

Creative and Scientific Thinking

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CRE252
Information Technology Department

Lecture 4



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Learning Objectives:

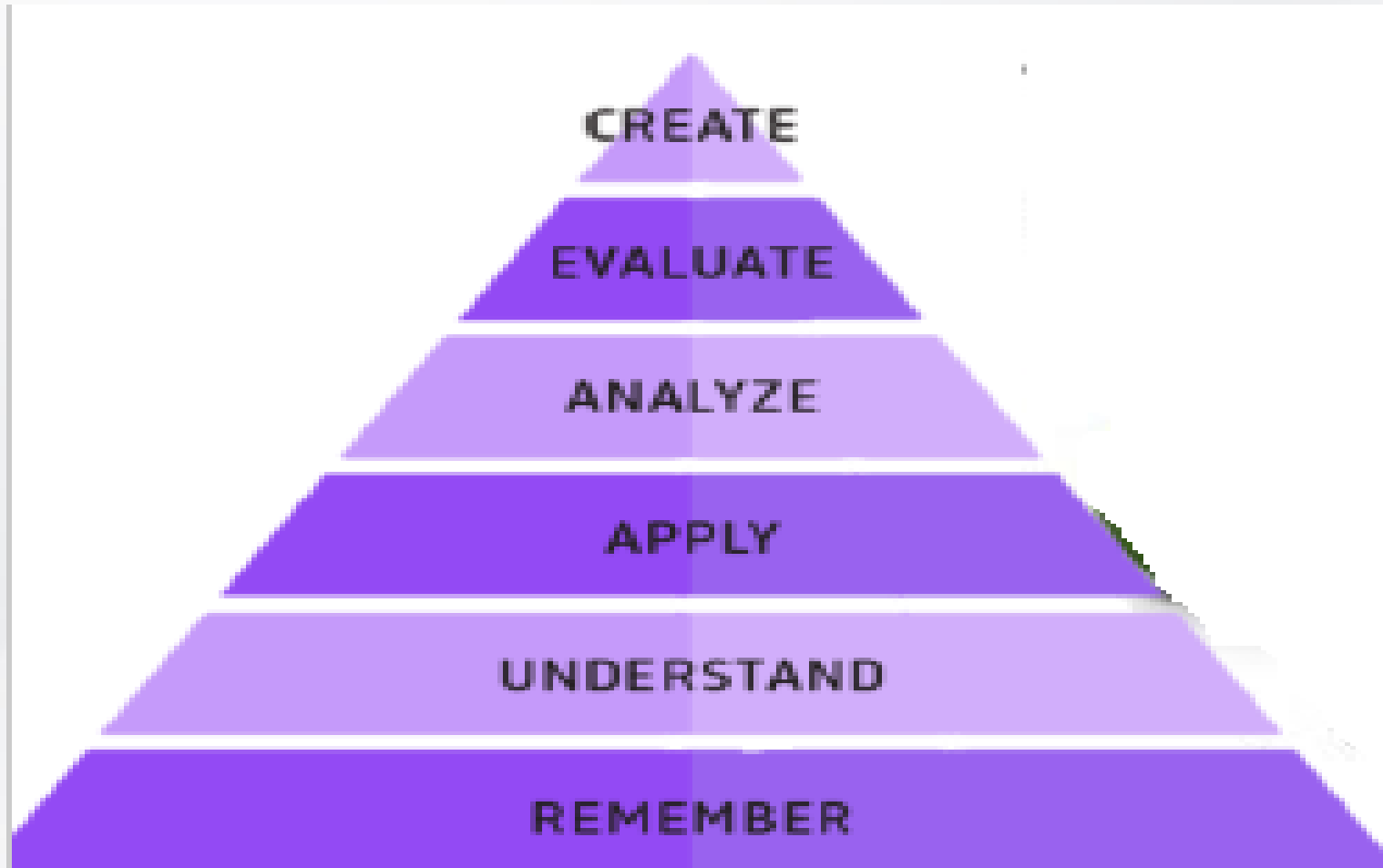
- **Bloom`s Taxonomy**
- **Bloom`s Taxonomy Levels**
- **Bloom`s Taxonomy Examples**
- **Bloom`s Taxonomy Definition**
- **Levels of thinking: Bloom Taxonomy**
- **Low level of thinking**
- **High level of thinking**
- **Using Bloom`s Taxonomy in Designing a Course**
- **Components of Scientific Thinking**

Bloom`s Taxonomy

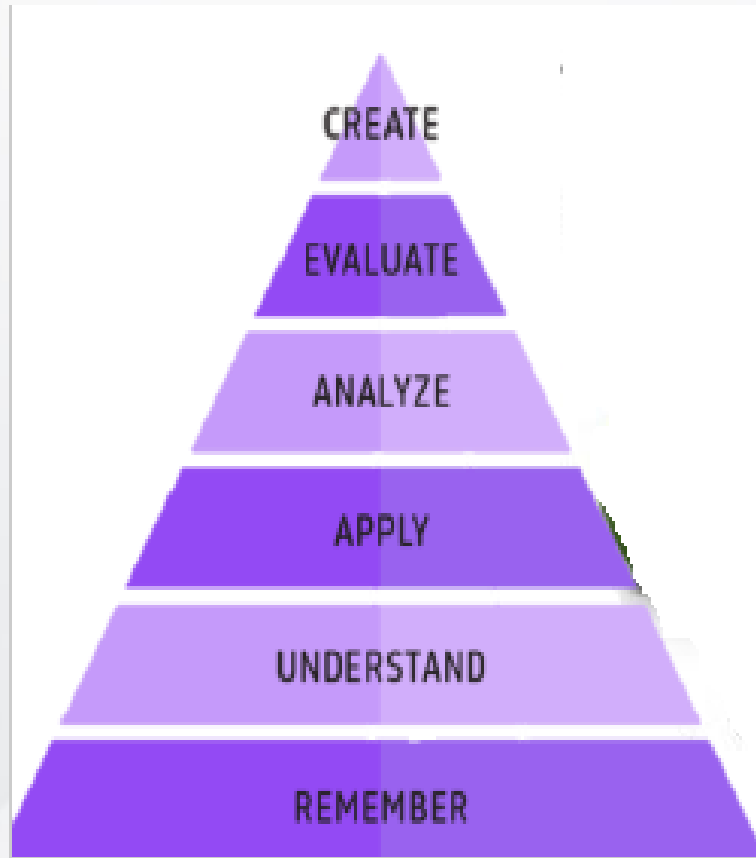
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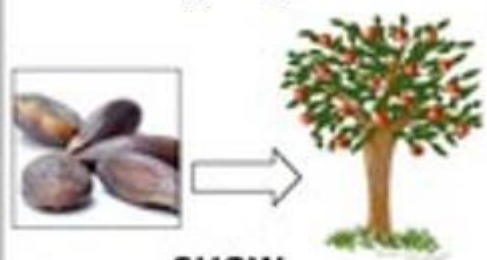
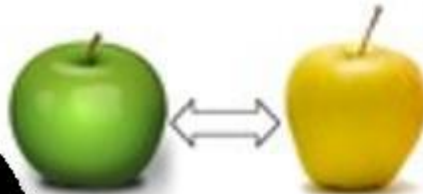
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Bloom`s Taxonomy Levels:



