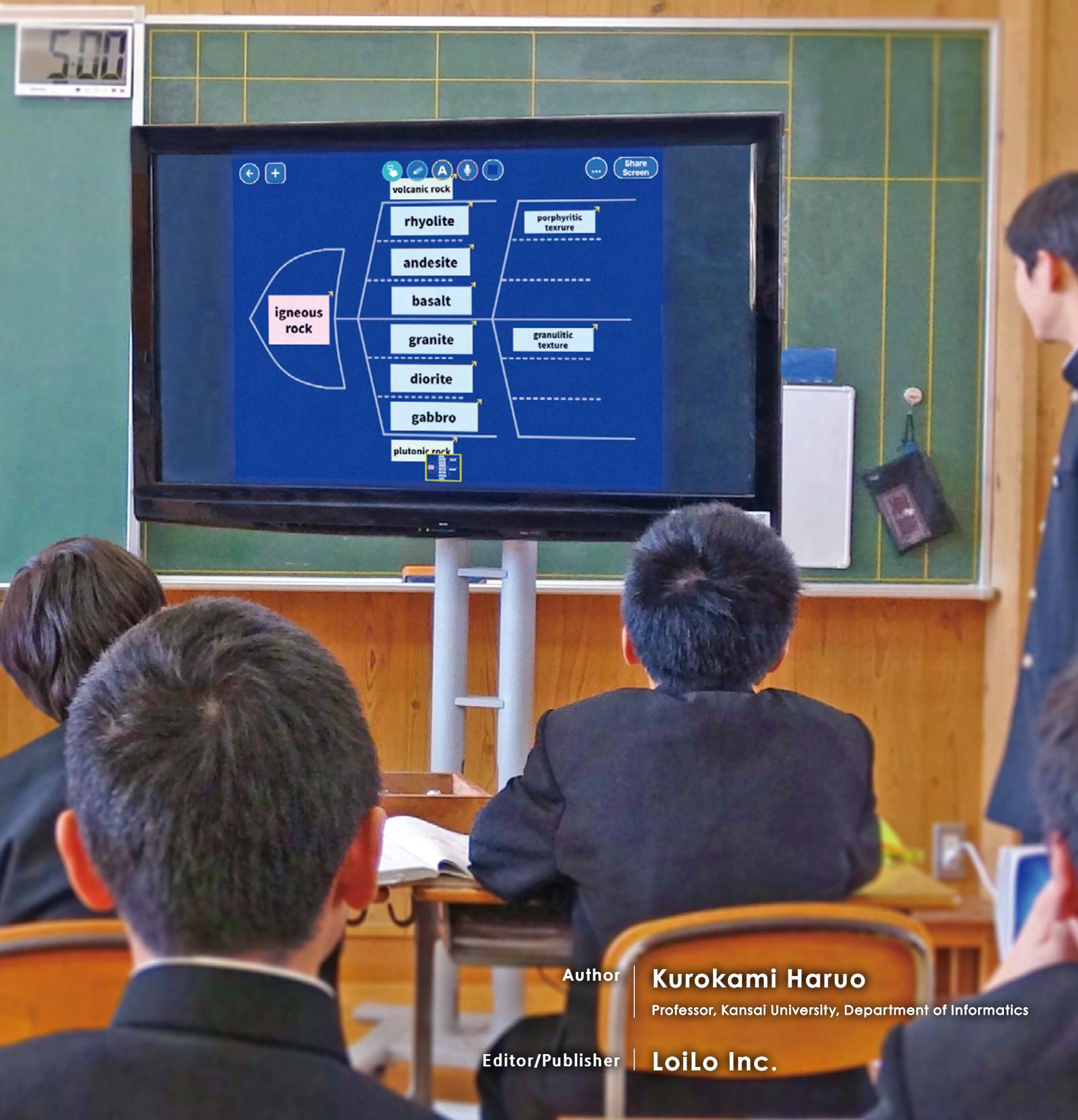




LoiLoNote School

# Learn about Thinking Tools



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Editor/Publisher

**LoiLo Inc.**

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What does it really mean to “think”?

What does it feel like when you are deep in thought?

We use the term “thought” to describe understanding, organizing, and summarizing all knowledge and events through a variety of perspectives.

In order for children to learn how to think, they must first learn which perspectives to look from.

Thinking Tools are the perfect way to accomplish this.

Moreover, by using the Thinking Tools in LoiLoNote School, they can gain the ability to express with words the results of their attempts to think about matters from a variety of perspectives.

LoiLo Inc.  
CEO Koji Sugiyama

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# How to use Thinking Tools

## 1 Choose the appropriate Thinking Tool

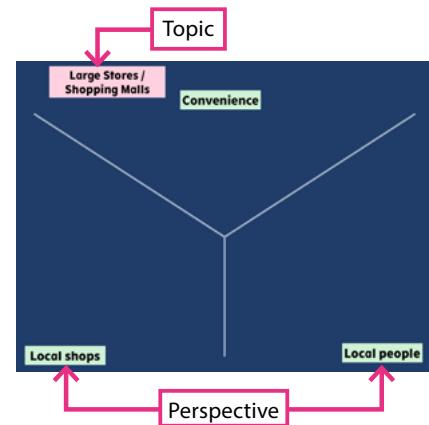
It's important to understand the strengths of each Thinking Tool, and choose the one best suited to each learning activity. Learn how to choose the best Thinking Tool for each learning activity on page 22.

## 2 Display the topic

The “topic” is the subject you will use a Thinking Tool to think about. You will arrange cards related to the topic on your chosen Thinking Tool.

## 3 Decide your perspective

During the thinking process, your perspective will guide you to a wealth of ideas. Choose a perspective that will lead to the success of your learning goals. (However, overly-broad perspectives like “Other” and “Thoughts” could possibly lead you astray from the goals of the lesson, and undermine the purpose for using Thinking Tools, so we don't advise using these as perspectives.)



## 4 Start writing down ideas

Write down ideas relevant to the topic on the cards available in LoiLoNote School. Generally, each card will have one idea.

There are no right or wrong ideas.



## 5 Look at all the ideas

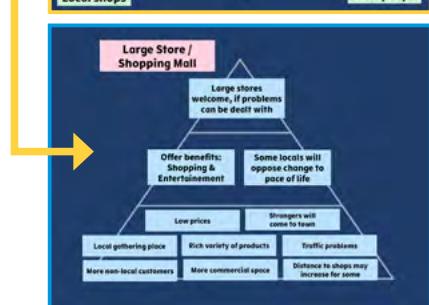
Take another look over the ideas you've written down, and decide which ones are really needed.

While thinking about the connections and combinations you can make between ideas, you'll start finding new ideas.



## 6 Share your thoughts with everyone

Trade your cards with others, and look at the diversity of information. Then, start developing your own thoughts based on the card you received. After completing the Thinking Tool, share the new questions and opinions you've come up with.



See more about changing Thinking Tools on page 24.

# How to read this booklet

## Flow of learning activities using Thinking Tools

Be aware of the flow of the lesson, and read the following sections in each example in order:

[1] Choose the appropriate Thinking Tool, [2] Generate ideas, and [3] Develop your thoughts.

Thinking Tools are designed to help you come up with thoughts, so be sure to follow this process so you can reach the stage where you discover new concepts.



### Venn Diagram compare

#### Merit

Venn Diagrams help students to compare items.

You can construct fresh views by comparing items which seem unrelated, along with similar ones, to find unexpected commonalities between them.

- 1 Choose an appropriate thinking tool " How are school lunches and packed lunches different? "



My school provides lunch, but one of my friends in another school says he brings his own lunch from home. These two kinds of lunch are quite different.

