Rethinkers
Brains ready for tomorrow

2

THINKING SCHOOLS

Path 2

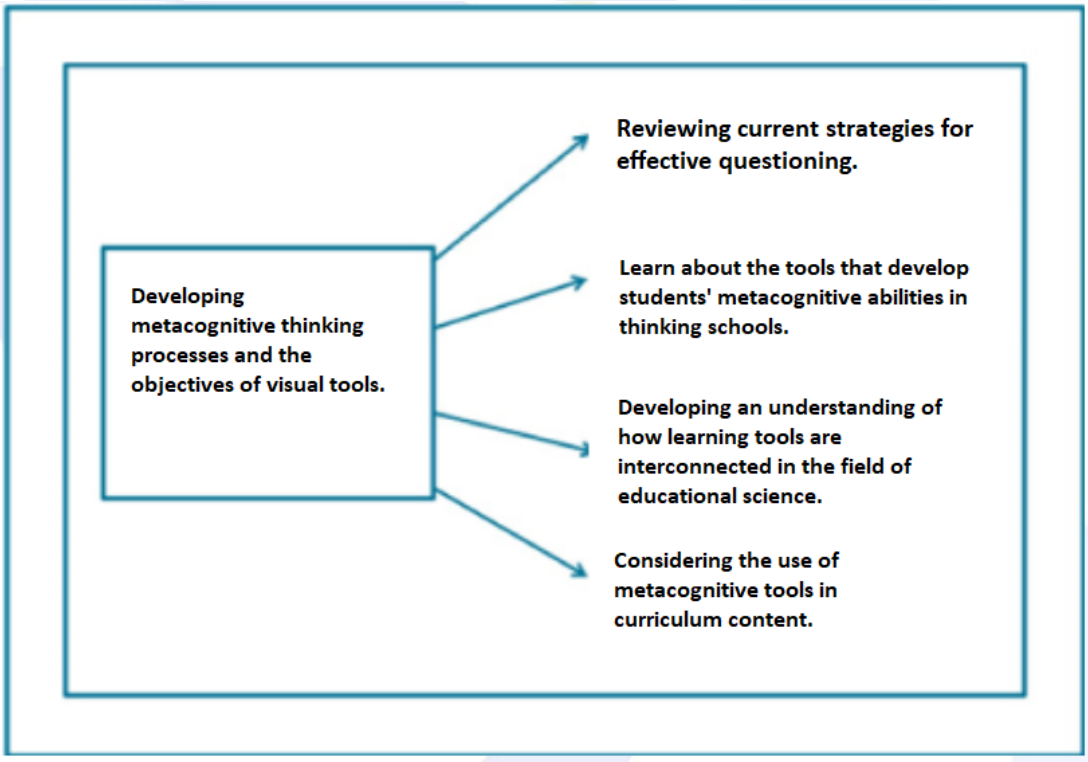
VISUAL THINKING

Participant's Guide

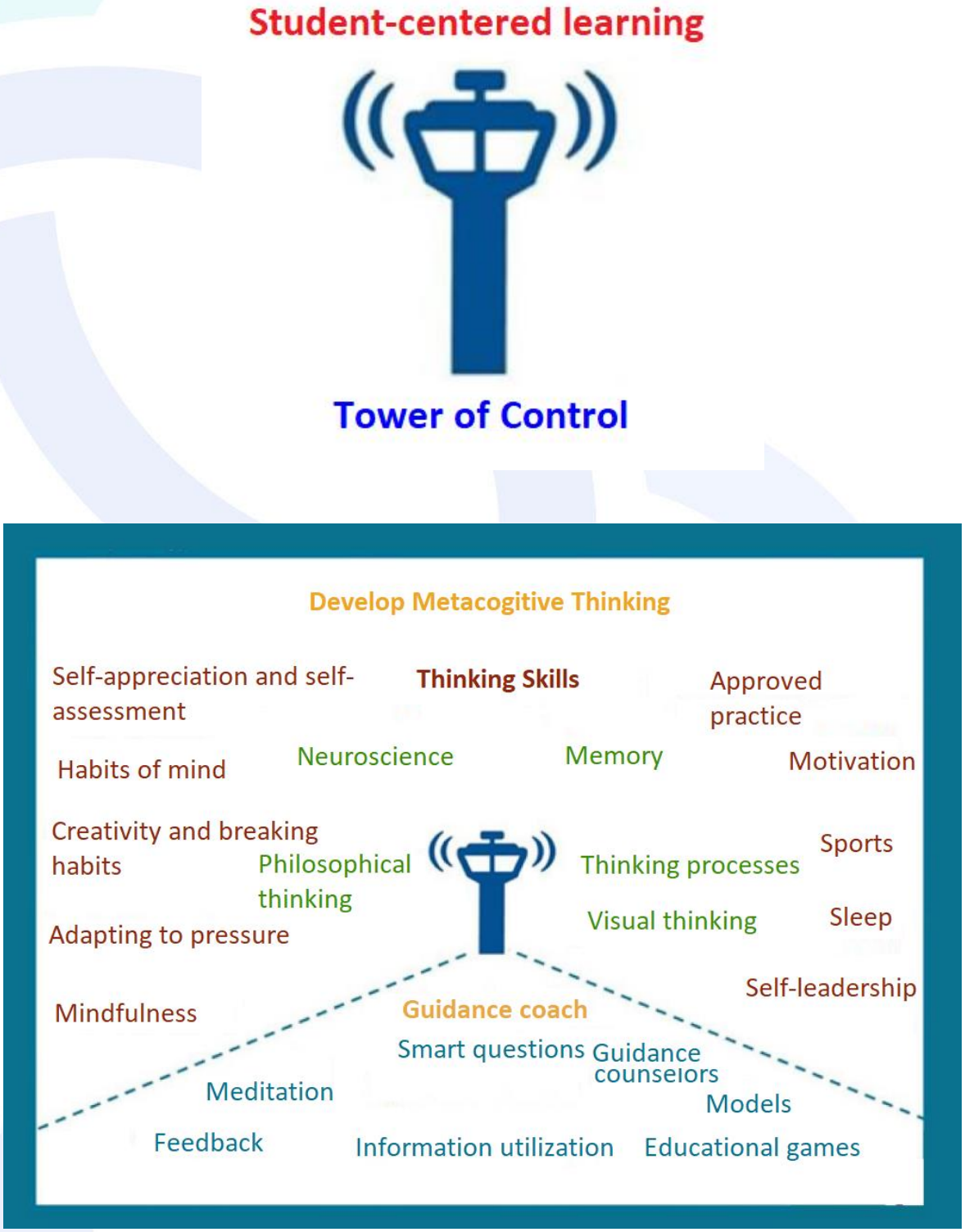
PRTICIPANTS GUIDE

Trainers and consultants for those who believe that thinking is important.