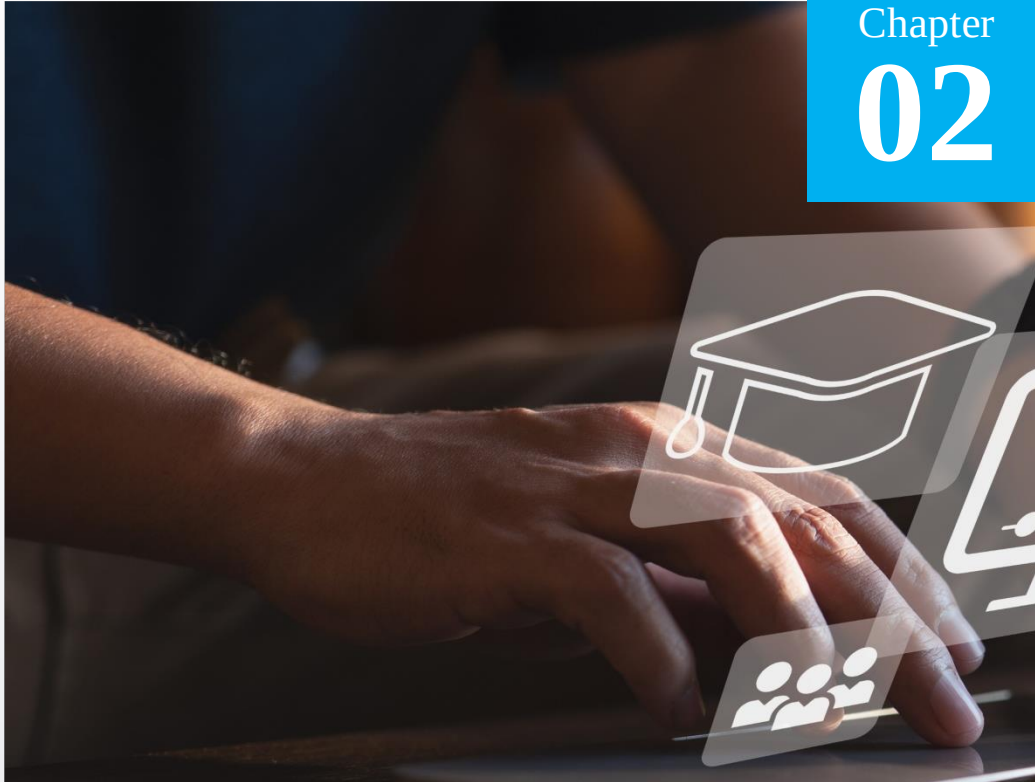
Example 1:



Bloom's Taxonomy		
1 Remember What is an apple  KNOW	2 Understand: Do you understand how an apple grows?  SHOW	3 Apply: Can you use apple?  DO
4 Analyze: Can you compare apples?  COMPARE	5 Evaluate: what is the best type of apples?  JUDGE	6 Create: Can you invent a new type of apple Sause?  CREATE

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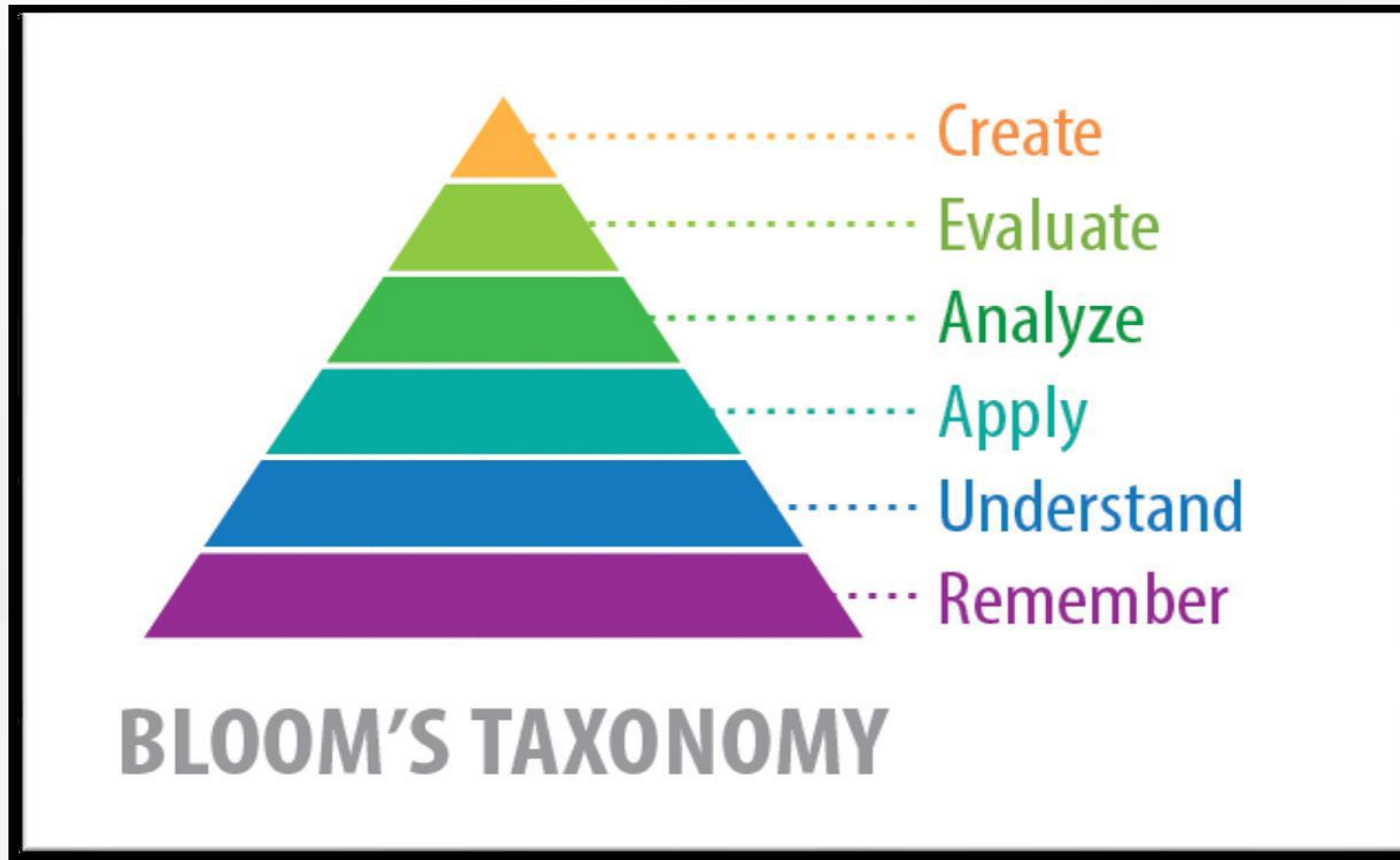
Bloom`s Taxonomy Definition