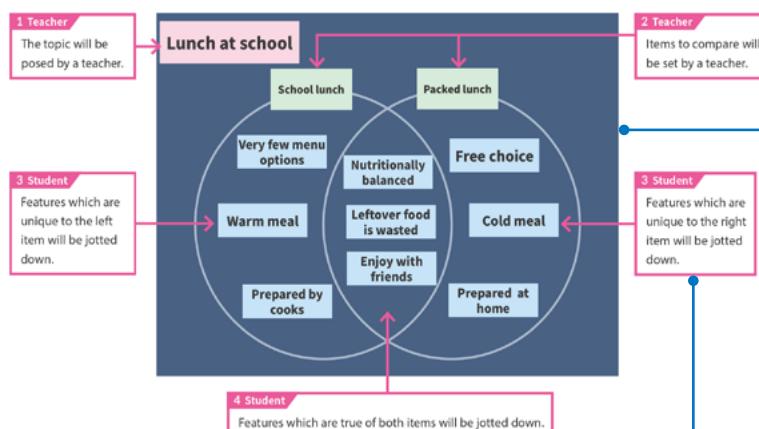


Are they truly different? Let's write out the characteristics and features of the two on cards. Next, put them in a Venn diagram to sort out how school lunch and packed lunches are similar or different.

#### Teachers

- ✓ Set a task for the students that will focus them on similarities or differences.

- 2 Generate ideas " Compare school lunch with lunch from home. "



#### Students

- ✓ First, write down everything you know about the two items on cards and put them into a Venn Diagram. This process will help you to develop new ideas. In the intersection of the diagram, you may have two or more cards with the same contents. You can either select one and discard the other or just stack them.

- 3 Develop your thoughts " Explain about the lunch at schools. "

There are two types of lunch for students at school: school lunch and lunch brought from home. School lunch usually has only one menu option, which is prepared by cooks. Lunch from homes are normally prepared by the students' family members, so no two lunches are the same. Both lunches are ideally nutritionally-balanced and leftovers mean food-loss in both cases. We should try to eat everything provided.

I would like to consider solutions for the food-loss problem in my school, and put everybody's ideas in order by priority.

#### Advice

- When students explain their thoughts to the class, they should not just read out the ideas on the Venn Diagram; they should develop their own thoughts based on the analyses of similarities and/or differences.

4

## Color Codes in Example Images

In this booklet, we will use the following color codes.

Topic = Pink

Perspective = Light Green

Idea (Example) = Light Blue

## Example of thought development

Look back over the ideas that have been written down, and combine them into well developed thoughts.

Ideally the teacher will prepare activities after this stage to build on the results discovered via the Thinking Tools.

## Idea Creation Process

The order to follow when writing down and organizing ideas is numbered in the pink boxes.

However, depending on the focus or learning goals of your lesson, the process you use with the Thinking Tools may differ from what is described here.

In addition, the steps are labeled with [Teacher/Student] depending on who performs the action in question, but this may change as the situation demands.



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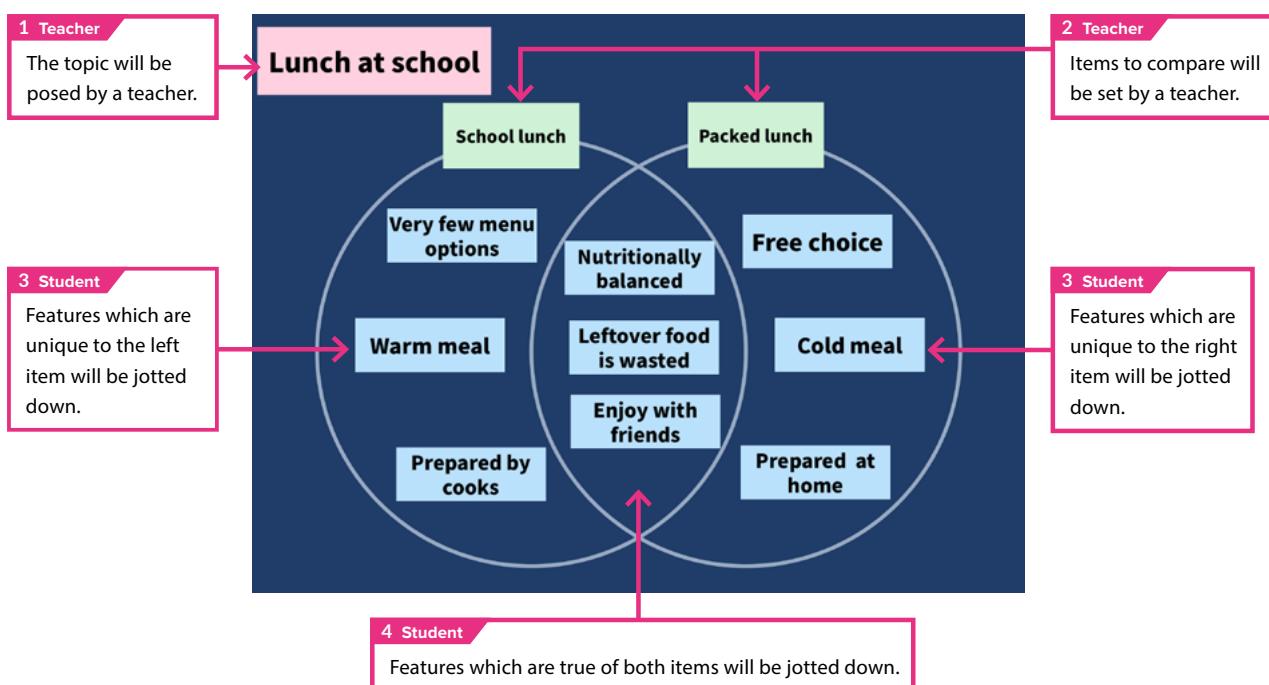


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I would like to consider solutions for the food-loss problem in my school, and put everybody's ideas in order by priority.

#### Advice

- ◆ When students explain their thoughts to the class, they should not just read out the ideas on the Venn Diagram, they should develop their own thoughts based on the analyses of similarities and/or differences.



# Y/X/W Chart multiple viewpoints / classify

## Merit

Y/X/W Charts help students to think about a topic from multiple viewpoints and classify information into categories. A Y Chart can have three viewpoints, an X Chart can have four, and a W Chart can have five.

### 1 Choose an appropriate thinking tool “What is platypus?”



We learned that living things with backbones are called “vertebrates” and classified into five categories.

These classifications don't seem to apply to a platypus.

