

## A Review of Bloom’s Taxonomy and It’s Application to PWUAAC

In 1956, Benjamin Bloom headed a group of educational psychologists who developed a classification of levels of intellectual behavior important in learning, generally referred to as Bloom’s Taxonomy. This taxonomy attempts to divide cognitive objectives into subdivisions ranging from the simplest learning/questioning to the most complex. It was considered “a work in progress.” In the 1990s, a group lead by Lorin Anderson, a student of Bloom, met for the purpose of updating the taxonomy, hoping to add relevance for 21st century students and teachers. One primary change was the transition from nouns to verbs. A second change was the switch in the order of the top 2 items in the hierarchy. The chart below shows both the original and revised taxonomy.

	Original Taxonomy	Revised Taxonomy
complex	<b>EVALUATION</b>	<b>CREATING</b>
	<b>SYNTHESIS</b>	<b>EVALUATING</b>
↑	<b>ANALYSIS</b>	<b>ANALYZING</b>
↑	<b>APPLICATION</b>	<b>APPLYING</b>
	<b>COMPREHENSION</b>	<b>UNDERSTANDING</b>
simple	<b>KNOWLEDGE</b>	<b>REMEMBERING</b>

On average, teachers ask questions in the "knowledge" category 80% to 90% of the time. In fact, Bloom found that over 95% of the test questions students encounter require them to think only at the lowest possible level ... the recall or remembering of information. These questions are not bad, but using them all the time is not promoting sufficient learning. Try to utilize higher order level of questions.

1. **Knowledge/Remembering** is the retrieving, recognizing, and recalling of relevant knowledge from long-term memory. It may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge/remembering represents the lowest level of learning outcomes in the cognitive domain.

Process	Verbs	Products
Remember information	define, tell, list, locate, name, recall, reproduce, tell, underline	definitions, fact charts lists, worksheets

2. **Comprehension/Understanding** is defined as the ability to grasp the meaning of material. The student is constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding.

Process	Verbs	Products
Explain information or concepts	calculate, describe, discuss, expand, explain, identify, locate, outline, report, restate	drawing, paraphrasing, peer teaching, show & tell, story problems, summary

3. **Application/Applying** refers to the ability to use learned material in new and concrete situations by carrying out or using a procedure through executing, or implementing. This may include the application of such things as rules, methods, concepts, principles, laws, and theories. Learning outcomes in this area require a higher level of understanding than those under comprehension.

Process	Verbs	Products
Use information in new ways	classify, demonstrate, dramatize, illustrate, practice, solve, use	collection, interview, model building, presentation, role playing, scrap book, simulation

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4. **Analysis/Analyzing** refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of parts, analysis of the relationship between parts, and recognition of the organizational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.

Process	Verbs	Products
Distinguish different parts	appraise, compare, contrast, differentiate, distinguish, examine, infer, outline, sequence, test	chart, plan, questionnaire, spread sheet, summary, survey

5. **Evaluation/Evaluating** is concerned with the ability to judge the value of material (statement, novel, poem, research report) for a given purpose. The judgments are to be based on definite criteria. These may be internal criteria (organization) or external criteria (relevance to the purpose) and the student may determine the criteria or be given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all the other categories, plus conscious value judgments based on clearly defined criteria.

Process	Verbs	Products
Defend concept or idea	appraise, defend, dispute, editorialize, judge, justify, prioritize, rate, select, support, verify	critique, judgment, opinion, recommendation, report, self-evaluation

6. **Synthesis/Creating** refers to the ability to put parts together to form a new whole. This may involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of new patterns or structure.

Process	Verbs	Products
Create new	change, combine, compose, create, design, formulate, hypothesize, improve, invent, predict	puppet show, cartoon, personal story, book cover, multimedia, new game, poem, skit, PPT, Wordle

### Applying Bloom's Taxonomy & Theory Of Developing Higher Levels Of Thought Processes To Everyday Classroom Reading

NOTE: While this discussion is specifically presented through the lens of the students' *reading of information*, similar applications can be made for activities that involve students' *listening to information* presented by the teacher in class.

