

# CRITICAL THINKING SKILLS

1

Knowledge

Identification and recall of information

define  
fill in the blank  
list  
identify

label  
locate  
match  
memorize

name  
recall  
spell

state  
tell  
underline

Who \_\_\_\_\_?  
What \_\_\_\_\_?  
Where \_\_\_\_\_?  
When \_\_\_\_\_?

How \_\_\_\_\_?  
Describe \_\_\_\_\_?  
What is \_\_\_\_\_?

2

Comprehension

Organization and selection of facts and ideas

convert  
describe  
explain

interpret  
paraphrase  
put in order

restate  
retell in your own words  
rewrite

summarize  
trace  
translate

Re-tell \_\_\_\_\_ in your own words.  
What is the main idea of \_\_\_\_\_?

What differences exist between \_\_\_\_\_?  
Can you write a brief outline?

3

Application

Use of facts, rules, and principles

apply  
compute  
conclude  
construct

demonstrate  
determine  
draw  
find out

give an example  
illustrate  
make  
operate

show  
solve  
state a rule or principle  
use

How is \_\_\_\_\_ an example of \_\_\_\_\_?  
How is \_\_\_\_\_ related to \_\_\_\_\_?  
Why is \_\_\_\_\_ significant?

Do you know of another instance where \_\_\_\_\_?  
Could this have happened in \_\_\_\_\_?

4

Analysis

Separating a whole into component parts

analyze  
categorize  
classify  
compare

contrast  
debate  
deduct  
determine the factors

diagram  
differentiate  
dissect  
distinguish

examine  
infer  
specify

What are the parts or features of \_\_\_\_\_?  
Classify \_\_\_\_\_ according to \_\_\_\_\_.  
Outline/diagram/web/map \_\_\_\_\_.

How does \_\_\_\_\_ compare/contrast with \_\_\_\_\_?  
What evidence can you present for \_\_\_\_\_?

5

Synthesis

Combining ideas to form a new whole

change  
combine  
compose  
construct  
create  
design

find an unusual way  
formulate  
generate  
invent  
originate  
plan

predict  
pretend  
produce  
rearrange  
reconstruct  
reorganize

revise  
suggest  
suppose  
visualize  
write

What would you predict/infer from \_\_\_\_\_?  
What ideas can you add to \_\_\_\_\_?  
How would you create/design a new \_\_\_\_\_?

What solutions would you suggest for \_\_\_\_\_?  
What might happen if you combined \_\_\_\_\_ with \_\_\_\_\_?

6

Evaluation

Developing opinions, judgements, or decisions

appraise  
choose  
compare  
conclude

decide  
defend  
evaluate  
give your opinion

judge  
justify  
prioritize  
rank

rate  
select  
support  
value

Do you agree that \_\_\_\_\_? Explain.  
What do you think about \_\_\_\_\_?  
What is most important?

Prioritize \_\_\_\_\_ according to \_\_\_\_\_?  
How would you decide about \_\_\_\_\_?  
What criteria would you use to assess \_\_\_\_\_?

LEARNING  
TAXONOMY  
FOR THE  
MS  
STUDENTS

# Learning Taxonomy for the MS Students

One of the focal points teachers may focus while designing the course contents is whether their students are able to learn whatever they are required to learn. Students always learn something, but good teachers want their students to learn something important and significant, rather than something relatively insignificant. This leads to a question that is key to the whole teaching paradigm: What are the ways in which learning can be significant? Basic knowledge of a task or fact is not enough without the critical thinking to put these to use, especially in MS courses. In order to develop the higher order cognitive skill in the students, we are using **Bloom's Taxonomy** as a "Learning Taxonomy" for MS students in the semester Fall 2013.

## What is Cognitive Skill?

Skills in the cognitive domain revolve around knowledge, comprehension, and "thinking through" a particular topic. Traditional education tends to emphasize the skills in this domain, particularly the lower-order objectives. There are six levels in the Bloom's taxonomy, moving through the lowest order process to the highest.

## What is Bloom's Taxonomy?

Bloom's Taxonomy helps educators identify the intellectual level at which individual students are capable of working. It also helps them ask questions and create instructions aimed at critical thinking by striving to reach the top three levels of analysis, synthesis and evaluation with students ready for those levels.

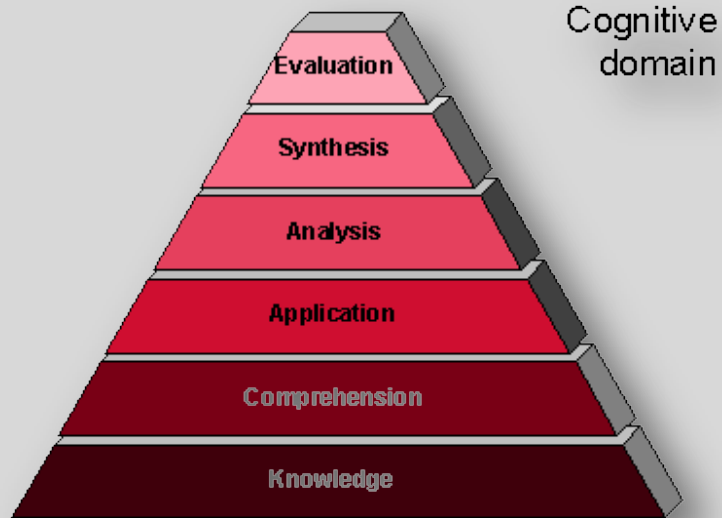
## **What Are The Benefits?**

- Helps students to develop higher level thinking skills
- Increases the permanent acquisition of learning