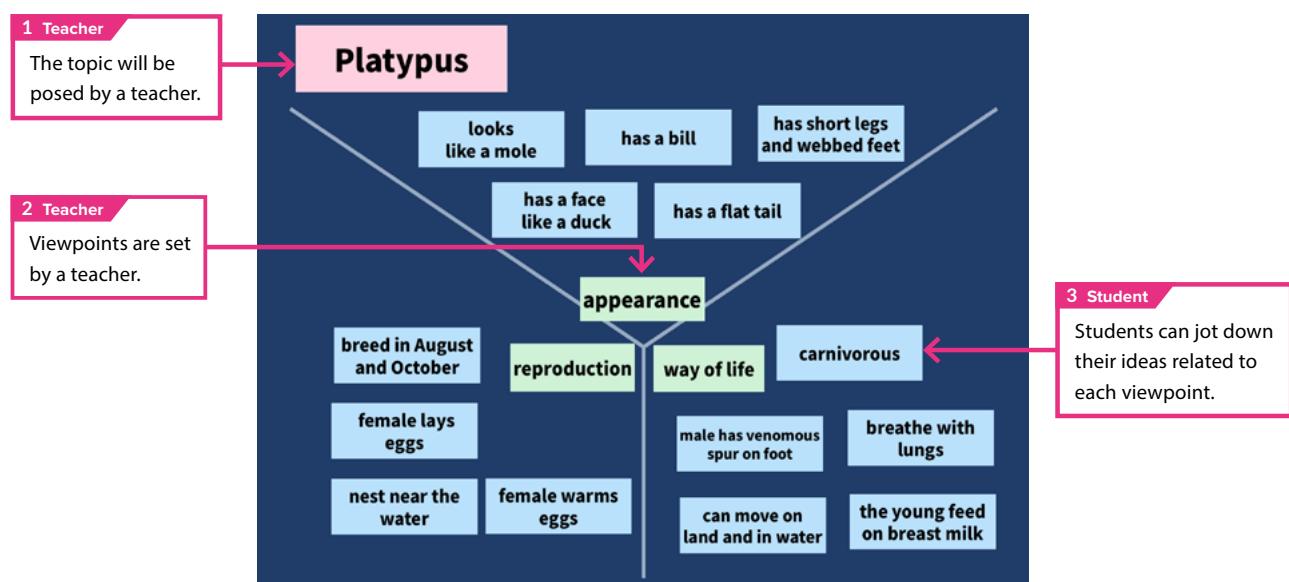


A Y Chart is useful to reveal the distinguishing features of a platypus. You can identify the features using the viewpoints of “appearance”, “way of life”, and “reproduction”.

#### Teachers

- ✓ If the viewpoints are set before you collect data, you can observe or appreciate the data from multiple viewpoints.
- ✓ When Y/X/W Charts are used to classify information, students can generate category names for each group of information after making categories.

### 2 Generate ideas “Investigate Platypus.”



#### Students

- ✓ To generate a multi-perspective understanding of the topic, jot down any information related to each viewpoint on the Y chart.
- ✓ Arrange appropriate cards with the name of things when you use Y chart to classify them.

#### Teachers

- ✓ How many viewpoints you/students should set, or how you/they should handle the ideas irrelevant to the viewpoints, depends on the goal laid out in class.

### 3 Develop your thoughts “Explain what feels odd to you about the classification of living things.”

A platypus has a bill and a head like that of duck. A female platypus lays eggs. So I thought it is a kind of bird. However, it is classified as a mammal. It surprised me that it is a mammal despite the fact that it is not viviparous. I am interested to learn how an animal with the characteristics of both birds and mammals developed. Now I am really curious to know more about how living things evolve.

#### Advice

- ❖ You are expected to contemplate further about what you have achieved through the process of classifying the data and/or viewing them from many different angles.



# Butterfly Chart multiple viewpoints / classify

## Merit

Butterfly Charts help students to view a topic from multiple viewpoints.

Students can think about the pros and cons of a topic(proposition): they will give opinions from both sides in this chart. Butterfly Chart are useful for debate activities.

## 1 Choose an appropriate thinking tool “Why is playing baseball prohibited in parks?”



There is a sign in the park banning people from playing baseball. Why can't we play baseball in the park?

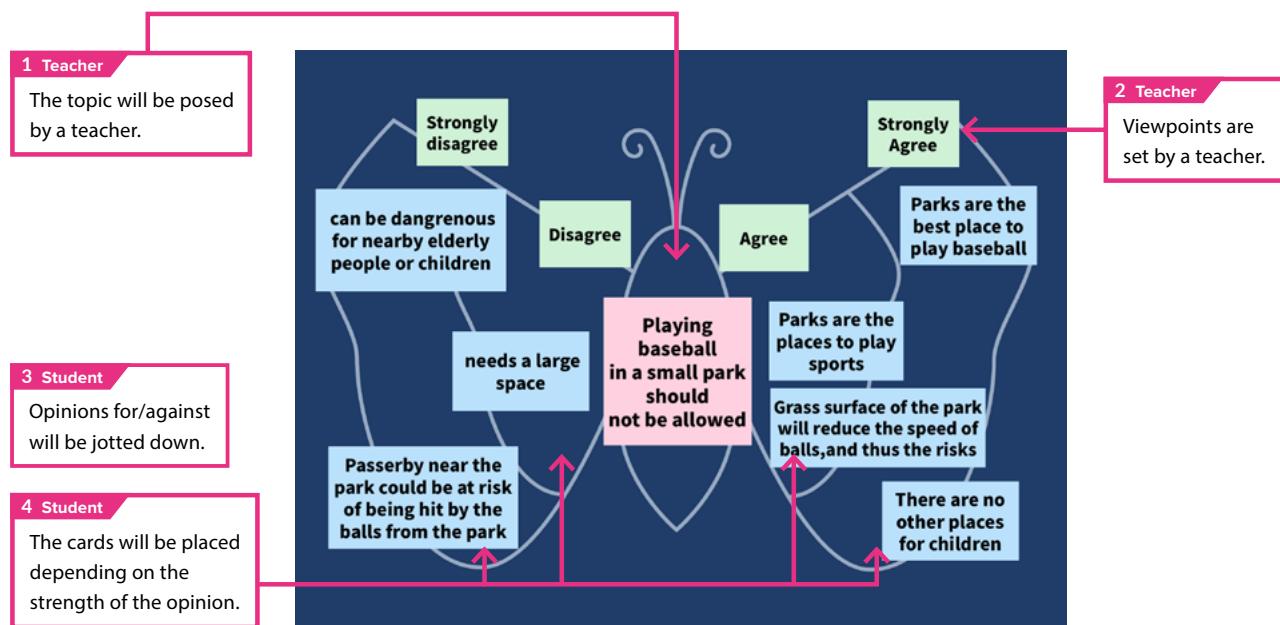


Try to discover opinions for and against playing baseball in parks. You can sort them out on a Butterfly Chart.

### Teachers

- ✓ The topic placed in the center of the Butterfly Chart should be a proposition that students can argue both for and against.

## 2 Generate ideas “Sort out opinions about playing baseball in parks.”



## 3 Develop your thoughts “Explain your opinion about playing baseball in the park.”

I think playing baseball in parks should be allowed.

Some people say it is dangerous to use a bat and ball in the park. However, if we find a place where there are no elderly people and young children, it should be safe to play. Baseball requires wide-open spaces, and parks are the best places to find wide-open spaces. Basically, the park is a place for various sports. Baseball is a sport.

If we are all careful and considerate of others, we can all enjoy the park.

### Advice

- After you have chosen the side of you agree with, take time to consider the other side's opinion, then start thinking of reasons to support both sides. It is important to decide which of the opposing sides' reasons you will address in your arguments.



# Jellyfish Chart give reasons

## Merit

Jellyfish Charts help students to give reasons to support an argument. Students can use it to make their argument more persuasive, as it helps them to clarify their reasoning.

### 1 Choose an appropriate thinking tool “Which method of power generation is the best overall solution?”



I can see that the power generation methods used today have many problems. I think power generation via biomass will solve these problems.