**Explanation** - Many students are directed to read narrative or expository selections for classroom assignments for the purpose of answering factual questions. This type of reading for literal comprehension is often emphasized because of the ease and equity of evaluation. The emphasis is limiting because many students do not develop a personal attachment to books they read. They do not see reading as a bridge to their imaginations, a way to understand how others live their lives, or a method to gain self-understanding and evaluation.

Questions that teachers ask can direct the students to the realization that reading has a greater and more diverse purpose than just the simple recall of facts. If this can be accomplished, it is likely that students will place a higher value on reading, continue to turn to it for pleasure and as a resource, and will establish it as a life-long habit.

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**Procedure** - For any assigned reading selection, develop questions that reflect the progression of thinking and responding from the literal level to the evaluative. Not all levels need to be developed for every selection. Consider a range that will lead the student to the greater purpose of reading. Examples of appropriate questions or directives are given to illustrate each level. In addition, some possible classroom projects are also provided. The story of *Goldilocks and the Three Bears* was used for general understanding.

## Examples of Taxonomy Questions and Learning Activities

- 1. Knowledge/Remembering** – The recall of specific information
  - Who was Goldilocks?
  - Where did she live? With whom?
  - What did she find in the woods?
  - Complete the worksheet – draw a line from the object to the correct bear (e.g., big bed to daddy bear).
- 2. Comprehension/Understanding** – An understanding of what was read
  - This story was about \_\_\_\_\_. (Topic)
  - The story tells us \_\_\_\_\_. (Main Idea)
  - Why didn't her mother want her to go to the forest?
  - What did she discover when she went in the house?
  - What kind of girl was she?
  - Why would she go in their house when no one was home?
  - Draw a picture of Goldilocks in the Bear's house.
  - Retell, in your own words, what she did after she went in the house.
- 3. Application/Applying** – The converting of abstract content to concrete situations
  - How were the bears like real people?
  - Write a sign that should be placed on the front door of the house.
  - Draw a picture of what the bear's house looked like.
  - Draw a map showing Goldilocks' house, the path in the forest, the bear's house, etc.
  - Show through action how Goldilocks sat in the chairs, ate the porridge, etc.
- 4. Analysis/Analyzing** – The comparison and contrast of the content to personal experiences, distinguish different parts
  - How did each bear react to what Goldilocks did?
  - How would you feel if someone ate your food or broke your chair?
  - Compare Goldilocks to any friend and make a chart of characteristics.
  - Do you know any animals (pets) that act human? Develop a survey.
- 5. Evaluation/Evaluating** – The judgment and evaluation of characters, actions, outcomes, etc. for personal reflection and understanding
  - Why were the bears angry at Goldilocks?
  - Why was Goldilocks happy to get home?
  - What do you think she learned by going into that house?
  - Do you think she will listen to her mother's warnings in the future? Why?
  - Do parents have more experience and background than their children?
  - Would you have gone in the bear's house? Why or why not?
  - Do you think this really happened to Goldilocks? Why?
  - Why would a grown-up write this story for children to read?
  - Why has the story of Goldilocks been told to children for many, many years?
- 6. Synthesis/Creating** – The organization of thoughts, ideas, and information from the content
  - List the events of the story in sequence.
  - Point out the importance of time sequence words by asking: What happened after Goldilocks ate the Baby Bear's porridge? What happened before Goldilocks went into the forest? What is the first thing she did when she went into the house?
  - Point out the importance of time sequence words by asking: What happened after Goldilocks ate the Baby Bear's porridge? What happened before Goldilocks went into the forest? What is the first thing she did when she went into the house?
  - Write a story about how something similar happened to you or your family.

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- Draw a cartoon or stories about bears. Do they all act like humans?
- Do you know any other stories about little girls or boys who escaped from danger?
- Make a puppet out of one of the characters. Using the puppet, act out his/her part in the story.
- Make a diorama of the bear's house and the forest.

### Chart of Useful Verbs, Sample Question Stems, and Potential Activities and Products

These sample question stems were originally developed based on the assumption that the student is capable of answering with his/her natural speech. The activities and products are also assuming the ability to write, draw, and other physical abilities. Any of these questions, activities or products would need to be modified for a student/person who uses AAC and is physically challenged. Some examples follow this chart.