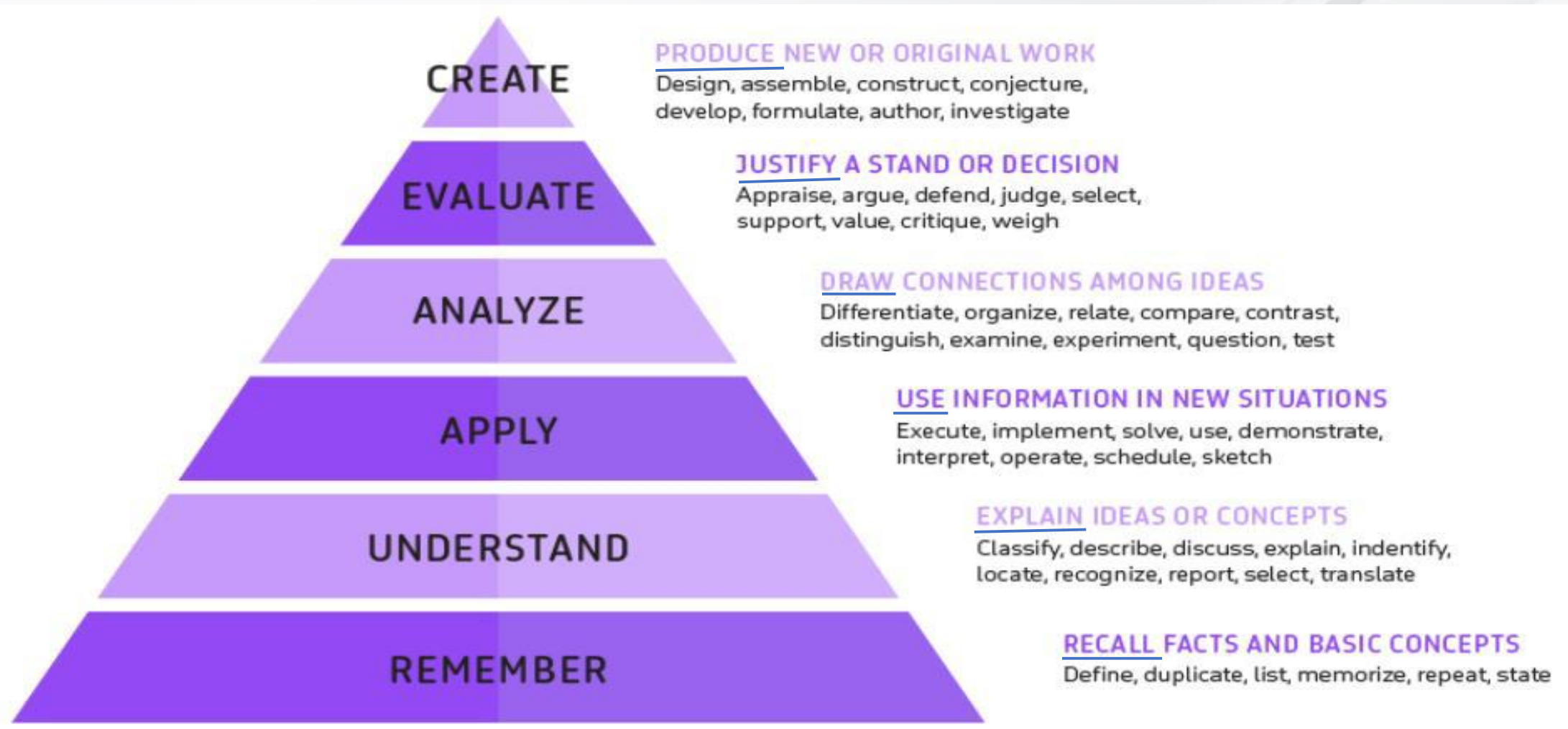
Bloom`s Taxonomy Definition:

- **Bloom`s taxonomy** is a **framework** for **educational** achievement in which each level depends on the one of the following:
 - **Create**
 - **Evaluate**
 - **Analyze**
 - **Apply**
 - **Understand**
 - **Remember**

Bloom's Taxonomy:



Levels of thinking: Bloom Taxonomy



Levels of thinking: Bloom Taxonomy Definition

- Levels of thinking using Bloom Taxonomy is a method to categorize the brain thinking as six level.

Levels of thinking: Bloom Taxonomy

- The levels of thinking using Bloom Taxonomy are organized into two groups.