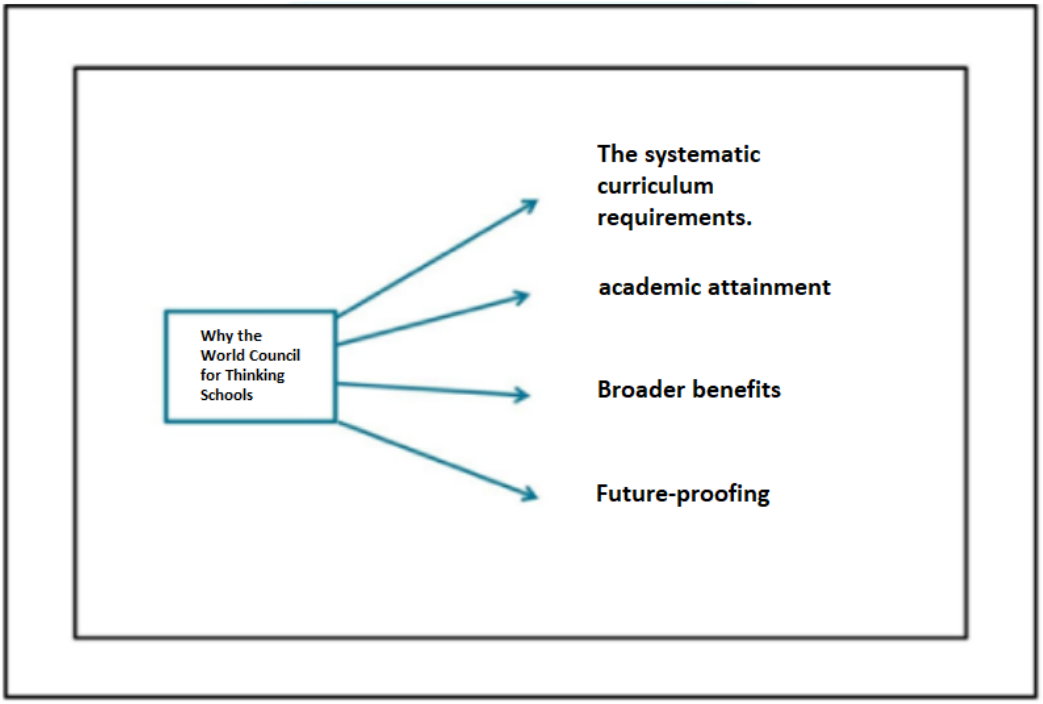
We seek to provide evidence-based guidance to develop beyond knowledge in individuals. We have established a working Frame for professional development of teachers to nurture intelligence and effective tools. We need to excel in a range of thinking abilities and teaching actions that extend beyond mere knowledge. Furthermore, we offer specialized guidance to leadership teams on transforming their institutions' culture, so that explicit thinking and self-improvement are at the core of what they do. Independent learners developing capabilities worldwide, our unique approach results in an organized structure that shapes innovative and adaptive mindsets and behaviors for success in a rapidly-changing future.



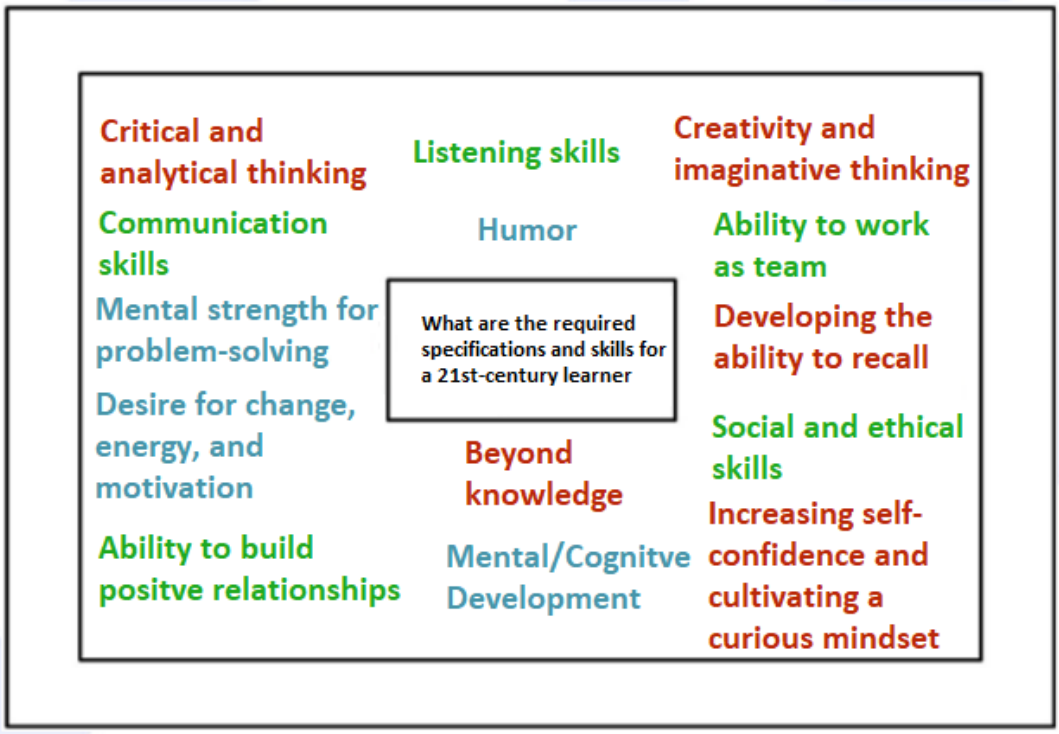
The approach of active thinking.



Why is thinking Important?



The 21st-century learner:



Effective thinking:

It is essential for schools to align their vision and values with the following international principles of thinking schools:

- Student Focus: Emphasizing the need to focus on students and improve their thinking abilities. Student-centered teaching revolves around equipping students with metacognitive tools and strategies that enhance their thinking skills. It is believed that all learners have innate capabilities to think in diverse ways, and their thinking abilities can be improved through the use of cognitive tools and strategies.
- Universal Approach: Recognizing that all learners possess natural abilities for thinking in various ways. Establishing educational practices and policies should be based on strong evidence from research and investigation.
- Evidence-Informed: Ensuring that educational practices and policies are guided by strong evidence.
- Focus on Progress: Acquiring and developing metacognitive strategies and intelligent learning behaviors leads to more effective learning outcomes when integrated into content planning. It is important for teachers to fully commit to this by:

1. Using a shared language of explicit thinking and learning.
2. Making thinking and learning explicit.
3. Fostering independent thinkers and learners.

The eight forces that shape the culture:

Ron Ritchhart from Harvard University presented the concept of culture as a key to deep learning and the development of strategies beyond knowledge and intelligent learning behaviors that students need as they face the complexities and challenges of our world. He identified eight "forces" that shape the culture.

Part 1:

Introduction to metacognitive visual tools.

