THOUGHT PROCESS-BASED LEARNING

Book #2

Level 1-1: Building concepts; foundation of thinking outside the box!

In order to develop thought process, the concepts have to be built by yourself. This training material will show you how to build concepts using your own brain. With this, you will get your brain ready to think outside the box.

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FIRST EDITION

PonderEd
A novel education consultant and education provider

Publisher: PonderEd Education

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About author

Tongpil Min has Ph.D. in science and had worked in science field for more than 10 years. When his son was diagnosed with high functional autism about 10 years ago, he decided to develop educational method to teach children with autism ever since. But later, he found that the educational methods he had been developing is not just for children with the autism spectrum disorder. It can be applied to anyone since the method is directly tackling the thought process of the brain. As such he decided to publish the series of the thought process-based education booklets to be used as textbooks for the learners who would like to develop their brain power.

Pre-step (Check point)

The following method is based on the law of causation. You will be able to check how much potential your brain has to think outside the box and creatively.

The rationale of applying the laws of causation will be provided in Level 4 training. In this pre-step, only the basic application of the law of causation is provided.

The general rule for application of the law of causation is to generate **a pair of questions** as a set like; *'Would A exist if B does not exist?'* and *'Would B exist if A does not exist?'*

Method

Step 1.

Choose a topic and make questions asking the definition of the topic of your choice and then, describe your answer.

Example (topic: water)

Question: What is water? Description: Water is essential for all life forms. Or water forms a lake and so on.

Step 2.

Generate a set of questions by applying the law of causation on existence as mentioned above. Here, 'A' = 'water' and the 'B' = 'life forms' or 'lake'

Example

Would water exist if a lake does not exist? / Would a lake exist if water does not exist?

Step 3.

Analyze

Example

Water can exist regardless of existence of lakes. So, the answer to the first question is yes.

Lifeforms cannot exist without water. So, the answer is no to the second question.

If any of the answers is NO, it means that the statements (Water is essential for the lifeforms or water forms a lake etc.) cannot be the description for the ‘what is water?’ question. In this case, the knowledge you know is not the knowledge that you can describe. Thus, you might have the knowledge but not as concept. Since thinking outside the box and creative thinking requires concept building and connections rather than the amount of knowledge as stated in book #1, higher the mismatch means less chance to think differently.

In thought process-based education, questions, observations and descriptions have to be relevant to each other. Thus, confirming whether question and description are matching is essential for building concepts.

Apply a set of questions using the law of causation every step where questions and descriptions are involved while building concepts using provided step by step guidance.

Level 1-1: Building concepts (foundation of thinking outside the box!)

<u>Set 1: Start building concepts using your own brain</u>

In this step, you will be able to build (not learning knowledge) concept using your own brain.

It is very important not to use references in this step. No dictionary, no books and no internet search. Use your brain only!

Rationale

In order to develop a series of thought processes, you will need to generate questions to start to think. But not any questions. There are questions that could box your brain in the knowledge and there are questions that lead your brain out of the box. The simplest way to distinguish is to analyze questions to see if it makes you observe. For example, questions like ‘what color is the water in a glass?’ will lead you to observe the water. On the other hand, questions related to the goals or usage like ‘what is the water for?’ could box your brain in the knowledge you already have such as drinking, cooling, washing and so on. It will be difficult for you to find any new usage of water. In that case, even if you list all the usage of water, it will be just repetition of the knowledge that you know like a parrot does after listening to a human.

In order to develop thought process, you need to turn the knowledge you already know as a topic to train your brain to build a concept.

A few things to remember

- Always start with questions (Level 1 training is to build observation and description skills. However, from level 2, questioning itself will be the focus. If you are not getting used to making questions in this level, you might have a difficult time to go through level 2 training.)

- Try to observe to describe in details. These are the key factors for thinking outside the box!

- Summarize and define the concept (This will improve your presentation and writing skills.)

- Identify the keywords and build concepts further (From this point, your knowledge can be exploded.)

- Merge the concepts with main topic (Focusing on the topic and build writing skills)

- Comparison and analysis (These skills will be used to generate questions out of curiosity later.)

Method (example topic: water)

Step 1. Rules for choosing a topic

- Choose the simplest; Concepts referred to in this booklet do not simply refer to the lexical meaning of words. They are the overall constitution of words. For example, rain is a concept containing many different concepts; water, temperature, evaporation, drop, gravity and more. A word with many concepts combined like ‘rain’ will be very complicated to deal with in the beginning of the study. So choose the simplest like ‘water’ as a topic.