<b>KNOWLEDGE/REMEMBERING</b>		
<i>Useful Verbs</i>	<i>Sample Question Stems</i>	<i>Potential Activities and Products</i>
define tell list relate locate write find state name	<ul style="list-style-type: none"> <li>•What is...?</li> <li>•Where did .... happen?</li> <li>•How many...?</li> <li>•Who was it that...?</li> <li>•Describe what happened at...?</li> <li>•Who spoke to...?</li> <li>•Can you tell why...?</li> <li>•Find the meaning of...?</li> </ul>	<ul style="list-style-type: none"> <li>• Make a list of the main events.</li> <li>• Make a timeline of events.</li> <li>• Make a facts chart.</li> <li>• Write a list of any pieces of information you can remember.</li> <li>• List all the .... in the story.</li> <li>• Make a chart showing...</li> <li>• Make an acrostic.</li> </ul>

<b>COMPREHENSION/UNDERSTANDING</b>		
<i>Useful Verbs</i>	<i>Sample Question Stems</i>	<i>Potential Activities and Products</i>
explain interpret outline describe discuss distinguish predict restate translate compare explain locate restate	<ul style="list-style-type: none"> <li>•Can you write in your own words...?</li> <li>•Can you write a brief outline...?</li> <li>•What do you think could of happened next...?</li> <li>•Who do you think...?</li> <li>•What was the main idea...?</li> <li>•Who was the key character...?</li> <li>•Can you distinguish between...?</li> <li>•What differences exist between...?</li> <li>•Can you provide an example of what you mean...?</li> </ul>	<ul style="list-style-type: none"> <li>•Cut out or draw pictures to show a particular event.</li> <li>•Illustrate what you think the main idea was.</li> <li>•Make a cartoon strip showing the sequence of events.</li> <li>•Write and perform a play based on the story.</li> <li>•Retell the story in your words.</li> <li>•Paint a picture of some aspect you like.</li> <li>•Write a summary report of an event.</li> <li>•Prepare a flow chart to illustrate the sequence of events.</li> <li>•Make a coloring book.</li> </ul>

<b>APPLICATION/APPLYING</b>		
<i>Useful Verbs</i>	<i>Sample Question Stems</i>	<i>Potential Activities and Products</i>
solve show use illustrate construct complete examine classify demonstrate dramatize solve	<ul style="list-style-type: none"> <li>•Do you know another instance where...?</li> <li>•Can you group by characteristics such as...?</li> <li>•What factors would you change if...?</li> <li>•Can you apply the method used to some experience of your own...?</li> <li>•What questions would you ask of...?</li> <li>•Would this information be useful if you had a ...?</li> </ul>	<ul style="list-style-type: none"> <li>•Construct a model to demonstrate how it will work.</li> <li>•Make a diorama to illustrate an important event.</li> <li>•Make a scrapbook about the areas of study.</li> <li>•Make a clay model of an item in the material.</li> <li>•Design a market strategy for your product using a known strategy as a model.</li> <li>•Write a textbook about... for others.</li> <li>•Take a collection of photographs to demonstrate a particular point.</li> </ul>

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<b>ANALYSIS/ANALYZING</b>		
<i>Useful Verbs</i>	<i>Sample Question Stems</i>	<i>Potential Activities and Products</i>
analyze distinguish examine compare contrast investigate categorize identify explain separate advertise outline sequence test	<ul style="list-style-type: none"> <li>• If ... happened, what might the ending have been?</li> <li>• How was this similar to...?</li> <li>• What was the underlying theme of...?</li> <li>• What do you see as other possible outcomes?</li> <li>• Why did ... changes occur?</li> <li>• Can you compare your ... with that presented in...?</li> <li>• Can you explain what must have happened when...?</li> <li>• How is ... similar to ...?</li> <li>• What are some of the problems of...?</li> <li>• What were some of the motives behind...?</li> <li>• What was the turning point in the game?</li> </ul>	<ul style="list-style-type: none"> <li>• Design a questionnaire to gather information.</li> <li>• Write a commercial to sell a new product.</li> <li>• Conduct an investigation to produce information to support a view.</li> <li>• Make a flow chart to show the critical stages.</li> <li>• Construct a graph to illustrate selected information.</li> <li>• Make a jigsaw puzzle.</li> <li>• Make a family tree showing relationships.</li> <li>• Put on a play about the study area.</li> <li>• Write a biography of the study person.</li> <li>• Prepare a report about the area of study.</li> <li>• Arrange a party. Make all the arrangements and record the steps needed.</li> <li>• Review a work of art in terms of form, color and texture.</li> </ul>