Metacognitive visual tools enable students to examine their own thinking beyond the presented knowledge (Costa, 1991). They can reflect on their thinking by visualizing it as a reflection in a pool of water, using visual tools. Through these tools, students can make their thinking visible and easily engage in thinking with their peers. This process allows them to become self-reflective in their actions and content, leading to the development of more advanced forms of thinking.

Thinking Frames are a specific type of visual organizational tools based on distinctive visual patterns that help structure thinking and ideas. They effectively integrate linguistic (words and phrases) and non-linguistic elements (lines, images, arrows, symbols, etc.), aiding students in storing knowledge and enhancing their understanding of the content.

The more students who utilize both representational systems (linguistic and non-linguistic), the better they are able to think about and recall the knowledge.

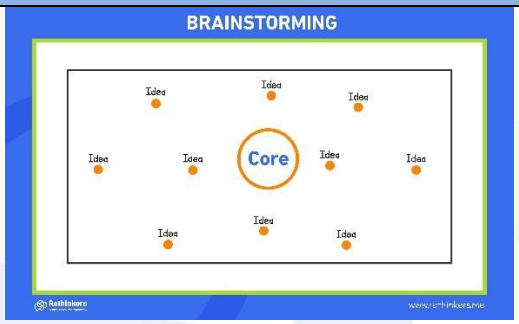
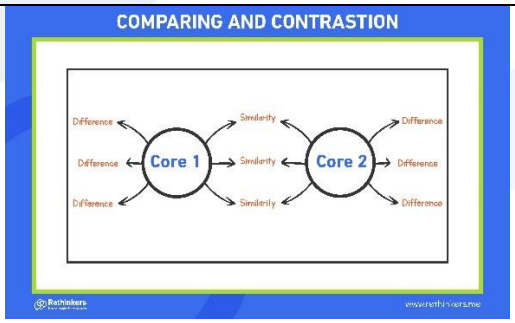
Why use thinking Frames?

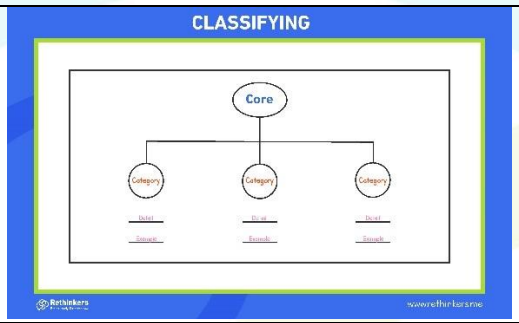
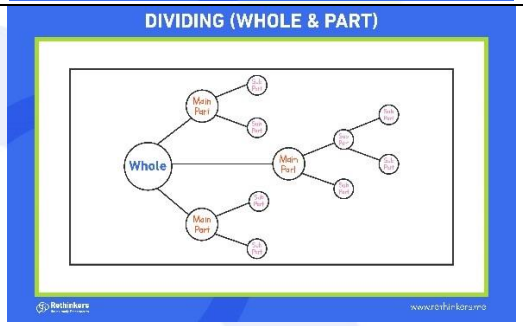
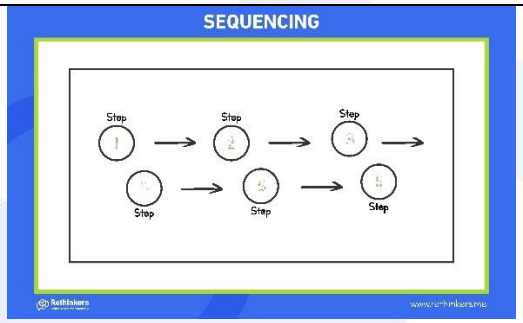
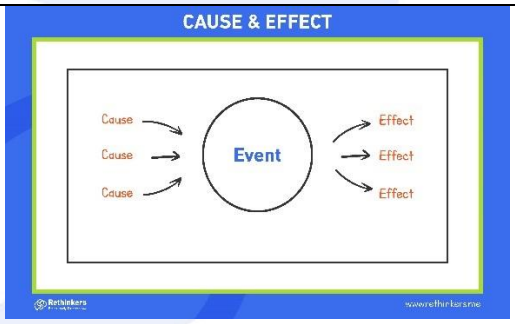
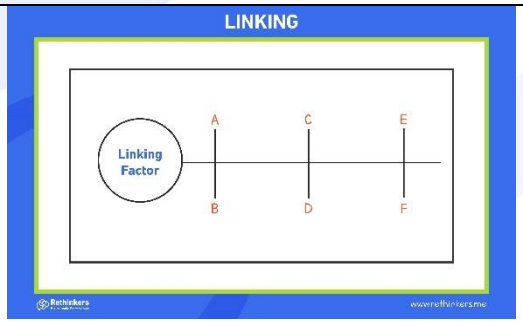
- Enhancing Learning by Strengthening Neural Connections: Visual tools act as bridges between the reticular brain and cognitive and emotional capacities, generating creative, analytical, and conceptual ideas.
- Making Specific Cognitive Processes Explicit: Thinking Frames aim to develop eight specific cognitive processes using a consistent visual pattern and the associated language of thinking. They also encourage the transfer of thinking skills and provide a visual record of thinking while stimulating the creation of thinking tools by students.
- Providing a Shared Visual Language: Thinking Frames offer adaptable tools that can be used by students and teachers across all subject areas and age groups. They can involve the use of images and writing, suitable for use in various topic domains.
- Supporting Deeper Thinking at All Levels: Thinking Frames can be employed to achieve deeper thinking across all levels of Bloom's taxonomy. The tools can be used at the foundational level to describe thinking, but also in complex structures to facilitate depth and complexity.

Vygotsky argued convincingly that our ideas are influenced by the types of tools we use. We can see that when we engage in physical tasks like gardening or brushing our teeth, the way we approach the task and whether we succeed are affected by the tools we use. However, we often fail to realize that tools can also have an impact on how we shape mental tasks and how we think about them, as well as whether we successfully complete them.

Visual tools for thinking:

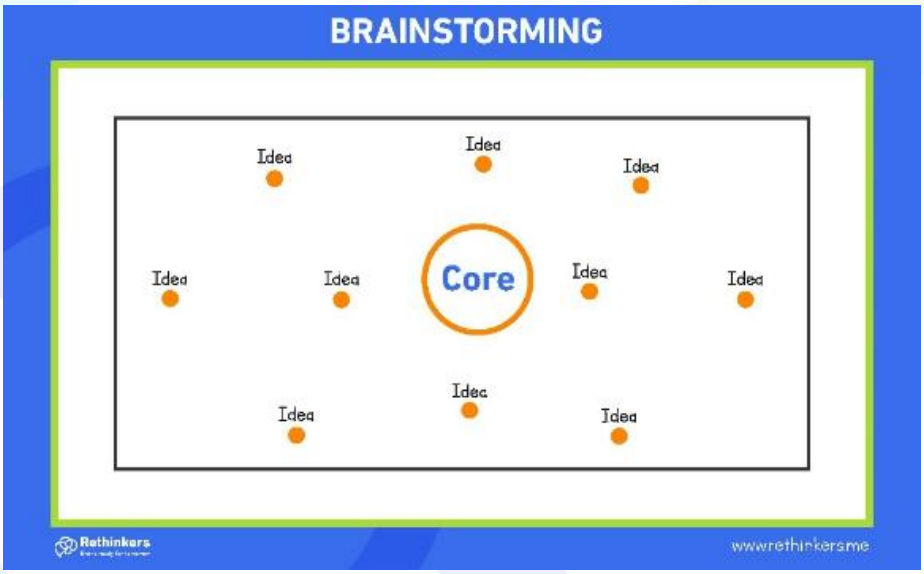
Thinking frames:

Thinking Process	Thinking frames	Key questions
Brain Storming		Tell me everything you know about this. How do you know it? What is your reference Frame?(Brainstorming about the topic)
Description		How would you describe this object/idea/person? What qualities would you use?
Comparison and contrast.		What are the similarities and differences?