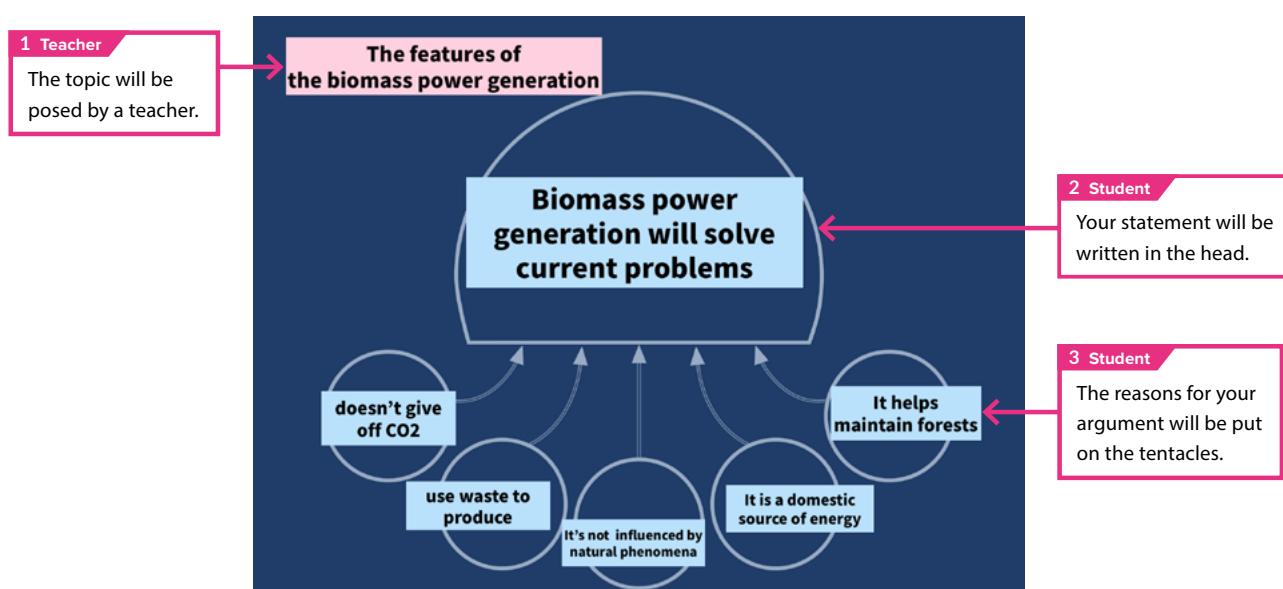


Why do you think so?  
You can clarify your reasoning by jotting down a reason on each tentacle.

#### Teachers

- ✓ Jellyfish Chart is useful either to show reasons that support an argument or to find the causes of a problem.

### 2 Generate ideas “Jot down the features of biomass power generation.”



#### Students

- ✓ Place in the tentacle parts what you learned from research about the topic that seems to support your statement written in the body.

#### Teachers

- ✓ You don't need to add information to every tentacle. Also, you can draw in more tentacles if needed.
- ✓ If you are worried that the connection between your main argument (placed on the body) and your reason (placed on a tentacle) will not be immediately clear, you might add extra explanation to the side of the tentacle.

### 3 Develop your thoughts “Explain why you think biomass power generation will be the solution to current problems.”

The main problems with currently used power generation methods are that they cause environmental damage, and require fuels whose supply is limited. Biomass power generation will solve these problems.

It is ecological because it uses wasted materials such as trees cut down in the process of thinning a managed forest, the dropping of animals, etc. to generate electric power. It is stable, too, because it is independent of natural phenomena. Because of these reasons, I think biomass power generation is the best way to solve the current problems.

#### Advice

- ◆ Students can better develop their thoughts by grading their reasons in terms of persuasiveness.



# Pyramid Chart (top to bottom) specifics / structure

## Merit

Pyramid Charts can help students to develop and form a logic to support their opinions/claims. To do this, it is recommended to organize information in this chart starting from the top and progressing downwards.

### 1 Choose an appropriate thinking tool “ Make a common goal for your class.”



I think reading books is good.  
I want my friends to understand that.

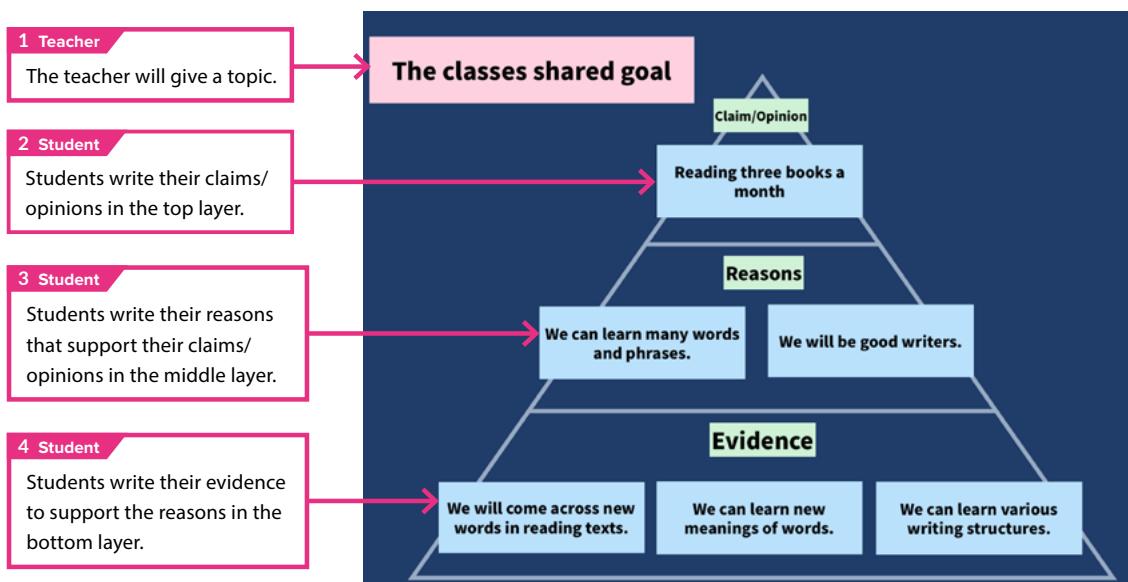


Organize your thoughts using a Pyramid Chart. You will decide your opinion/claim first. It should be placed in the top row of the pyramid. Next, in the middle layer, you will give the reasons for your opinion. In the bottom layer, you will fill in as much evidence as possible to support your reasons. This can be facts, data, or experiences.

#### Teachers

- ✓ A Pyramid Chart can be used to develop logic to support claims/opinions. To do this, the basic principle is to complete the pyramid from the top to bottom; first main claim/opinion, then the reasons for the opinion, and finally the evidence that supports the reasons.

### 2 Generate ideas “Create your suggestion for the class’ common goal for the term.”



#### Students

- ✓ Write your claims/opinions in the top layer, your reasons in the middle layer, and your evidence such as facts, data, and experiences in the bottom layer.

### 3 Develop your thoughts “ Explain your opinion about the common goal.”

I propose “reading three books a month” as our common goal, because I hope our class can win a prize in the school’s essay contest. To do this, we need to write essays that are easy for readers to understand. If we accomplish this, we will be able to express our thoughts appropriately in various occasions including in language classes. To have readers understand our essays, we must think of the readers. If we think and become aware of others, the atmosphere of our class will also become better.

#### Advice

- ◆ Check if the logic is clear. Your evidence should support the reasons and reasons should support your claim/opinion.



# Pyramid Chart (bottom to top) focus-in / abstract / structure

## Merit

Pyramid Charts can help students to focus their thinking, form abstract ideas, and structure the various information they collected. Finally, they can produce their own opinions or claims. To do this, it is recommended to complete the chart starting at the bottom and progressing upwards.

### 1 Choose an appropriate thinking tool “What makes a station barrier-free?”



The other day, I saw a visually impaired person at a train station. There were textured tiles on the floor to show the path forward and slopes as well as stairs, but still the person was having trouble. I wonder how all users can use the station comfortably and safely.