- Start with the key words if there is more than one word; You might try to deal with words like ‘Heart attack’ as whole. However, dealing as a whole could box your brain in the knowledge because numerous knowledge about heart attacks

already exists. In order to build skills to think outside the box, you will need to deal with each word separately and merge later. And for an easier start, begin with the keyword by checking dependency among the words. The keyword can be identified by applying the law of causation. In short, the keyword in heart attack is heart because attack is dependent on the other words used together. Thus, it cannot be the key word. Dealing with words that are dependent to other words needs a different approach and will be provided in higher level training.

- Break up compound words; Compound words are the words that look like single words but actually contains more than two words like hydropower (hydro + power) or biotechnology (bio + technology). As stated above, it will be challenging to deal with more than one concept in the beginning of study for thought process development. If you are interested in a compound word for your study, divide it into single words that constitute the compound and then, find the keyword to begin. For example, in hydropower, power is dependent to hydro. So, the keyword is the 'hydro (water)' and you can choose this as a topic to start.

In order to find out dependencies, use the law of causation as 'can there be hydropower if the water doesn't exist?' If the answer is no, the key word to explore first is the water. As mentioned previously, methods to deal with concepts like power will be explained in detail later series of thought process-based education.

Step 2. Begin the thought process with a question asking the definition of the topic of your choice

In order for the brain to start the thought process, you will need to generate a question asking the definition of the topic of your choice. Concept building means keep adding different concepts to the main topic one by one. As you add concepts, you might lose track especially when the next concept added is not closely related. For example, if you

started with water as a main topic and moved to light and color, your study might go in a completely different direction. To prevent this, you will need a point to come back to the main topic you started and the question asking definition of the main topic will work as a landmark.

You will be coming back to this question as you add each concept.

Example (Topic for example is 'water')

- What is water?

Step 3. Create questions to observe and describe the topic (5 senses; sight, hearing, taste, smell, touch + 5W1H; who, what, where, when, why, how)

Questions asking definition of the topic like 'what is water?', 'what is sky?', or 'what is love?' are not easy to answer. And thought process might not advance anymore. In order to continue thought process after the questions asking definition of the topic, you will need to replace these questions to the new questions to make yourself observe and describe. But even if the questions make you observe and describe, not all questions are equally effective.

A phenomenon like discontinued energy level in quantum mechanics or an object like light as a particle is not detectable with the five senses directly. If you create questions to observe and describe undetectable phenomena or objects, the thought process may have difficulties in continuing. (These will be the topics in Level 3 training). Thus, try to make as many questions as possible that can be observed directly with the five senses.

Example

- What color do I see about water?

- What do I taste when I drink water? And so on.

Step 4. Observe and describe as detailed as possible with each question from step 3

Example

- colorless

- tasteless

- odorless

- transparent liquid

- no specific shape

Step 5. Summarize and define the description

Example

- Water is a colorless, tasteless, odorless, and transparent liquid without specific shape.

Step 6. Find key words and list them

Example

- color, taste, odor, transparent

Step 7. Create questions asking for a definition of each keyword from step 6

Example

- What is color?

- What is taste?

- What is odor?

- What is transparent?

Step 8. If you already have answers to any of the questions from step 7, describe them in detail

Note: Do not mind whether your description is right or wrong. The key point here is to build confidence to use the knowledge you have. Accuracy of the knowledge can be improved later.

Example

- What is taste? (question from step 7)

- Taste is the interpretation of the signals from the tongue in the brain when food is in the mouth (the description you had already)

Step 9. For the concepts that you cannot describe, build concepts by repeating Steps 2-5

Example (color)

- What is color? (question from step 7)

- When do I see color? Etc. (repeat steps 2-5)

……

Then, summarize and define.

- Color is the light reflected from objects and depending on the object types, the characteristics of the reflected light have changed after interacting with the object and human eyes recognize the different characteristics of reflected light as colors.

Step 10. Merge description from steps 8 and 9 with the definition of the main topic from step 5

Note: When merging the descriptions, try to make smooth transition among the concepts to deliver meaning clearer.