Classifying		How can you classify the main ideas, supporting ideas, and details or examples?
Dividing (whole and part)		What are the parts that make up the whole object? Can the parts be further divided into subparts?
Sequencing		What is the sequence of events? What are the stages?
Cause and Effect		What are the causes and what are the effects
What are the relationships used and the common factor?		Linking

Thinking frames:

1. Brainstorming Frame:



Thinking process:

Definition Thinking Frame is used in idea exchange or generating multiple ideas.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach. The student writes their own name in the center of a square and records various random things about themselves around it using words, images, or phrases.

Embedding the Frame:

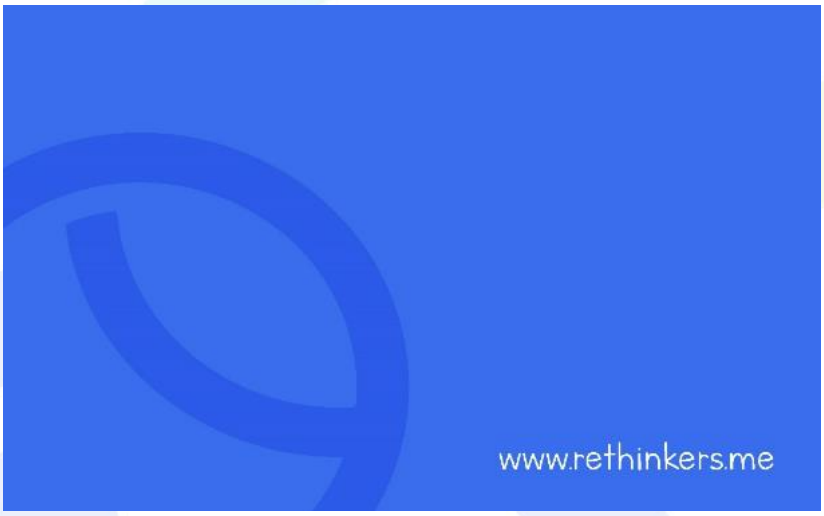
Once students use the tool in this way, all teachers use the same tool when requesting ideas, words, memories, alternatives, etc. (brainstorming).

Brainstorming Frame for previous knowledge, new knowledge, and creative ideas.

Color can be effectively used to distinguish what the student knows about the topic before research and after it. This means that the student reformulates previous knowledge using one color and records new knowledge using a different color after conducting research.

Task: Provide examples where students are asked to identify ideas. Collect examples from as many subjects and stages as possible

2. Description Frame:



Thinking process:

Description Thinking Frame is used to describe something.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach. The student writes their own name in the center of a square, and each line leads to a characteristic about themselves, perhaps with pictures. The student adds as many responses as possible, each with one characteristic or a descriptive sentence, which they are happy to share with others in the group.

Choosing specific features or describing words differs from "telling everything about something," as in the Definition Frame.

The description frame can also be used for features, attributes, and qualities.

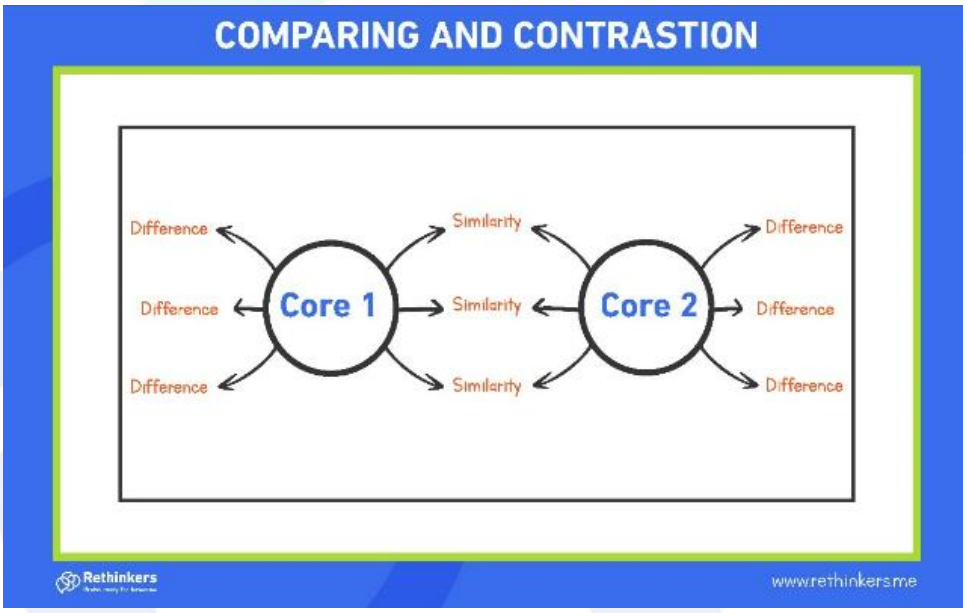
Embedding the Frame:

Once students use the tool in this way, all teachers use the same tool when requesting descriptive words to highlight something. It is a useful tool for enhancing students' descriptive language.

Note: The description frame should only include descriptive characteristics or phrases.

Task: Provide examples where students are asked to describe a person, object, or phenomenon. Collect examples from as many subjects and stages as possible.

3. Comparison and Contrast Frame:



Thinking process:

Comparison and Contrast Thinking Frame is used to compare two objects, elements, concepts, or phenomena.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach. The student compares themselves to a friend and records the similarities in the center and the differences on each side.