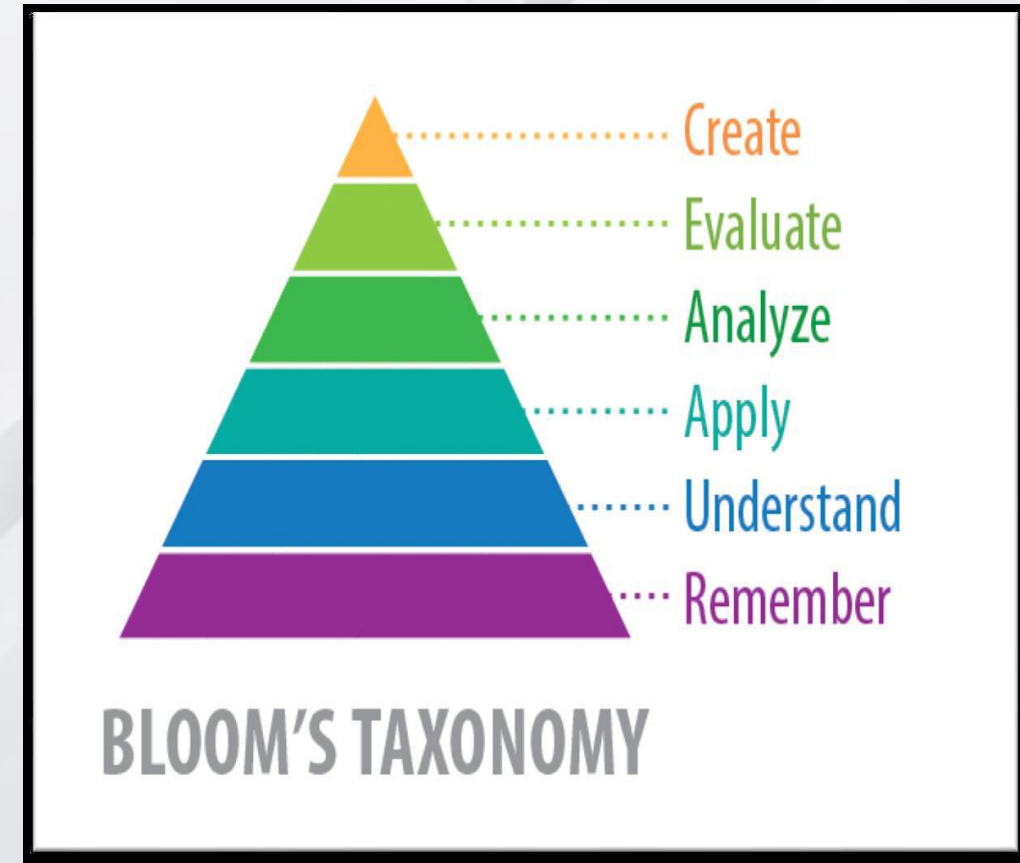
A. Low level of thinking

B. High level of thinking

Levels of thinking: Bloom Taxonomy

A. Low level of thinking: includes

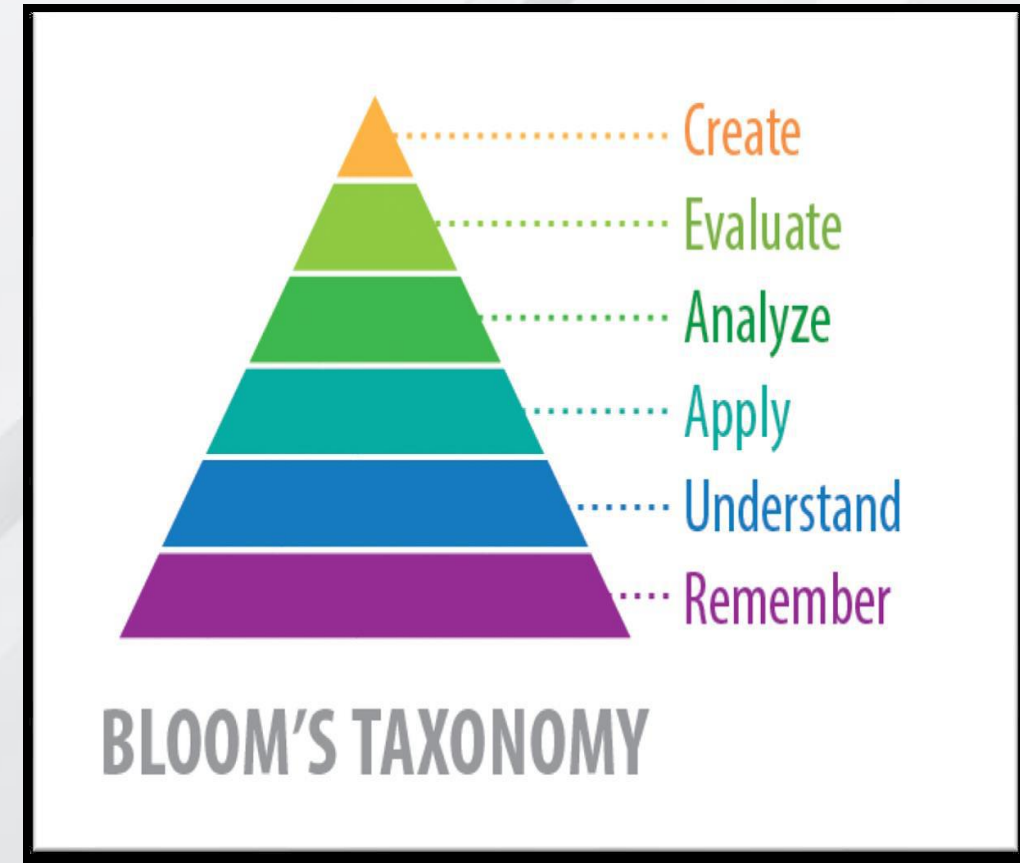
1. Remember
2. Understand
3. Apply



Levels of thinking: Bloom Taxonomy

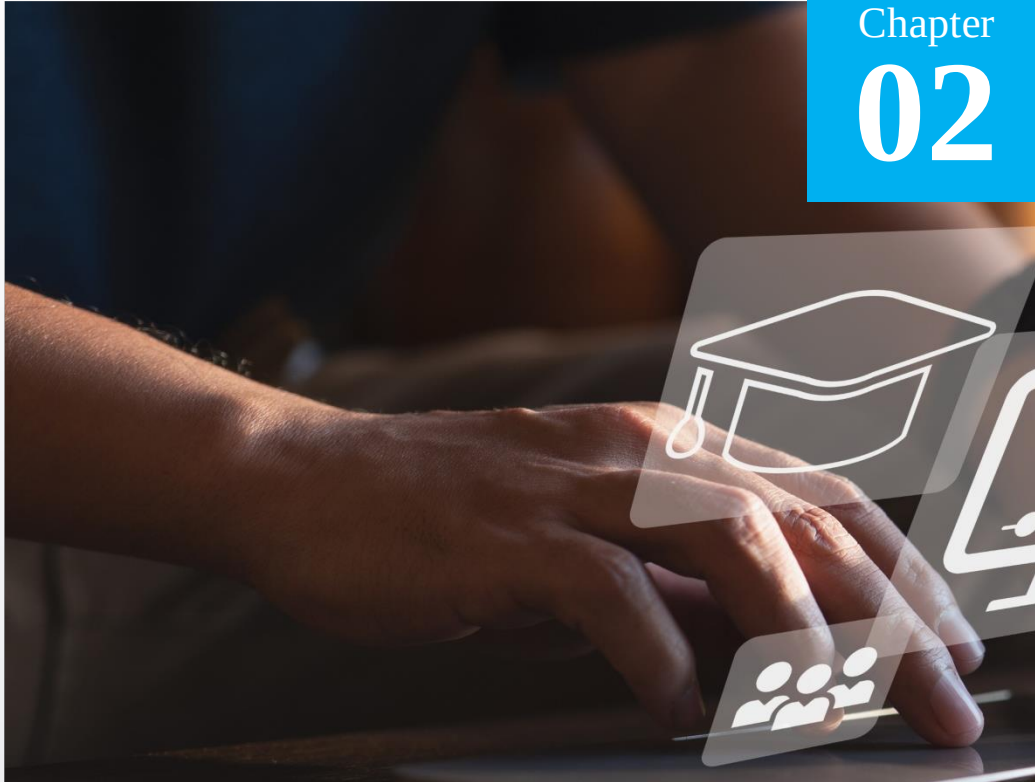
B. High level of thinking: includes

- 4. Analysis
- 5. Evaluate
- 6. Create



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The Six Levels of thinking: Bloom taxonomy



Bloom`s Taxonomy