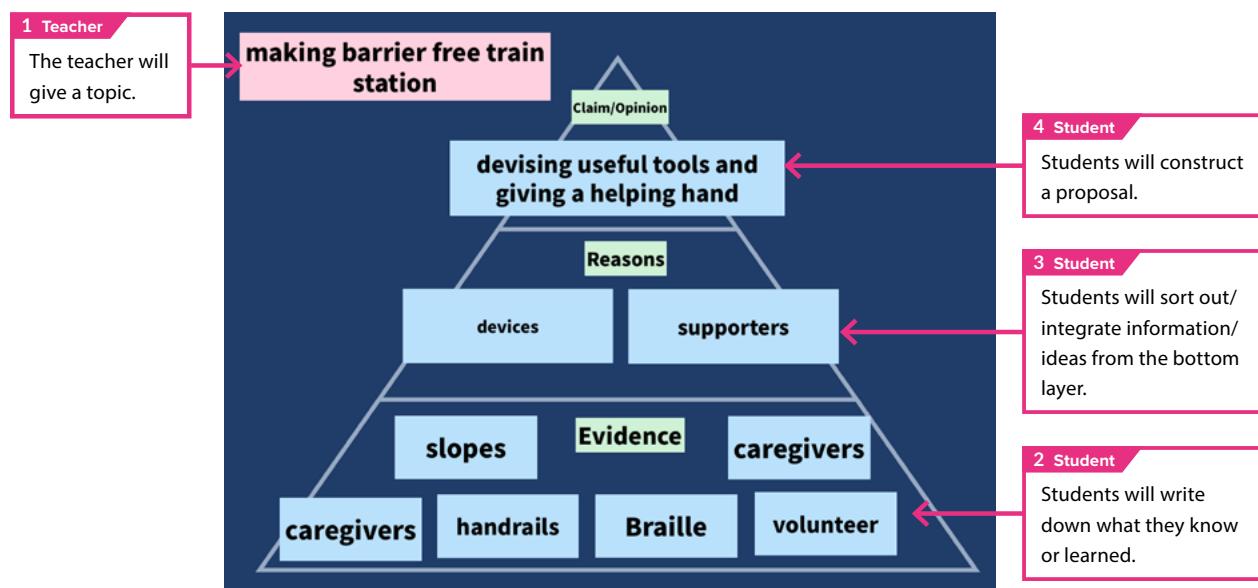


In this unit, you will each send a proposal to the railway system with suggestions how to create truly barrier-free stations. Each of you is expected to develop your own opinion based on what you learn.

#### Teachers

- ✓ A Pyramid Chart completed from bottom to top can be used as a final activity to wrap up the unit.

### 2 Generate ideas “Think of your own opinion about how to realize a barrier-free train station.”



#### Students

- ✓ In the bottom layer, list all information you already know or gathered about the topic. This information will be classified and integrated into the middle layer. The claim/opinion in the top layer should be closely connected and related to the items in the lower layers.
- ✓ You can add more layers in between if the sorting process is complex.

#### Teachers

- ✓ If students have multiple ideas in the middle layer, encourage them to integrate those ideas into just one opinion/claim.

### 3 Develop your thoughts “Explain what is needed to realize a barrier-free train station.”

Physical devices such as braille signs and slopes are necessary to realize a barrier-free train station. However those physical devices are sometimes not enough. For example, if a slope is too steep, a person in a wheelchair cannot use it. In that case, helping hands are necessary. The most important way to make train stations barrier-free is for each of us to be willing to help when we see a handicapped person in need of assistance.

#### Advice

- ◆ Check if there is logical consistency between the opinion/claim and the reasons.
- ◆ When there are multiple ideas in the middle layer, explore the relationship between them. It can be inclusion, exclusion, similarity, and so on. You should decide your opinion/claim depending on the relationship.



# Webbing (Image-Map) broaden

## Merit

Webbings (Image-Maps) help students to broaden their thinking.

Students will construct a web-like structure by thinking of ideas associated with a core concept.

Students may come up with unexpected and useful ideas.

## 1 Choose an appropriate thinking tool “What kinds of jobs can robots do?”

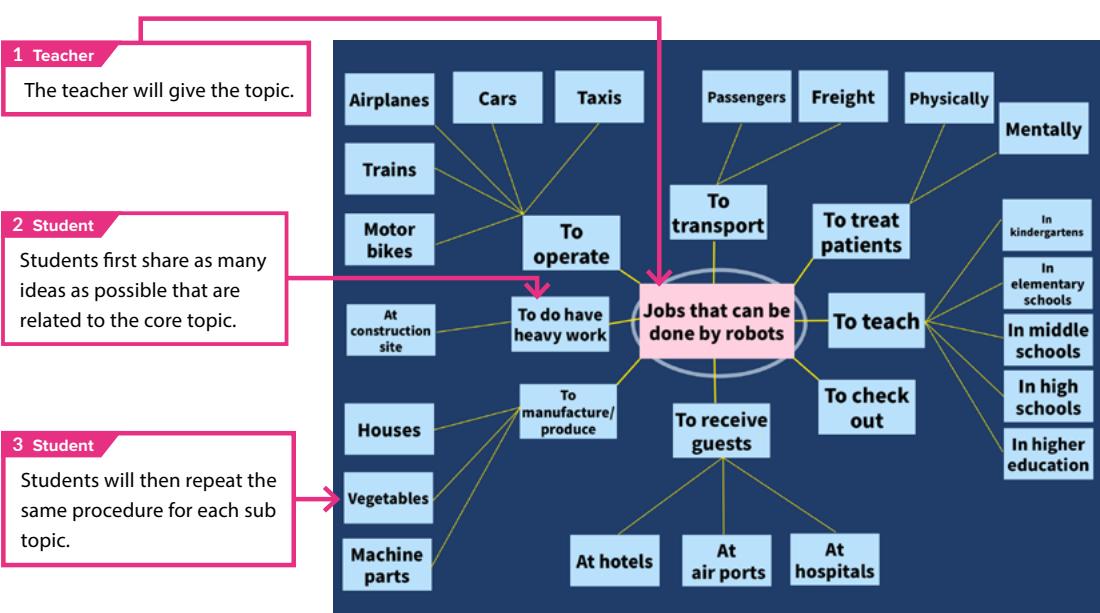


I read a book that said robots will replace people and take away our jobs. What kind of jobs can robots do?



First, around the core, write down all the job categories you think robots can do. Next, connect them to the core by drawing a line. Then, for each category write specific details of the jobs. After that, connect them to their category by drawing a connecting line.

## 2 Generate ideas “Write down jobs that robots can do”



### Students

- ✓ You are expected to continue the process of adding ideas outward to make a large web of ideas.
- ✓ You will decide whether you will use the ideas created on this tool or not after you finish the process.
- ✓ After you finish the process using this tool, you will decide which of the ideas created here will be used in the next activities.

### Teachers

- ✓ Let students freely write down any ideas on the chart.

## 3 Develop your thoughts “Explain what you realized by completing the web.”

I realized that robots can do almost all the jobs humans do today. Many countries like ours are facing a decline in the birth-rate so robots will be needed more and more to fill the roles when there are not enough human workers. For example, in the future doctor robots might even diagnose our diseases. Thus, it will be necessary for humans to learn to coexist with robots. The coming increase in automation makes it important for us to understand which careers will be replaced and which will not, and focus our energy on gaining skills for those careers that will remain.

### Advice

- ❖ When developing your thoughts, you should focus on how you developed the network and what new ideas you came up with.
- ❖ You can also choose a particular part of the chart and explain why you focused on it.