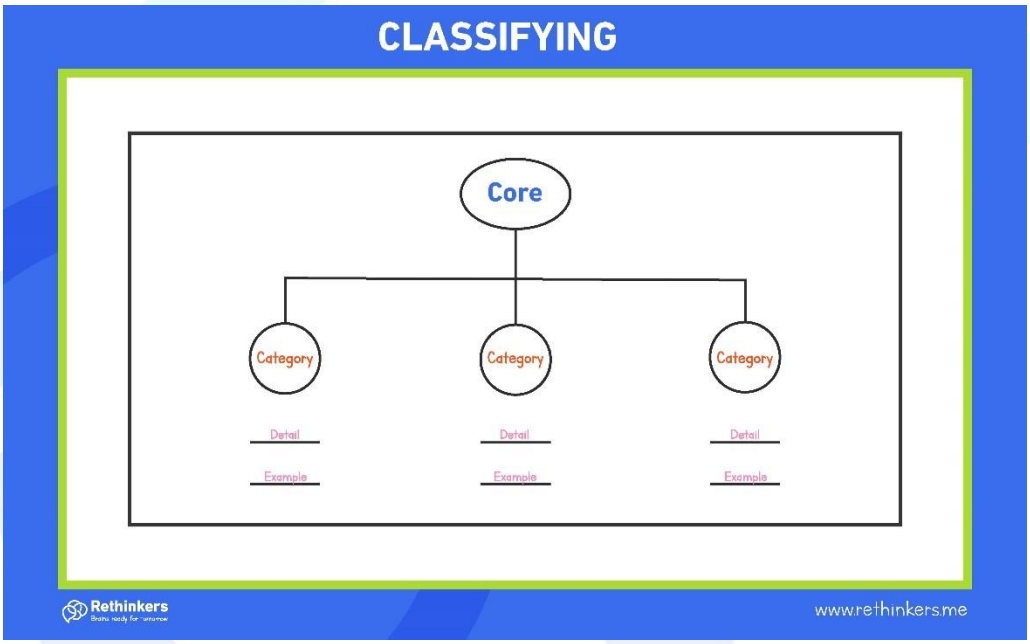
Embedding the Frame:

Once students use the tool, all teachers can use it. The sides do not have to be balanced, for example, "Miranda has a cat" does not have to be balanced with "Edward has a dog." The tool is useful for clarification when students mix up two things.

Color can be used to enhance and highlight the similarities and differences in this frame.

Task: Provide examples where students are asked to compare and contrast or where comparison and contrast have been helpful. Collect examples from as many subjects and stages as possible.

4. Classification Frame:



Thinking process:

Classification Thinking Frame is used for any type of classification.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach. The student collects or classifies their interests, such as sports, collecting, hobbies, games, media, and music.

Embedding the Frame:

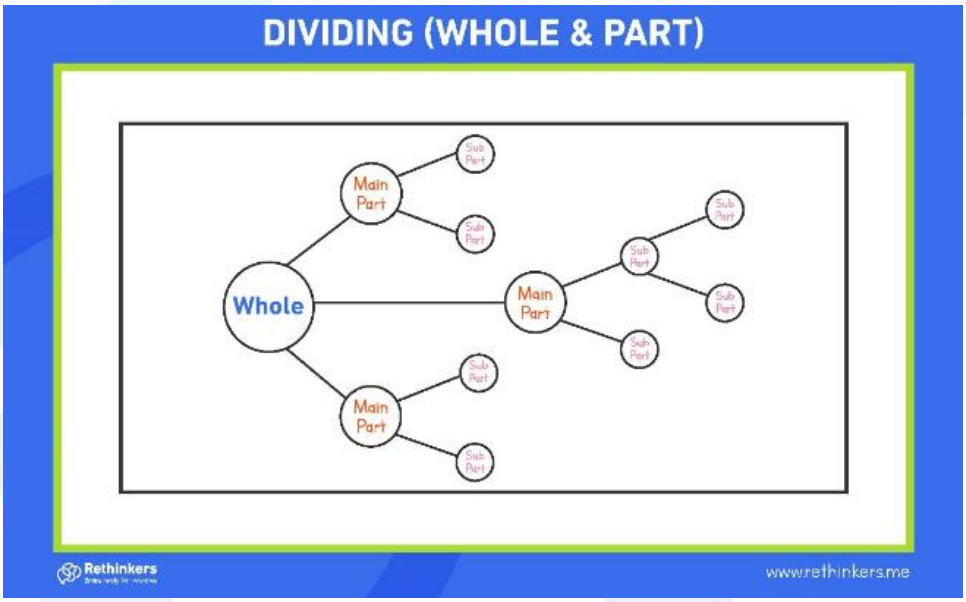
Once students use the tool, all teachers can use the same tool when requesting the collection or classification of items.

Main categories should have headings or examples of the main title and should be underlined or encouraged.

Subcategories can branch out further. Examples can be listed below.

Task: Provide examples where students are asked to classify specific information. Collect examples from as many subjects as possible.

5. The Dividing (Part and Whole) Frame:



Thinking process:

The Dividing Part and Whole Thinking Frame is used when constructing an integrated model.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach. The student takes a favorite item or something they desire to possess, such as music, a bicycle, a game, or a phone, and divides it into constituent parts and subparts. Main parts should be encouraged wherever possible.

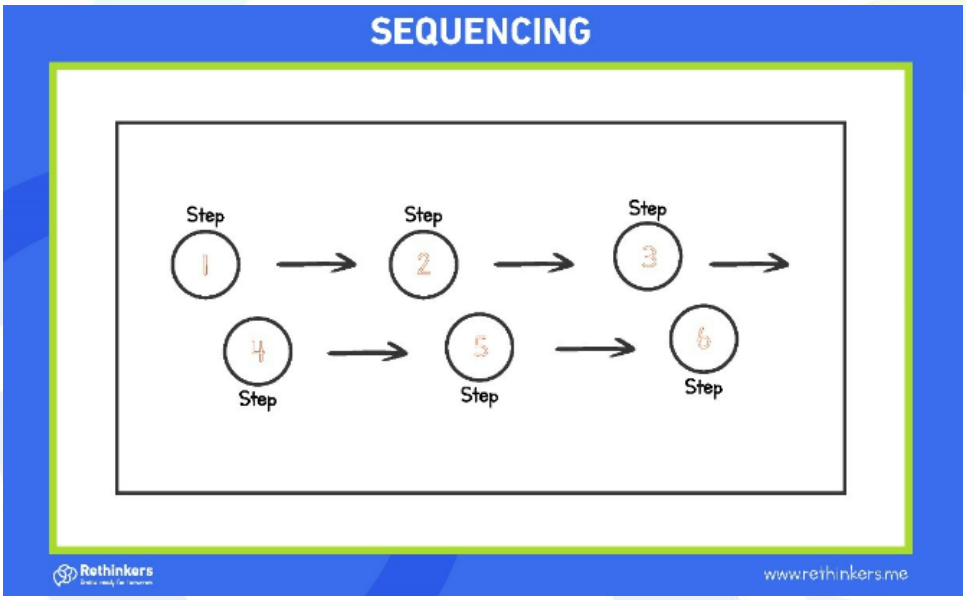
Embedding the Frame:

Once students use the tool, all teachers can use the same tool when requesting the division of topics into parts or the reassembly of a complete object from smaller parts.