Example

Description from step 5: Water is ***taste***less, ***odor***less, ***color***less and ***transparent*** material that has no specific ***shapes***.

Description from step 8: **Taste** is the interpretation of the signals from the tongue in the brain when food is in the mouth.

Description from step 7: **Color** is the light reflected from objects and depending on the object types, the characteristics of the reflected light….

➔ Merged description: Water is a molecule that doesn't signal brain to recognize as taste nor doesn't interact with visible light thus transparent. Also, it is liquid without specific forms so that the shape is determined by the container holding the water.

Step 11. Repeat with all the concepts remain and merge back to the main topic

Set 2: Building and expanding concepts with references

Rationale

Knowledge stored in the brain is limited. No one can know everything. With this training, you will be able to build and expand concepts further by using references. It is not simply gathering knowledge to know and understand, but building and expanding concepts similar to the set 1.

A few things to remember

- You will need to use your thought process to digest knowledge from references.
- Comparison is the key for building and expanding concepts further.
- Merge concepts by making connections (This will enhance writing skills.)

Methods (topic - Water)

Set 2 - Step 1. Have the question from set 1 - step 1 and final description from set 1 ready

Example

- What is water? (from set 1 – step 1)

- Water is molecule that doesn't signal the brain to recognize as taste nor doesn't interact with visible light thus transparent. Also, it is liquid without specific forms so that the shape is determined by the container. (Final description from set 1)

Set 2 - Step 2. Look up the same topic from a reference

Example

- Water is colorless, odorless, and tasteless substance. It is fluid and its chemical formula is H2O ....

Step 3. Compare the definitions you have in step 1 with the one from a reference in step 2, find the differences and then list the new knowledge that were not in your definition

Example

- H2O, hydrogen, oxygen, fluid and so on

Step 4. Generate questions to define the key words

Example

- What is oxygen?

- What is fluid?

Step 5. If you already have answers to any questions to define the key words in step 4, describe in detail

Example

- What is fluid? (question from step 4)

- Fluid is a material that doesn't have shape and moves when an external force like

gravity or wind is applied.

Step 6. If you do not have any information for any of the key words, use a reference to build the concept further

Example

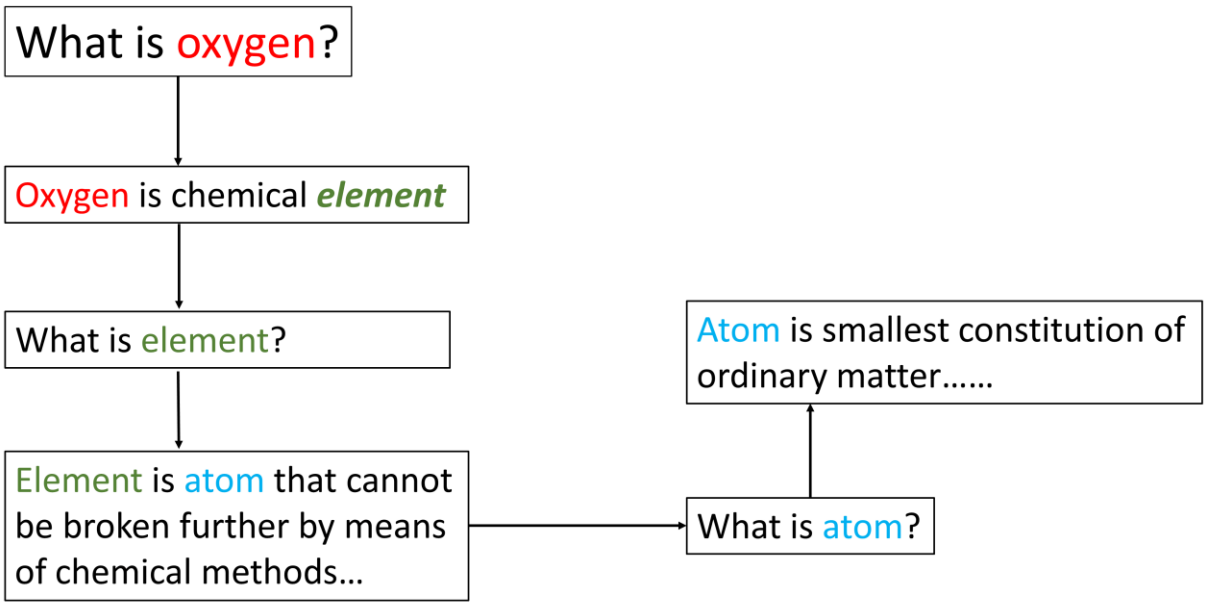
- What is oxygen? (question from step 4)

- From a reference: Oxygen is a chemical element ....,

- What is element?