# Fishbone Diagram

multiple viewpoints / predict



## Merit

Fishbone Diagrams help students to analyze a problem from multiple viewpoints and plan how to solve it. Write a problem that needs to be fixed in the head of the “fish” and analyze its main causes.

### 1 Choose an appropriate thinking tool “How can we win the tug-of-war again next year?”



We won the tug-of-war at our school's sports day this year. I want to win again next year.

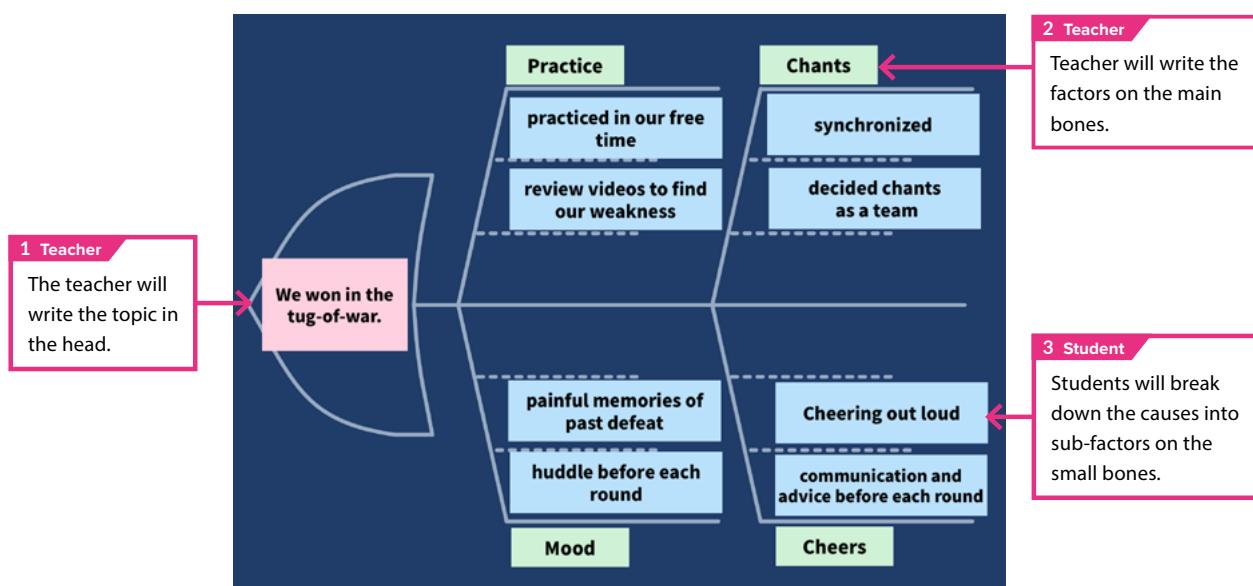


Why do you think you won the match?  
Use the fishbone diagram to find out why.

#### Teachers

- ✓ In the head, a problem (ex. we couldn't win the match), a result (ex. we were able to win the match), or a goal to be obtained (we will win the match) will be placed.

### 2 Generate ideas “Analyze the factors related to why we won the tug of war”



#### Students

- ✓ Students will come up with concrete episodes or facts as sub-factors related to the main factors.

#### Teachers

- ✓ To use the Fishbone Diagram to solve a problem, the teacher should label the main bones of the diagram with the main factors related to the problem. Students should analyze the problem by breaking down each factor into smaller sub-factors and writing them on the smaller bones.

### 3 Develop your thoughts “Explain the keys to winning a tug-of-war.”

The keys to winning a tug-of-war, I think, consist of four factors: practice, chants, mood, and cheering. We devised chants and practiced them every day. When our chants were synchronized, we could pull at the same time. It is so important to concentrate our minds and power. On the day of the match, we tried to encourage each other and confirmed our will to win in a huddle before every round. Teamwork is important to win the match.

#### Advice

- ◆ Develop your thoughts by referring to the relationships among sub-factors.



# Candy Chart predict

## Merit

Candy Charts help students to make predictions.

Students will predict the result based on the assumptions. Basically, start from the assumption, the consequence next, and finally grounds. Students start with assumed situations, use them to predict consequences, and finally clarify the reasons for those consequences.

## 1 Choose an appropriate thinking tool “Why do we need renewable energy?”



We learned that renewable energy comes from natural resources. Sunlight, wind, rain, tides, waves and geo-thermal energy can be the resources. Why should we develop renewable energy?

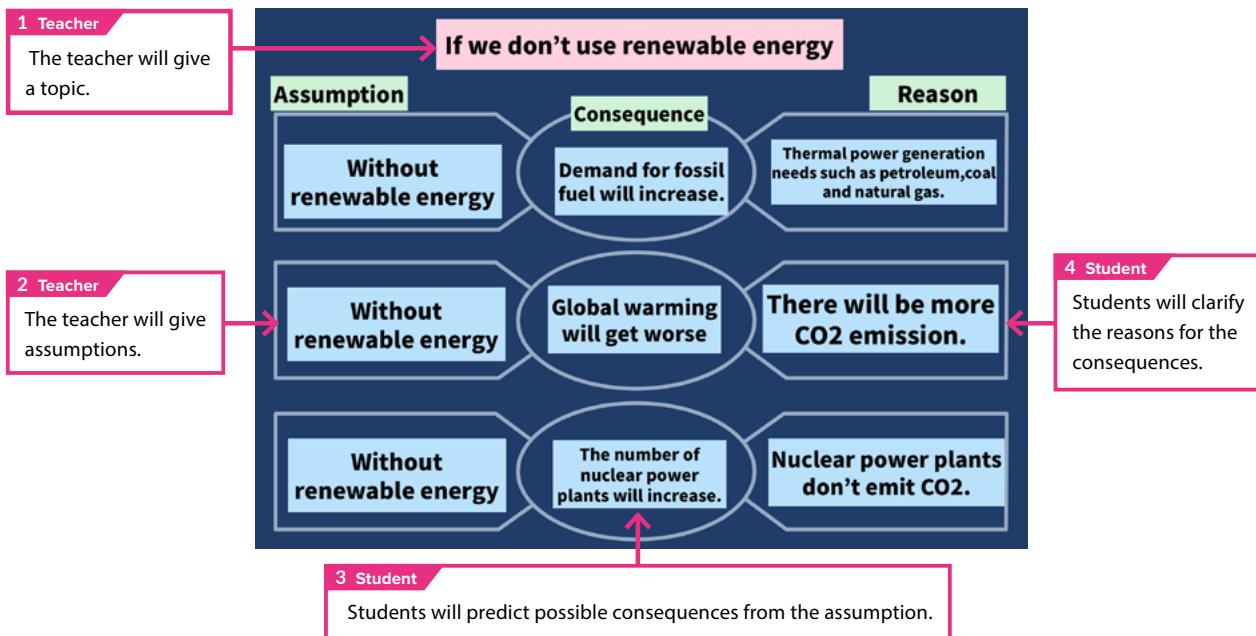


What will happen to the world without renewable energy?  
Write down your prediction in the candy chart.  
Then clarify the reasons and grounds.

### Teachers

- ✓ Using only one piece of candy on the candy chart is possible. In this case, let students write about each area in depth.
- ✓ Students can compare all the candies and explore which one is the most reasonable.

## 2 Generate ideas “What will happen if we don’t use renewable energy?”



### Teachers

- ✓ Basically, use the same assumption in every piece of candy.
- ✓ Alternatively, if you provide the consequences, students can think of the assumption and reasons.