Low level of thinking

Level 1 of thinking: Bloom taxonomy

Remember:

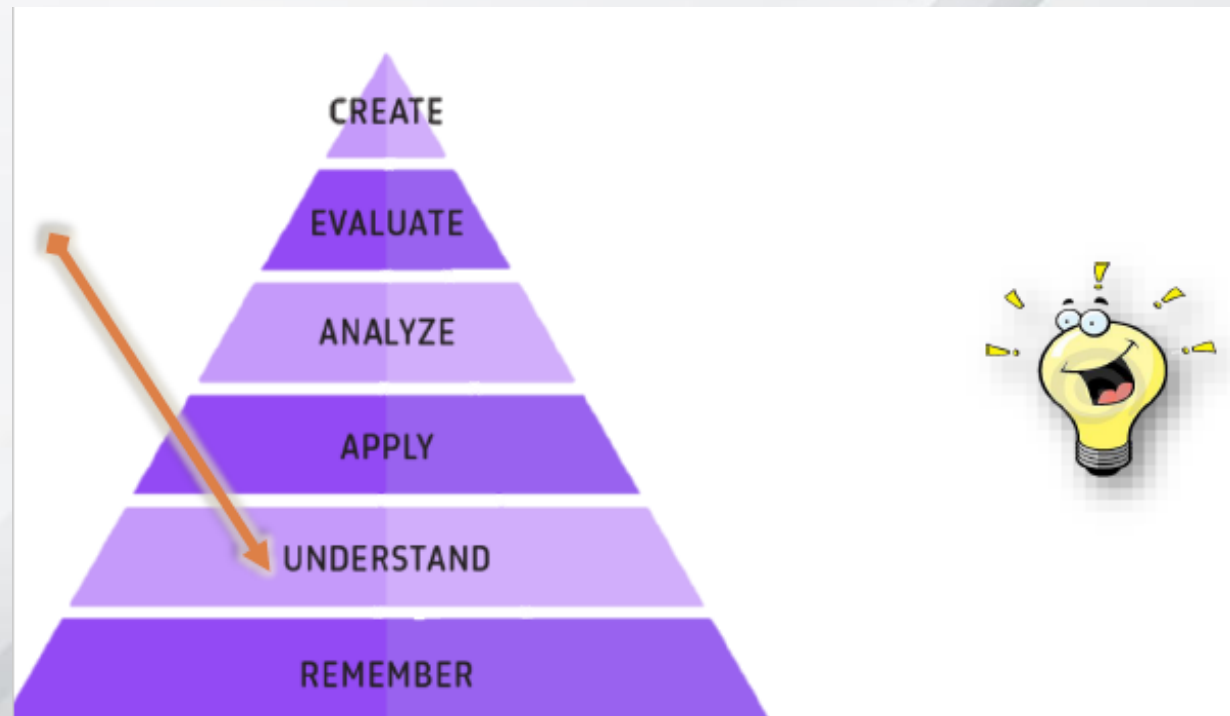
- Is about **recalling facts and concepts**.
- A student can define and duplicate, make a list, memorize points, repeat information, and make valid statements.
- It **does not prove understanding**.



Level 2 of thinking: Bloom taxonomy

Understand:

- This is where **the student understand**.
- The student explains ideas, explains what they mean and translates the facts in some way.



