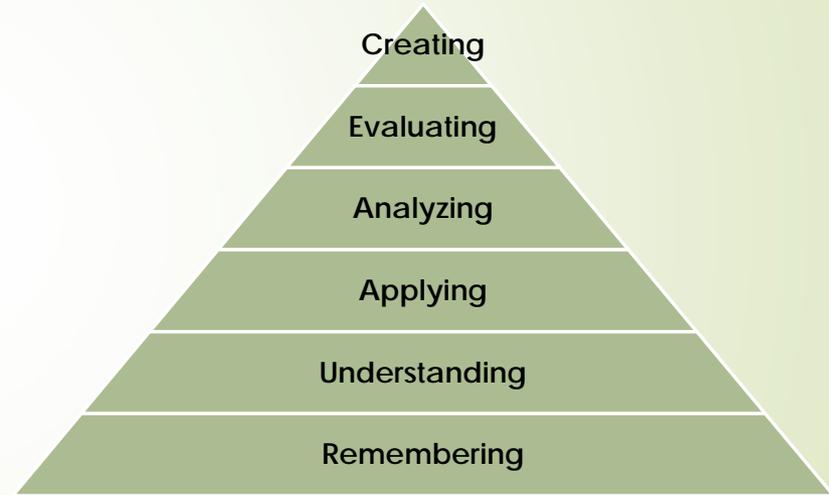- Judge, critique, justify, discriminate

Bloom's – Higher Levels

- Meaningful or deep learning
- Go beyond textual material in that they must be inferred or extrapolated from the material in the assigned material.
- Students' creativity, originality and critical thinking is required at higher levels
- More authentic than lower levels
- Thinking at this level is more likely to represent types of performances required in the real world
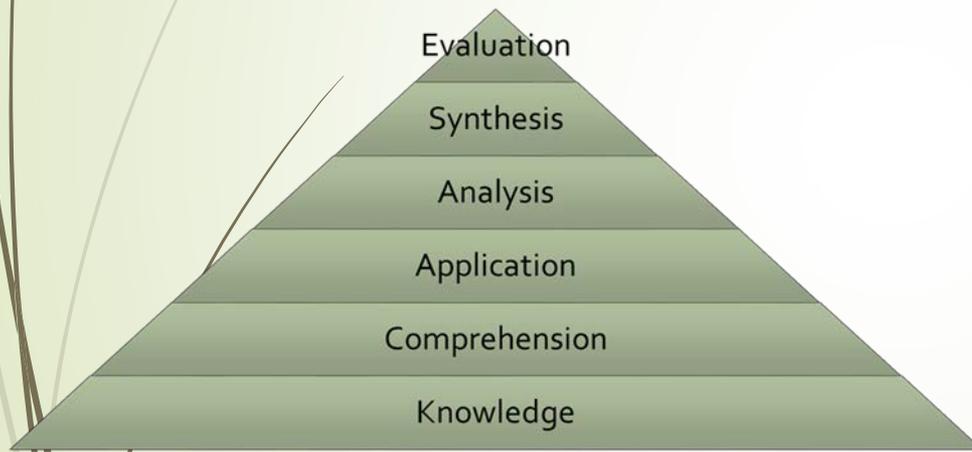
Bloom's Taxonomy Revised

Bloom's Taxonomy, 1956

Evaluation
Synthesis
Analysis
Application
Comprehension
Knowledge

Bloom's Revised Taxonomy, 2001

Creating
Evaluating
Analyzing
Applying
Understanding
Remembering

Bloom's Comparison

| Bloom's Original	Bloom's Revised
Knowledge	Remembering
Recall appropriate information	Recall appropriate information
Comprehension	Understanding
Grasp the meaning of the material	Grasp the meaning of the material
Application	Applying
Use new material in new and concrete situations	Use new material in new and concrete situations

Bloom's Comparison

Bloom's Original	Bloom's Revised
Analysis	Analyzing
Break down material into component parts so that its organizational structure may be understood	Break down material into component parts so that its organizational structure may be understood
Synthesis	Evaluating
Put parts together to form a new whole	Make judgments based on criteria and standards
Evaluation	Creating
Judge the value of material for a given purpose	Put elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.

Webb's Depth of Knowledge [2002]

Bloom's Taxonomy, 1956
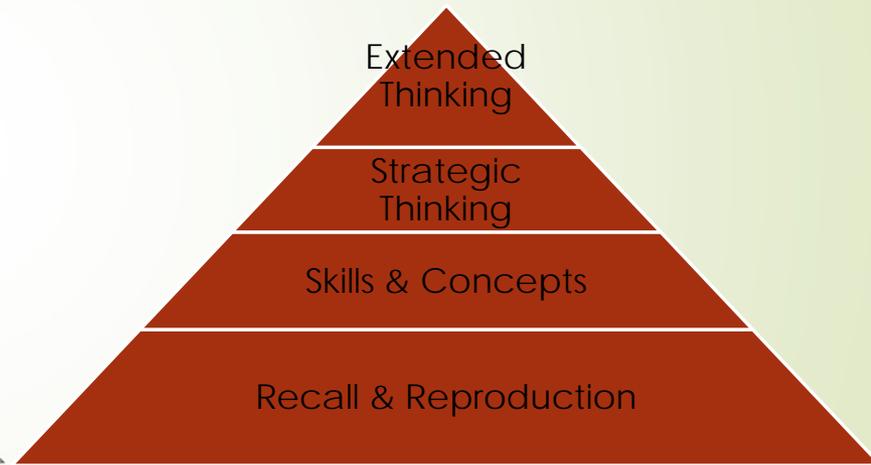
Webb's Depth of Knowledge, 2002

Webb's Depth of Knowledge [2002]

Webb's DoK Level	Described
Recall & Reproduction	Recall a fact, information, or procedure
Skill & Concepts	Engages in mental process beyond habitual response using information or conceptual knowledge. Requires two or more steps.