## 3 Develop your thoughts “Explain why we need renewable energy.”

If we don't use renewable energy, we will have to produce that same amount of energy using thermal power plants. In this case, we will consume fossil fuels, such as oil, coal, natural gas, and more. These create CO2 and accelerate global warming. To avoid global warming, it may be important to use nuclear energy. On the other hand, considering the dangers of radioactive substances, it is not good to rely too much on nuclear power. As a conclusion, renewable energy is essential.

### Advice

- ◆ Pay attention to the likelihood of each reason as you develop your thinking.



# KWL Chart plan learning

## Merit

KWL Charts help students to form a learning plan.

Students can use KWL charts to sort out what they already know about a topic, what they want to know, and what they subsequently learned about it through other activities. That means they can have a clear idea of what to research. You can use this for a full unit or short activities such as field trips.

## 1 Choose an appropriate thinking tool “What are problems supermarkets face?”



Supermarkets deal with a huge amount of food everyday. What efforts do they make to avoid food-loss?



We're going to visit a supermarket. Complete the KWL chart to clarify what you know and what you want to know about supermarkets, beforehand. Next, write down what you learned.

### Teachers

- ✓ KWL Chart is useful for planning and reflecting.
- ✓ It is important to show students how this activity fits into the context of the unit as a whole.

## 2 Generate ideas “Investigate what efforts supermarkets make to avoid food-loss.”

Efforts of super market to reduce food-loss		
K:What I know	W:What I want to know	L:What I learned
Fresh foods are discounted just before closing time.	Slogan of the shop	Discount of fresh foods can push the sales up.
Vegetables are directly delivered from farmers.	the location of various products	10 plastic bags are filled with food gabages per day.
Prices are usually discounted as the time to expiry comes closer.	The quantity of food throw away in a day	Salesperson learn about food-loss as OJT.
	What happens to food after it's thrown away.	

### 1 Teacher

The teacher will give the topic.

### 2 Student

(K) Write everything you know about the topic already.

### 3 Student

(W) Next, write what you want to know in relation to what you already know.

### 4 Student

(L) Write down what you learned through other activities.

### Teachers

- ✓ (W/What I Want to know) Have students write down what they want to learn and what they're supposed to learn about. This will help them predict and think about the problem.
- ✓ (L/What I Learned) Students will complete this part after the research activities. Note that it is just a list of what they have already learned. This enables them to have a clear view of what they have learned, and figure out what they should work on next.

## 3 Develop your thoughts “Explain what you learned about the supermarket’s efforts to avoid food-loss.”

A huge amount of food is thrown away every day in supermarkets because of regulations. It's wrong to waste all this food. Most supermarkets reduce the prices of perishable items just before closing time to sell as much as possible. This supermarket trains their employees about food-loss by taking them to a garbage disposal facility. This makes them more conscious about food waste. After hearing this, I became interested in food-loss. I would like to learn more about the relationship between regulations and consumers.

### Advice

- ◆ Students should think about how their thoughts and/or impressions have changed through the learning activities, what aspects they better understand as a result, and what new questions they discovered.



# Data Chart compare / give reasons

## Merit

Data Chart help students to compare and give reasons.

This table is used to organize data from multiple aspects that were gained from multiple sources.

Students can gain a broader view and construct their own opinions by comparing the data.

## 1 Choose an appropriate thinking tool “How can we sustain regional agriculture?”



The number of people engaged in regional agriculture is decreasing. How can we sustain regional agriculture?



You can organize different opinions, compare the opinions, and come up with solutions.

## 2 Generate ideas “What must we do to sustain regional agriculture?”

		Subtopics		
		Rice	Vegetables	Fruits
1 Teacher	To sustain regional agriculture	Getting more farmers	Training successors	Seeking possibility of changing crops
	Farmers	Promoting large scale irrigated rice farming	Promoting huge scale farming	Branding fruits produced in the city
2 Student	Resources	An agricultural company	Withdrawal depending on the cost performance	Vegetable Industry powered by AI

### Students

- ✓ Sources are where you get or how you get your information.
- ✓ References can be broad categories such as books, brochures, or the Internet; or more specific like encyclopedias, almanacs, or newspapers.

### Teachers

- ✓ If students already have any argument, let them choose the information which supports their argument.

## 3 Develop your thoughts “Explain what is needed to sustain regional agriculture.”

I believe labor shortage is the biggest problem for regional agriculture. My city government is advancing large scale agriculture to solve this problem. As a result, the number of cooperating companies are increasing. With the help of their AI technology, it might solve the problems of labor shortage and lack of successors on family farms. However, companies will help as long as it is profitable. Therefore, it is important for regional governments to continue to support such companies.

### Advice

- ❖ Compare the information you got from different sources and construct your own opinions based on the similarities and differences. If you already have your own conclusion, focus on examining which information will help you prove your thoughts or how to make it more persuasive.

# 2 Axes Chart order / compare

## Merit

2 Axes Charts help students to compare and decide the order of ranking.

Students can clarify the position of each ideas in relation to two scales represented by the two axes. If they use just one axis, it is called a “Tug-of-War Chart.”

## 1 Choose an appropriate thinking tool “How can we stop global warming?”



We brainstormed ideas on how to stop global warming.

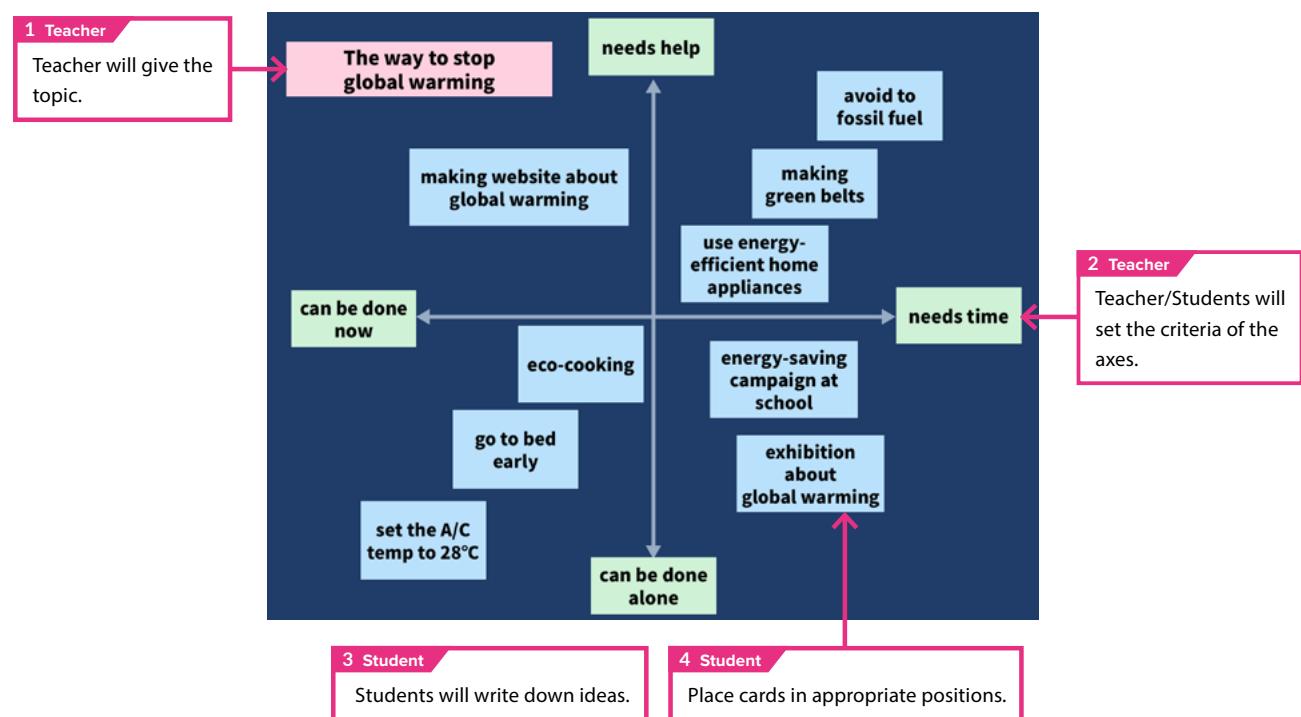


Organized the ideas on the chart, where the axes represent “how soon it can be done” and “how much cooperation is needed.”