Level 3 of thinking: Bloom taxonomy

Apply:

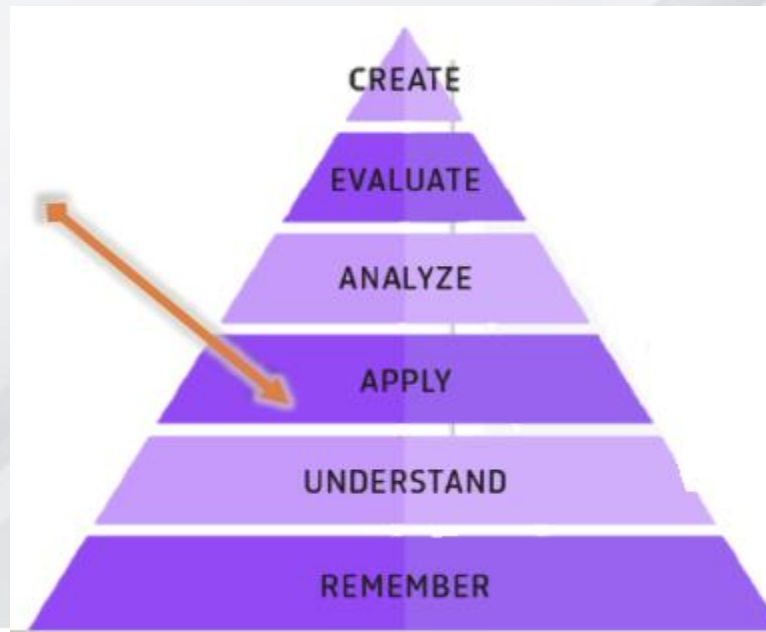
- In this level, students use the information.
- They have learned in new situations, whether it's to solve a problem, demonstrate an idea.



Level 3 of thinking: Bloom taxonomy

Apply:

- In **Apply** level of thinking using Bloom Taxonomy:
 - Be able to use / apply knowledge – to solve problems in new situations.
 - Example: How would you use what you know to detect a flaw in the structure?



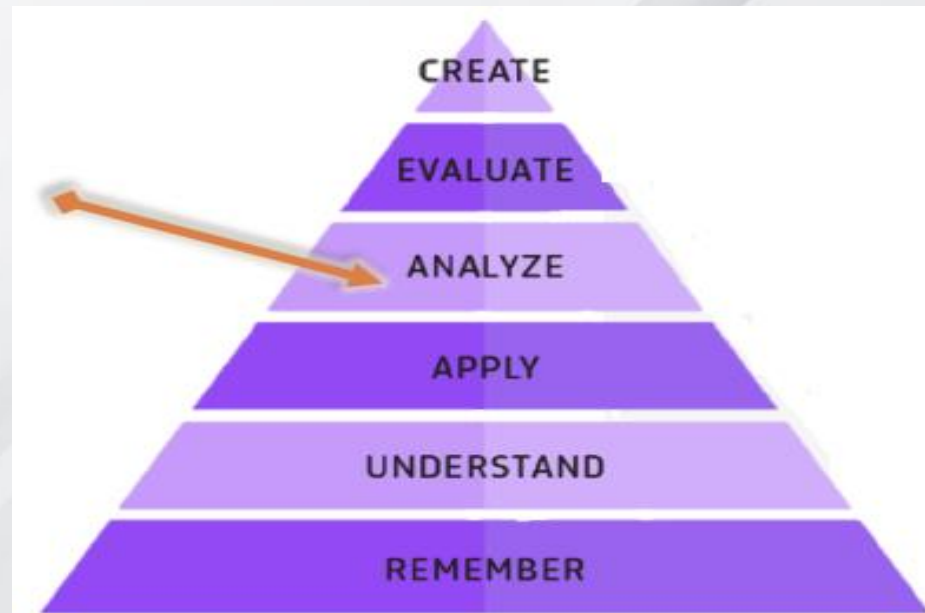
Bloom`s Taxonomy

High level of thinking

Level 4 of thinking: Bloom taxonomy

Analyze:

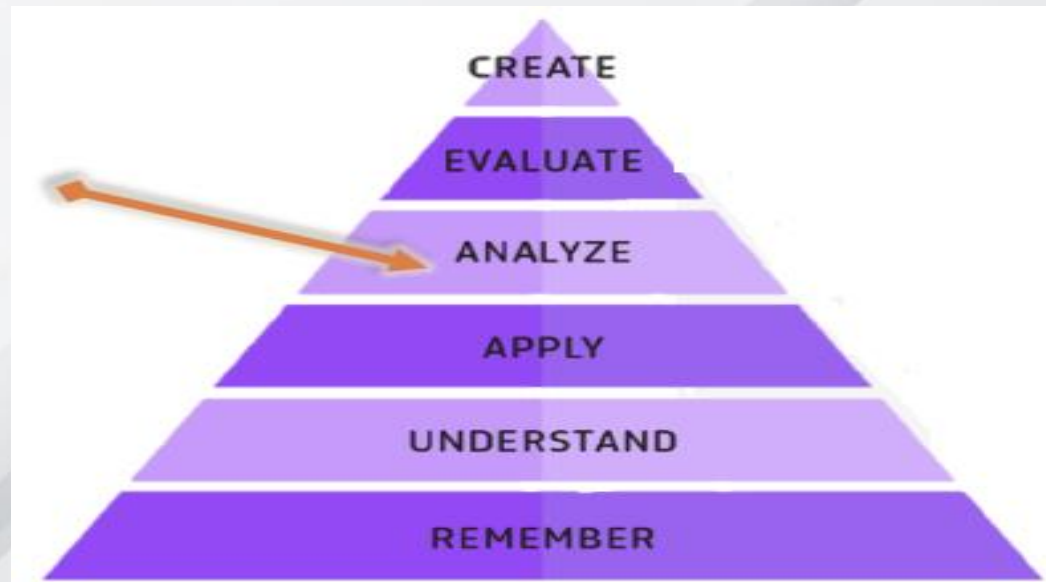
- The students must draw connections between ideas in the analyze level of Bloom's taxonomy.
- In the analyze level of Bloom's taxonomy, they must examine, question or test their knowledge.



Level 4 of thinking: Bloom taxonomy

Analyze:

- Critical thinking finally comes into play, as the student distinguishes between fact and opinion, and breaks information down into component parts.