<b>EVALUATION/EVALUATING</b>		
<i>Useful Verbs</i>	<i>Sample Question Stems</i>	<i>Potential Activities and Products</i>
judge select choose decide debate verify argue recommend assess discuss rate prioritize	<ul style="list-style-type: none"> <li>• Is there a better solution to...</li> <li>• Judge the value of...</li> <li>• Can you defend your position about...?</li> <li>• Do you think ... is a good or a bad thing?</li> <li>• How would you have handled...?</li> <li>• What changes to ... would you recommend?</li> <li>• Do you believe?</li> <li>• Are you a ... person?</li> <li>• How would you feel if...?</li> <li>• How effective are...?</li> <li>• What do you think about...?</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare a list of criteria to judge a ... show. Indicate priority and ratings.</li> <li>• Conduct a debate about an issue of special interest.</li> <li>• Make a booklet about 5 rules you see as important. Convince others.</li> <li>• Form a panel to discuss views, e.g., "Learning at School."</li> <li>• Write a letter to ... advising on changes needed at...</li> <li>• Write a half yearly report.</li> <li>• Prepare a case to present your view about...</li> </ul>

<b>SYNTHESIS/CREATING</b>		
<i>Useful Verbs</i>	<i>Sample Question Stems</i>	<i>Potential Activities and Products</i>
create invent compose predict plan construct design imagine propose devise formulate invent	<ul style="list-style-type: none"> <li>• Can you design a ... to ...?</li> <li>• Why not compose a song about...?</li> <li>• Can you see a possible solution to...?</li> <li>• If you had access to all resources how would you deal with...?</li> <li>• Why don't you devise your own way to deal with...?</li> <li>• What would happen if...?</li> <li>• How many ways can you...?</li> <li>• Can you create new and unusual uses for...?</li> </ul>	<ul style="list-style-type: none"> <li>• Invent a machine to do a specific task.</li> <li>• Design a building to house your study.</li> <li>• Create a new product. Give it a name and plan a marketing campaign.</li> <li>• Write about your feelings in relation to...</li> <li>• Write a TV show, play, puppet show, role-play, song or pantomime about...?</li> <li>• Design a record, book, or magazine cover for...?</li> <li>• Sell an idea.</li> <li>• Devise a way to...</li> </ul>

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## Applying this Information to Students using AAC Devices To Promote Use of Core Vocabulary and Generative Language:

Using the example of Goldilocks and the Three Bears, the following questions/answers could be used with a student using an AAC device who has access to (1) a robust set of core vocabulary words and (2) frequently used/common nouns.

### 1. Knowledge/Remembering

- Who was Goldilocks? a girl
- What did she find in the woods? a house
- What did she do when she got to the house in the woods? she went in

### 2. Comprehension/Understanding

- What did she discover when she went in the house? no one was there
- Why would she go in the house when no one was there? she was afraid, she was hungry and tired
- Retell, in your own words, what she did after she went in the house. She ate food, sat down, and went to sleep.

### 3. Application/Applying

- How were the bears like real people? They had a house, chairs, and bed. They went for a walk.
- Write a sign that should be placed on the front door of the house when you go away. Do not come in.

### 4. Analysis/Analyzing

- How would you feel if someone ate your food or broke your chair? I would be mad.

### 5. Evaluation/Evaluating

- What do you think Goldilocks learned by going into that house? Do not go in if people are not home.
- Would you have gone in the bear's house? Why or why not? I would not go in because it is wrong. I would wait for them to get home.

### 6. Synthesis/Creating

- Write a story about how something similar happened to you or your family. We went on a trip. When we came home, someone was in our house. It was very scary. We called the police, but he got away.