## **The Cognitive Domain**

The cognitive domain involves the acquisition and use of knowledge, and is predominant in the majority of courses. Bloom identified six levels within the cognitive domain:

- 1. Knowledge**
- 2. Comprehension**
- 3. Application**
- 4. Analysis**
- 5. Synthesis**
- 6. Evaluation**



### Cognitive Domain for Bloom's Taxonomy

Category	Definition	Related Behavior (Verbs)
<b>Evaluation</b>	judging the value of material or methods as they might be applied in a particular situation; judging with the use of definite criteria	accept, appraise, assess, arbitrate, award, choose, conclude, criticize, defend, evaluate, grade, judge, prioritize, recommend, referee, reject, select, support
<b>Synthesis</b>	Creating something new by putting parts of different ideas together to make a whole.	blend, build, change, combine, compile, compose, conceive, create, design, formulate, generate, hypothesize, plan, predict, produce, reorder, revise, tell, write
<b>Analysis</b>	breaking something down into its parts; may focus on identification of parts or analysis of relationships between parts, or recognition of organizational principles	analyze, compare, contrast, draw diagram, differentiate, dissect, distinguish, identify, illustrate, infer, outline, point out, select, separate, sort, subdivide
<b>Application</b>	using a general concept to solve problems in a particular situation; using learned material in new and concrete situations	apply, adopt, collect, construct, demonstrate, discover, illustrate, interview, make use of, manipulate, relate, show, solve, use

<b>Comprehension</b>	understanding something that has been communicated without necessarily relating it to anything else	alter, account for, annotate, calculate, change, convert, group, explain, generalize, give examples, infer, interpret, paraphrase, predict, review, summarize, translate
<b>Knowledge</b>	recalling or remembering something without necessarily understanding, using, or changing it	define, describe, identify, label, list, match, memorize, point to, recall, select, state

## Knowledge

Recalling the memorized information. May involve remembering 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. Represents the lowest level of learning outcomes in the cognitive domain.

**Learning objectives at this level:** know common terms, know specific facts, know methods and procedures, know basic concepts, know principles.

**Question verbs:** Define, list, state, identify, label, name, who? When? Where? What?

## Comprehension

The ability to grasp the meaning of material. Translating material from one form to another (words to numbers), interpreting material (explaining or summarizing), estimating future trends (predicting consequences or effects). Goes one step beyond the simple remembering of material, and represent the lowest level of understanding.

**Learning objectives at this level:** understand facts and principles, interpret verbal material, interpret charts and graphs, translate verbal material to mathematical formulae, estimate the future consequences implied in data, justify methods and procedures.

**Question verbs:** Explain, predict, interpret, infer, summarize, convert, translate, give example, account for, paraphrase x?

## Application

The ability to use learned material in new and concrete situations. Applying rules, methods, concepts, principles, laws, and theories. Learning outcomes in this area require a higher level of understanding than those under comprehension.

**Learning objectives at this level:** apply concepts and principles to new situations, apply laws and theories to practical situations, solve mathematical problems, construct graphs and charts, and demonstrate the correct usage of a method or procedure.

**Question verbs:** How could x be used to y? How would you show, make use of, modify, demonstrate, solve, or apply x to conditions y?

## Analysis

The ability to break down material into its component parts. Identifying parts, analysis of relationships between parts, 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.

**Learning objectives at this level:** recognize unstated assumptions, recognizes logical fallacies in reasoning, distinguish between facts and inferences, evaluate the relevancy of data, analyze the organizational structure of a work (art, music, writing).

**Question verbs:** Differentiate, compare / contrast, distinguish x from y, how does x affect or relate to y? Why? How? What piece of x is missing / needed?

## Synthesis

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.

**Learning objectives at this level:** write a well-organized paper, give a well-organized speech, write a creative short story (or poem or music), propose a plan for an experiment, integrate learning from different areas into a plan for solving a problem, formulate a new scheme for classifying objects (or events, or ideas).

**Question verbs:** Design, construct, develop, formulate, imagine, create, change, write a short story and label the following elements:

## Evaluation

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, which may be internal (organization) or external (relevance to the purpose). 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.

**Learning objectives at this level:** judge the logical consistency of written material, judge the adequacy with which conclusions are supported by data, judge the value of a work (art, music, writing) by the use of internal criteria, judge the value of a work (art, music, writing) by use of external standards of excellence.

**Question verbs:** Justify, appraise, evaluate, judge x according to given criteria. Which option would be better/preferable to party y?

## Example





### Level 1. Knowledge

- When was this picture taken?
- Where was this picture taken?

**Question cues:** List, define, tell, label

### Level 2. Comprehension

- What is happening in this picture?
- Why are these boys dressed like this?

**Question cues:** Describe, name, identify, discuss

### Level 3. Application

- How would you describe the photograph to others?
- What caption would you write for this photograph (say, in a newspaper, magazine or blog)?

**Question cues:** Modify, solve, change, Explain

### Level 4. Analysis

- Why are these boys here and not in university?
- What do you know about their cause based on this photo?

**Question cues:** Analyze, separate, compare, contrast

### Level 5. Synthesis

- What might these boys say about their work in an interview setting?
- What might they say about their future?

**Question cues:** Create, construct, plan, role-play

### Level 6. Evaluation

- What is the significance of this photo for the education?
- Give your opinion regarding the cause depicts from this photo?

**Question cues:** Give opinion, criticize, discriminate, summarize

**Note:** Go to cover page and practice the questions to build your critical thinking skill