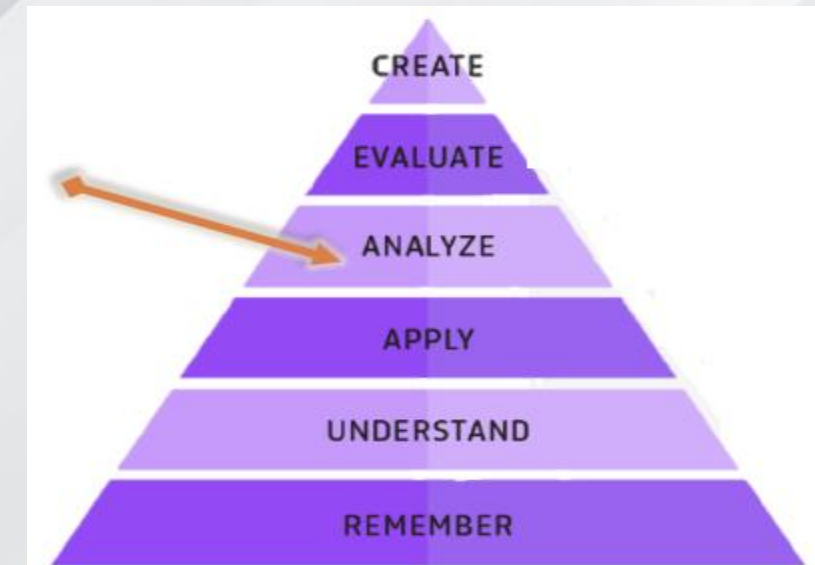
Level 4 of thinking: Bloom taxonomy

Analyze:

- In **Analyze** level of thinking using Bloom Taxonomy:

Be able to:

- Break up any new information to parts (Identify Reasons, Causes, Motives. etc...)
- Find evidence to support view.
- Example: Why are Dolphins called mammals?



Level 5 of thinking: Bloom taxonomy

Evaluate:

- In the **Evaluate** stage, the student can justify a decision by arguing, defending, judging, supporting, or weighing in with thoughts based on the knowledge and application they have acquired thus far.



Level 6 of thinking: Bloom taxonomy

Create:

In the final level **Create** of Bloom's taxonomy:

- The **student Create full knowledge** by **applying** what they have learned, analyzed and evaluated, and built.



Level 6 of thinking: Bloom taxonomy

Create:

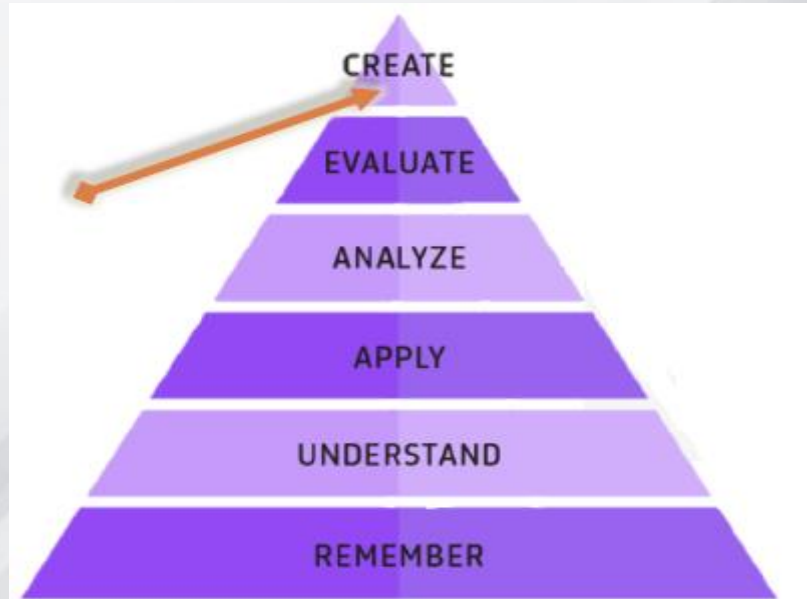
They can design a piece of machinery, or revising a process to improve the results.



Level 6 of thinking: Bloom taxonomy

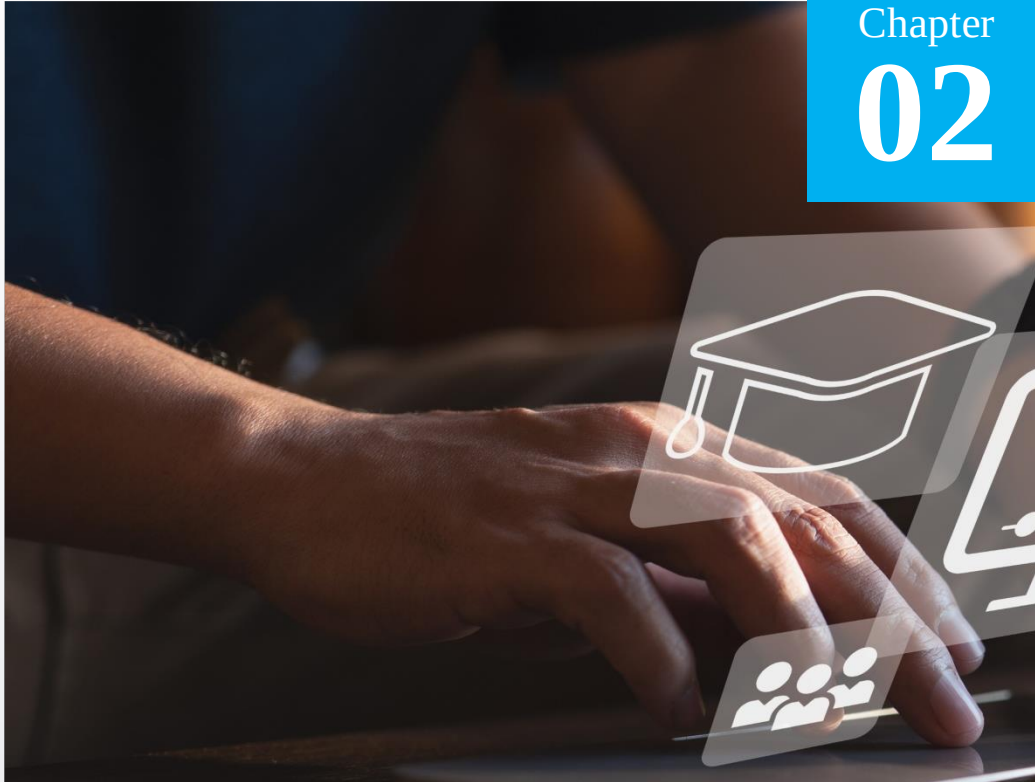
Create:

- In **Create** level of thinking using Bloom Taxonomy:
Be able to:
 - Defend Opinion / Findings based on Evidence.
 - Example: Why is Benjamin Franklin so famous?