It is often seen in subjects like science, technology, mathematics, and geography, but can also be used to show the parts of larger general objects, such as a building.

Task: Provide examples where students are required to break down a subject or construct it.

6. The Sequencing Frame:



Thinking process:

The Sequence Thinking Frame is used for sequencing.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach. The student defines "the day I dream of" using words or images, with arrows indicating each stage or step.

Embedding the Frame:

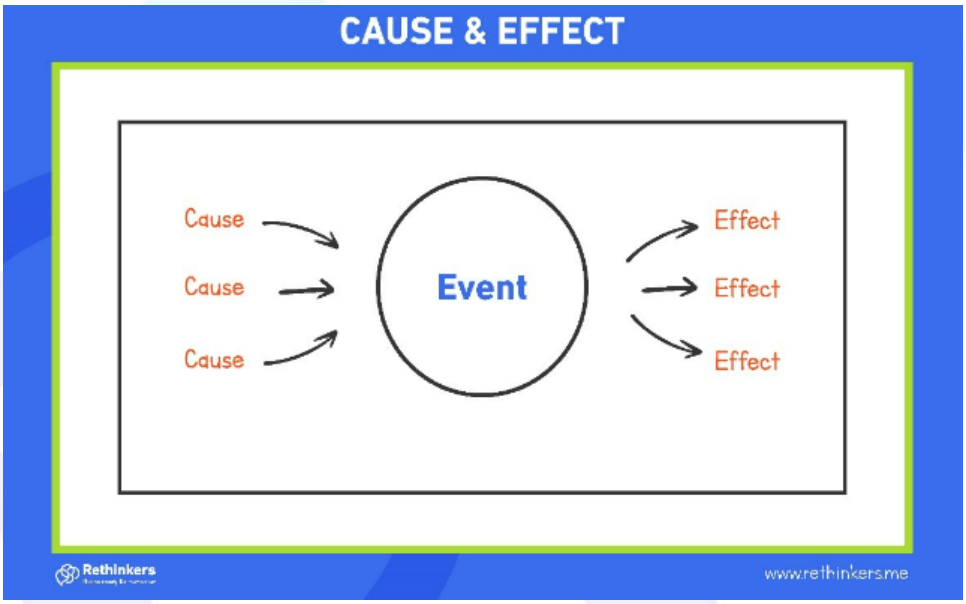
Once students use the tool, all teachers can use the same tool when requesting the sequencing of things. This simple tool is used for timelines, life cycles, ordering, plots, storyboards, processes, and planning.

Sequencing generally moves from left to right, but sometimes it can be presented in a vertical or circular form, such as for life cycles.

When used horizontally, where the sequence continues beyond one line, each line should end with an arrow, and new lines should start with an arrow to indicate continuous sequencing.

Task: Provide examples where students are required to sequence information, or it would be beneficial to do so.

7. The Cause and Effect Frame:



Thinking process:

The Cause and Effect Thinking Frame is used for understanding the relationship between cause and effect.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach. In the center, where an event is created, the student sets a goal. Depending on their age, this could be achieving a certain grade, getting into university, learning to swim, or learning to ride a bike.

On the left, they identify what they need to do to achieve their goal, and on the right, they identify how they will benefit from reaching this goal.

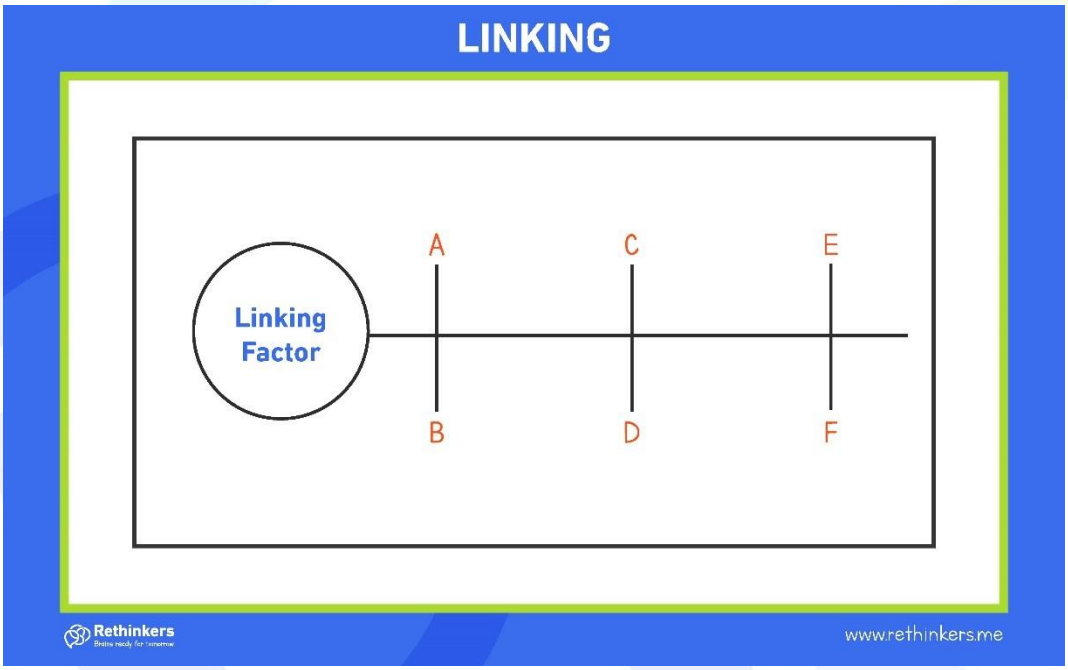
Embedding the Frame:

Once students use the tool, all teachers can use the same tool when asking about the causes, inputs, outcomes, impact, and effects.

This frame can be used for causes only or effects only. Causes should not be balanced with contrasting effects. The teacher can provide the causes and ask students to speculate or predict the results. Conversely, the teacher can provide the effects and ask for possible causes. The teacher can present both causes and effects, and the student works on the event in the middle.

Task: Provide examples where students are asked to think about the causes or effects.

8. The Linking Frame:



Thinking process:

The Linking Thinking Frame is used for making connections and relationships or conveying relationships in the form of a Frame.

Introduction of the Frame:

When first introduced to students, it is often done through an autobiographical approach, such as encouraging the student to identify a person they care about and the topic of "care". For example, in the "Linking Factor" box, the student writes "Cares". Then the student may write "My mom" where "A" is located, and "me" where "B" is located, and they identify other caregiving pairs and write those that have C/D, E/F, and so on. For example, "Nurse cares for patients," "Teacher cares for students," etc.

Embedding the Frame:

Once students use the tool, all teachers use the same tool when encouraging creative thinking, connecting facts and ideas, seeing relationships, similarities, and making comparisons.

Each linking frame contains a linking factor (CF), which should be read as a sentence that includes CF as a link between each pair. For example, "My mom cares for me just like nurses care for patients, just like grandmothers care for grandchildren."

The teacher can provide students with:

-Different pairs but no linking factor.