- From a reference: Element is material that cannot be broken further by means of chemical methods....

Figure 1. Step 6 in flowchart



Step 7. Merge the description from step 6 backward by replacing the keyword with the description

Note: The key is merging backward. For example, if the description from step 6 was A – B – C – D then, merge order should be D – C – B – A.

Example

The thought process order;

A: Oxygen is a chemical element....,

B: An element is material that cannot be broken further by means of chemical methods....

Merging order;

A: Element is material that cannot be broken further by means of chemical methods....

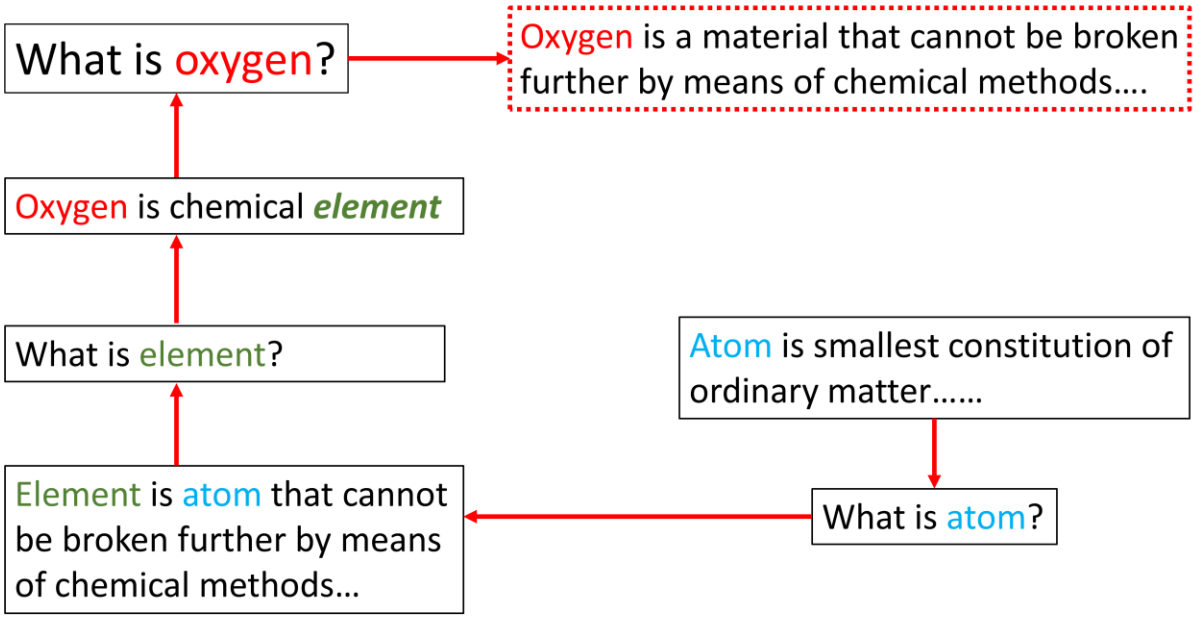
B: Oxygen is a chemical element....,

➔ Merged: Oxygen is a material that cannot be broken further by means of chemical methods....

Summarize the description

- Water is composed of oxygen and hydrogen elements which cannot be broken further by ....

Figure 2. Step 7 in flowchart



Step 8. Merge the descriptions from steps 6 and 7 with the main description from step 1

Description from step 6: Fluid is a material that doesn't have shape and move when external force like gravity or wind applied.

Description from step 7: Water is composed of oxygen and hydrogen elements which cannot be broken further by ....

Description from step 1: Water is molecule that doesn't signal brain to recognize as taste nor doesn't interact with visible light thus transparent. Also, it is liquid without specific forms so that the shape is determined by the container.

➔ Merge the description from step 6 and 7 to step 1 and describe: Water is fluid that can change shapes and move by external force and it is composed of two hydrogen and one oxygen atoms which are smallest ordinary matter. It is not recognized by brain as taste and colorless to our eyes due to limited interaction with visible light and odorless.

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