Webb's Depth of Knowledge [2002]

Webb's DoK Level	Described
Strategic Thinking	Requires reasoning, developing a plan or a sequence of steps, some complexity, more than one possible answer, higher level of thinking than the previous 2 levels.
Extended Thinking	Requires investigation, complex reasoning, planning, developing, and thinking most likely over an extended period of time. Note: longer time period is not an applicable factor if work is simply repetitive and/or does not require higher order thinking skills

Knowledge: Key Words

- Arrange
- Define
- Describe
- Duplicate
- Identify
- Label
- List
- Match
- Order

- Outline
- Recognize
- Relate
- Recall
- Repeat
- Reproduce
- Select
- State
- Who, what, when, & where

Knowledge: Questions

- What happened after. . . ?
- How many. . . ?
- Who was it that. . . ?
- Can you name the. . . ?
- Describe what happened at. . . ?
- Who spoke to. . . ?
- Can you tell why. . .?
- Find the meaning of. . . ?
- What is. . . ?
- Which is true or false. . . ?

Comprehension: Key Words

- Classify
- Convert
- Defend
- Describe
- Discuss
- Distinguish
- Estimate
- Explain
- Express
- Extend
- Generalized
- Give example(s)

- Identify
- Indicate
- Infer
- Locate
- Paraphrase
- Predict
- Recognize
- Rewrite
- Review
- Select
- Summarize
- Translate

Comprehension: Questions

- Can you write in your own words. . . ?

- Can you write a brief outline. . . ?

- What do you think could of happened next. . . ?

- Who do you think. . . ?

- What was the main idea. . . ?

- Who was the key character. . . ?

- Can you distinguish between. . . ?

- What differences exist between. . . ?

- Can you provide an example of what you mean. . . ?

- Can you provide a definition for. . . ?

- How would you classify the type of . . . ?

Application: Key Words

- Apply
- Change
- Choose
- Compute
- Demonstrate
- Discover
- Dramatize
- Employ
- Illustrate
- Interpret
- Manipulate
- Modify

- Operate
- Practice
- Predict
- Prepare
- Produce
- Relate
- Schedule
- Show
- Sketch
- Solve
- Use
- Write

Application: Questions

- Do you know another instance where. . . ?

- Could this have happened in. . .?

- Can you group by characteristics such as. . . ?

- What factors would you change if. . . ?

- Can you apply the method used to some experience of your own. . . ?

- What questions would you ask of. . . ?

- From the information given, can you develop a set of instructions about. . . ?

- Would this information be useful if you had a. . . ?

Analysis: Key Words

- Analyze
- Appraise
- Breakdown
- Calculate
- Categorize
- Compare
- Contrast
- Criticize
- Diagram
- Differentiate
- Discriminate
- Distinguish
- Examine

- Experiment
- Identify
- Illustrate
- Infer
- Model
- Outline
- Point out
- Question
- Relate
- Select
- Separate
- Subdivide
- Test

Analysis: Questions

- Which events could have happened. . . ?
- If . . . happened, what might the ending have been?
- How was this similar to. . . ?
- What was the underlying theme of. . . ?
- What do you see as other possible outcomes?
- Why did. . . changes occur?
- Can you compare your. . . with that presented in. . . ?
- Can you explain what must have happened when. . . ?
- How is. . . similar to. . . ?
- What are some of the problems of. . . ?
- Can you distinguish between. . . ?
- What were some of the motives behind. . . ?

Synthesis: Key Words

- Arrange
- Assemble
- Categorize
- Collect
- Combine
- Comply
- Compose
- Construct
- Create
- Design
- Develop
- Devise
- Explain
- Formulate

- Generate
- Plan
- Prepare
- Rearrange
- Reconstruct
- Relate
- Reorganize
- Revise
- Rewrite
- Set up
- Summarize
- Synthesize
- Tell
- Write

Synthesis: Questions

- Can you design a . . . to . . .?
- Why not compose a song about. . . ?
- Can you see a possible solution to. . . ?
- If you had access to all resources how would you deal with. . . ?
- Why don't you devise your own way to deal with. . . ?
- What would happen if. . . ?
- How many ways can you. . . ?
- Can you create new and unusual uses for. . . ?
- Can you write a new recipe for a tasty dish?
- Can you develop a proposal which would. . . ?

Evaluation: Key Words

- Appraise
- Argue
- Assess
- Attach
- Choose
- Compare
- Conclude
- Contrast
- Debate
- Defend
- Describe
- Discriminate
- Estimate

- Evaluate
- Explain
- Judge
- Justify
- Interpret
- Relate
- Predict
- Rate
- Select
- Summarize
- Support
- Value

Evaluation: Questions

- Is there a better solution to. . . .
- Judge the value of. . . .
- Can you defend your position about. . . ?
- Do you think . . . is a good or a bad thing?
- How would you have handled. . . ?
- What changes to . . . would you recommend?
- Do you believe. . . ?
- Are you a . . . person?
- How would you feel if. . . ?
- How effective are. . . ?
- What do you think about. . . ?

Bloom & Grow

- Bloom's Taxonomy is a useful tool in crafting Student Learning Outcomes [SLO]

- Bloom's Taxonomy is a useful tool in drafting questions at various levels of cognition [that could be used on tests and quizzes and during class discussions]

- Bloom's Taxonomy is a useful tool in designing appropriate assessments that relate to SLO

Bloom & Beyond

Thank you for your time and attention

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