-Only one element from the pairs, and the student must continue identifying other pairs.

-The linking factor without the pairs, and the student must work on the correct pairs.

Task: Provide examples where students are asked to think laterally about connections and comparisons or where it may be beneficial to do so.

The Reflective Lens

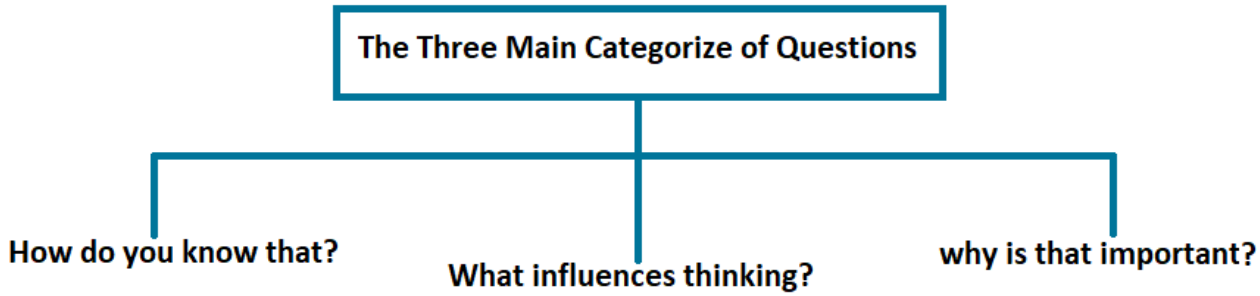
The Reflective Lens (RL)

Is a process of thinking that involves teachers (or students) posing generative or metacognitive questions. RL consists of a set of double lines to create a dual frame that can be placed around each thinking frame. It serves as an interrogative tool. It should always be presented, even if it is not actively used.

This indicates that there is always the possibility of asking questions, digging deeper, and so on.

Incorporating the Reflective Lens:

We look at three categories of RL questions that can be asked.



The three categories of questions help in exploring understanding. They can be related to the levels in Bloom's taxonomy or built upon questions arising from within the levels of Bloom's taxonomy, but they also allow the teacher and student to go "beyond Bloom." Some questions may form the basis for deeper and continued inquiry.

1. **How do you know this?**

Students are asked to identify sources of information to recall or reinforce prior knowledge or begin the process of committing what they have researched to long-term memory.

Similar questions may include:

- Where did you find this information?
- How did you come to know this?
- Is the source reliable? How confident are you in its accuracy?

2. **What influences thinking?**

Students can explore perspectives by looking at a topic through the eyes of a particular character or by comparing cultural, historical, or contextual conditions that may have influenced what is being thought.

Teacher: "Why do you think you see the same character differently? What is your point of view?"

Similar questions may include:

- From what perspective are you looking at this?
- What influenced your thinking?
- Who might see this differently?
- How would this appear in a different time or place?

3. **Why is this important?**

Students can explore levels of understanding, inquire further, or deepen initial thinking through follow-up or investigative questions.

Similar questions may include:

- Why do you believe we are learning about this?
- What conclusions can be drawn from this?
- What are we learning from this?
- Who might need to know this?
- For whom should this matter?

Principles of Brain-Based Learning:

1. **The Brain as a Biological System**

Although the human brain is composed of different functional areas, it functions as an integrated system that interacts with each other under varying conditions. This integration allows the brain to work as a whole by protecting itself and collaborating with other body parts.

2. **The Social Brain/Mind**

It is widely believed by psychologists that humans are social beings, and social influences begin to shape individuals from early stages of life through the impact of the social environment they live in, starting from the family environment, school peer groups, and

the larger community. The type of experiences provided by socialization institutions plays a crucial role in shaping the social mind, with language being the primary tool for shaping the social mind.

3. **Innate Search for Meaning**

It is commonly understood that the human brain is exposed to a wide range of stimuli in various life situations, and it is driven by nature to search for meanings behind these stimuli by forming cognitive representations to aid in this process. The five senses, which are innate gifts, and the questions posed by children and adults about different stimuli are evidence of their awareness of the formation of a unique understanding.

4. **The Search for Meaning through Patterns**

In the third principle, we conclude that the brain naturally seeks meaning in stimuli to understand the world it lives in. To achieve this goal, it constantly strives to form these meanings by categorizing them according to specific classifications, finding correspondences and similarities between stimuli. This process enhances the formation of meanings. Categorization is the basis of generalization, and children begin with categorizing sensory information, progressing to semi-abstract and eventually abstract categorizations. The availability of patterns in an individual's mind enables them to understand the flow of events they encounter.

5. **The Influence of Emotions on Pattern Formation**

Many researchers in the field of psychology have traditionally focused on the cognitive aspect of learning, studying the various cognitive processes involved. However, in recent years, since the 1990s, there has been a strong trend emphasizing the emotional aspect of the learner. It is assumed that learners are integrated personalities with multiple aspects of development, and neglecting the emotional aspect of the learner's personality may be due to the difficulty in studying it. However, the availability of brain imaging techniques such as radiographic, tomographic, and magnetic resonance imaging has enabled scientists to consciously study this type of developmental aspect. Consequently, a significant number of researchers have recognized the importance of emotions and emotional intelligence in daily life.

6. **The Brain Automatically Processes Parts and Wholes**

Behavioral school scientists used to claim that individuals perceive parts and then the whole. However, cognitive scientists countered this perspective by introducing the concept of Gestalt, which suggests that individuals perceive the whole and then the parts. Both perspectives are correct due to the presence of the left brain, which perceives parts first and then the whole, and the right brain, which perceives the whole first and then the parts. This is facilitated by the corpus callosum, which connects the left and right hemispheres.

7. **Learning Involves both Focused Attention and Peripheral Perception**

The brain is exposed to a wide range of stimuli, and therefore, it selectively filters and processes these stimuli. Not all stimuli are equally important to the individual, and their reception is selective. Individuals focus on stimuli that respond to specific needs. However, individuals are also engaged with stimuli beyond their focus, such as paying attention to pictures or sounds emanating from different areas. This is known as peripheral perception, which is less important than focused perception. Peripheral perception contributes to the formation of holistic perception of stimuli.

8. **Learning is a Conscious and Unconscious Process**

Individuals become aware of stimuli they are exposed to through deep processing, which increases with their cognitive development. This is referred to as mental alertness. Consciousness refers to the individual's awareness of their mental, physical, and emotional actions. On the other hand, unconscious states involve performing a set of actions automatically to some extent, such as routine activities that individuals regularly engage in, programming them into cognitive structures.

9. **We have at least two directions for memory**

Cognitive psychology suggests that individuals possess different types of virtual memory that enable them to store and retrieve a range of memories and experiences they have encountered. In this context, there are various memory systems, including explicit memory, semantic memory, procedural memory, and emotional memory.