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Using Bloom's Taxonomy in Designing a Course



Examples

Example 2: Using Bloom's Taxonomy in designing a course(Newton's three laws of motion)

- We are going to use the 6 levels to structure the learning objectives, lessons, and assessments of courses.

Example 2: Using Bloom's Taxonomy in designing a course(Newton's three laws of motion)

The Newton's three laws of motion:

- **Newton's First law:**

Objects in motion tend to stay in motion and objects at rest tend to stay at rest unless acted upon by an unbalanced force.

- **Newton's Second law:**

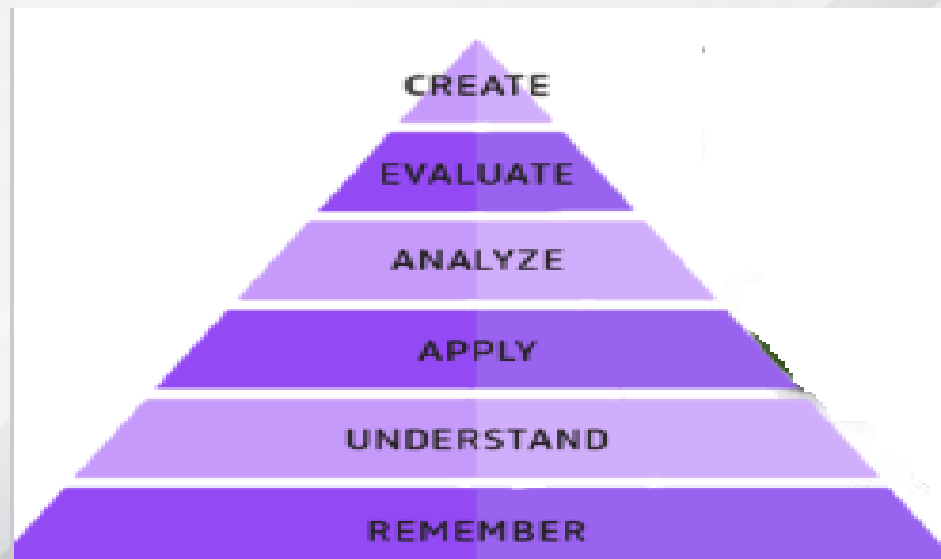
Force equals mass times acceleration ($F = ma$).

- **Newton's Third law:**

For every action there is an equal and opposite reaction.

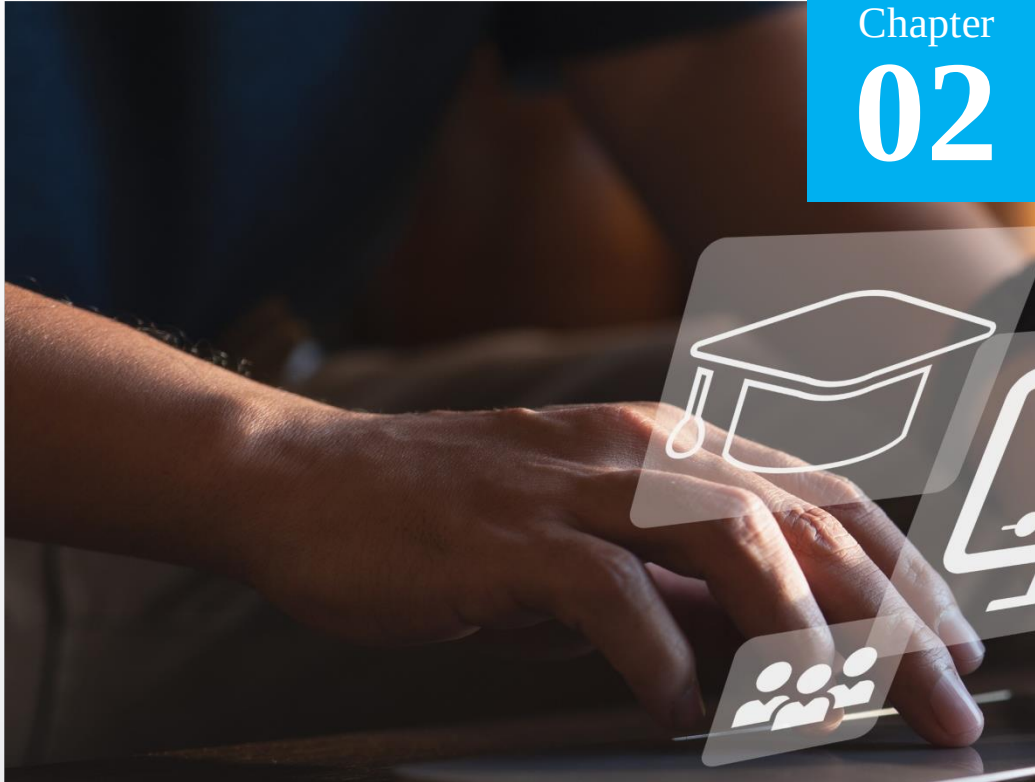
Example 3: Using Bloom's Taxonomy in designing a course(Newton's three laws of motion)

- Before you can **Understand**—a concept, you must be able to **remember** it.
- To **apply** a concept you must first (**understand**)it.
- In order to **evaluate** a process, you must have **analyzed** it.
- To **create** an accurate **evaluation**, you must have completed a thorough aware of it.



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EXERCISE



EXERCISE:

Think about Types of Thinking Skills

Are you using all six thinking skills?

- Reflect on your life in the past three weeks and identify specific examples where you used each of the thinking skills.
- Use the comment column to write notes about the skills that are natural to you and those you would like to develop further.

EXERCISE:

Think about Types of Thinking Skills

Skill Set	How You Used It in the Past Three Weeks	Comments
Remember		
Understand		
Applying		
Analyze		
Evaluate		
Create		

Components of Scientific Thinking

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Whatever the type of thinking, **scientific thinkers use three components of thinking:**

The **three components of scientific thinking** are:

- Empiricism
- Rationalism
- Skepticism

Whatever the type of thinking, **scientific thinkers use three components of thinking:**

The **three components of scientific thinking** are:

- Empiricism التجريبية:
(the theory that the origin of all **knowledge is sense experience**)
- Rationalism العقلانية:
(is the philosophy that **knowledge comes from logic**)
- Skepticism الشك.



Thank You