10. **Evolutionary Learning**

There are stages of physical brain development in humans. During the early years, the rate of brain growth is remarkable, and a significant number of connections are formed. Emotional development is much more significant than cognitive development, and the brain exhibits incredible flexibility and adaptability until adolescence.

11. **Complex Learning is Enhanced by Challenge and Hindered by Threat**

Every individual experiences fear and anxiety when confronted with a challenging situation that requires dealing with complex and difficult stimuli. Encouragement and reinforcement facilitate learning in such situations, while threats and punishment hinder the learning process.

12. **Every Brain is Uniquely Organized**

All humans possess the same brain systems, yet they differ based on genetic programming, previous knowledge, and environmental factors.

Brain Aligned Learning and Brain-Deprived Learning

Key Characteristics of both Brain Aligned and Brain-Deprived Learning:

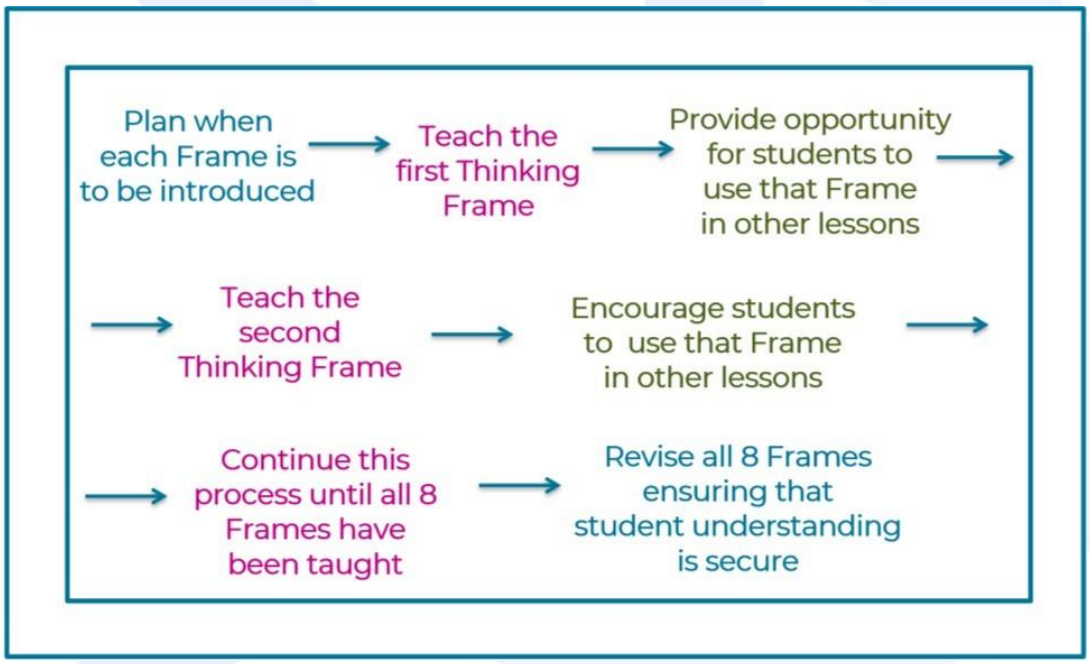
Brain Aligned Learning	Brain-Deprived Learning
Absence of Threat	Threatening Students with Punishment
Collaboration	Individualistic Learning
Highly Stimulating and Emotionally Relevant	Low Emotional Impact
Holistic and Realistic	Fragmented and Sequential Learning
Employing Multiple Intelligences	Overreliance on Lectures
Contextual Meaning and Value	Emphasis on Content Delivery
Multiple Systems and Interconnections	Teaching Subjects in Isolation
Rich in Dialogue, Activity, Movement, and Debate	Quiet Learning Environment
Intrinsic Motivation	Grade-Driven Learning
Optimal Learning is Difficult to Measure Directly	Outcome-Oriented Learning
Positive Language Use	Authoritative and Commanding Language
Inquiry-Based Learning	Single Correct Answer
Learning for Enjoyment	Learning for Testing
Ongoing Assessment and Celebration	Time-Limited Learning
Creative and easy going teachers	Single-Topic Instruction
Purposeful Learning	Belief in Difficulty of Learning
Face-to-Face Interaction and Movement	Sitting in Fixed Seats with Limited Interaction
Immediate and Dramatic Feedback	Negative Feedback

Guidelines for Implementing School-Wide:

It will be important for the school to have agreed upon an implementation plan for introducing thinking frames to students. The leadership team plays a crucial role in guiding and monitoring this process, offering guidance on the most suitable implementation model for its staff.

The recommended model for presenting thinking frames is as follows:

- Introduce each thinking frame based on a predetermined schedule (e.g., weekly or biweekly) across all primary classrooms or with specific groups of students (beyond the primary stage).
- The preliminary lesson for each thinking frame can be integrated into personal development lessons or, alternatively, the school may agree on other suitable curriculum contexts for delivering each frame.
- Shortly after introducing each thinking frame, modeling or encouraging opportunities to use the frame in other contexts should be provided. Teachers will have a model for using thinking Frames across a range of subject areas.



During implementation, it is important to integrate previously introduced thinking Frames into ongoing teaching and learning activities to reinforce prior learning and move students towards independent use of the tools.

In the early stages of the preparatory process, if there is a potential opportunity to use a thinking Frame that has not yet been introduced to students, it should be encouraged as this can build teacher confidence and student mastery by recognizing the authentic use of the tools and evaluating it.

By the end of the preparatory stage, students are expected to:

- Develop an understanding of the fundamental reasons for using thinking Frames.
- Identify all eight thinking Frames and the thinking process each represents.
- Be able to construct all eight thinking Frames and understand that they can be used in all subject areas.
- Apply the lens of reflective thinking and explore RL questions in a variety of contexts.

As the implementation progresses, staff may find it beneficial to consider the following suggestions:

- Students and staff will benefit from having visual Frame posters displayed in all classrooms and prominent areas of the school. This provides a reference point for staff and students, serving as reminders of the thinking processes each Frame represents and ensuring accuracy.

When presenting thinking frames, please take note of the following:

- An effective cognitive trainer will use clear instructional language when introducing new concepts, including presenting each thinking Frame.
- Each new thinking Frame should be modeled with expertise when introduced before asking students to create their own Frame.
- When students create their own Frames, the cognitive trainer should provide effective and supportive feedback using appropriate thinking language (with a focus on the thinking process used in the task).
- Ultimately, thinking Frames will be used more effectively in each subject area when the appropriate thinking process is identified within individual lessons or

action plans, potentially replacing graphic organizers or thinking tools previously used.

- In response to student questions, for example, when a student asks, "What is the difference between 'x' and 'y'?" the teacher answers using the comparison and contrast thinking Frame to demonstrate it.
- It is recommended to keep samples of thinking Frames, including those developed by staff, as well as examples of students' independent work to enable the Rethinkers team to monitor progress.

THE END

THINKING SCHOOLS

Path 2

VISUAL THINKING

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