### Teachers

- ✓ When using the tug-of-war chart, the position shows the strength or degree of the opinion. Write your reason on the card and tell why you put it at the position.

## 2 Generate ideas “Organized ideas about how to stop global warming.”



## 3 Develop your thoughts “Explain what we can do to stop global warming.”

I placed all my ideas on the chart. I focused on what we can do by ourselves, and what we need help to do.

We can easily set limit our use of air conditioning, or limit our activity late at night. On the other hand, we need the help of organizations, such as the city government, to make green belts. First, we must visit the environmental department of the city government. We must present the problems and our ideas on how to solve them. If we do this, they make agree to implement our ideas.

### Advice

- ❖ Develop your thoughts by examining the positions of the ideas.



# PMI Chart multiple viewpoints

## Merit

PMI Charts help students to think about a topic for multiple viewpoints.

They will organize ideas about the topic using three different angles. P: plus, M: minus, and I: interesting.

This chart is useful to evaluate something from multiple viewpoints and make a decision.

## 1 Choose an appropriate thinking tool “Why do we have homework?”



Why do I have homework everyday?

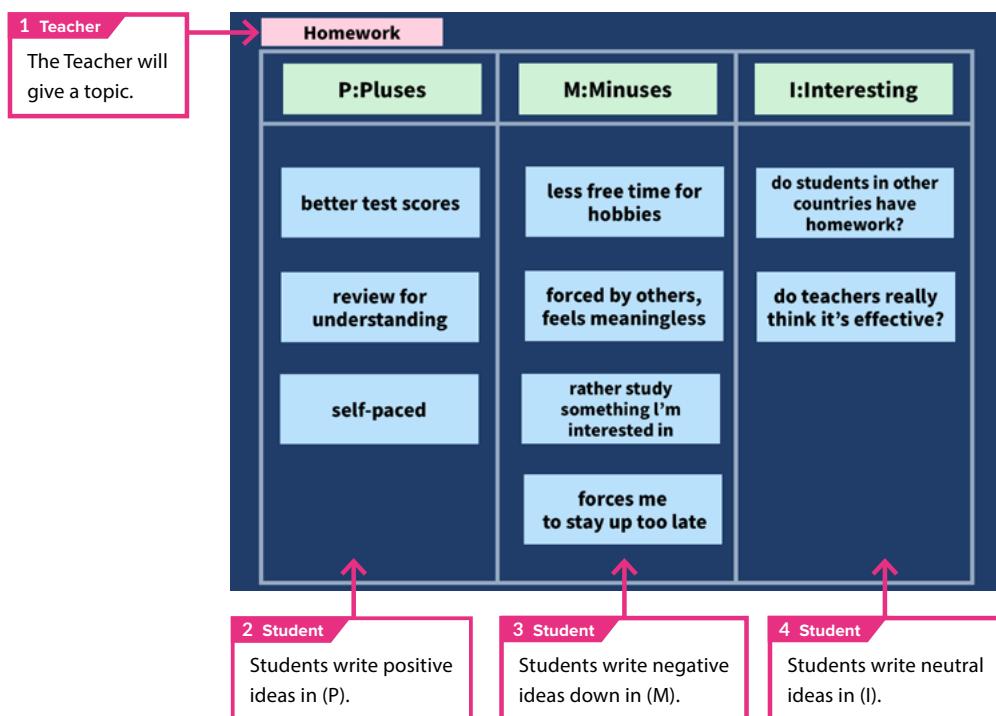


Not all students like homework. You can sort out the reasons with PMI Chart. Then think of your opinion about homework.

### Teachers

- ✓ In a classroom presentation, listeners can use a PMI Chart to evaluate other presentations.

## 2 Generate ideas “Rethink homework using a PMI Chart.”



### Students

- ✓ I is for neutral ideas: ideas which you are not sure if you are for or against. It also includes what you are interested in, worried about, wondering about, and so on.

### Teachers

- ✓ Have students become aware of which groups or individuals are for or against different opinions.

## 3 Develop your thoughts “Explain your opinion about homework.”

I don't like homework because it deprives me of time for my hobby.

I think it is more important to study what I am interested in. However, homework helps me get good grades.

I wonder, is there homework in all countries around the world? Furthermore, I'd like to know how teachers and parents think about homework.

### Advice

- ❖ Develop your thoughts referring to all of the ideas in plus, minus, and interesting.



# Concentric Circles Chart

notice change



## Merit

Concentric Circle Charts help students to notice changes.

The different sizes of the concentric circles represent the change of time, distance, generation, etc.

### 1 Choose an appropriate thinking tool “ How have household tools changed through the generations? ”



The tools we use at home now are very different from those used in the past, even though we use them for the same reason.

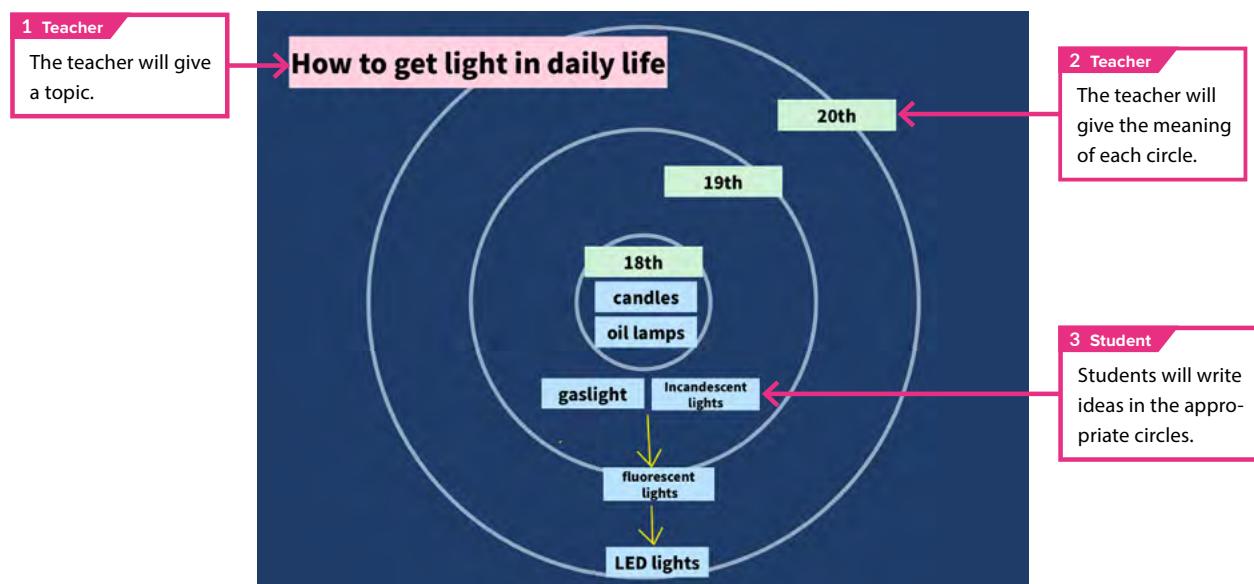


Research how household tools have changed through the generations with a Concentric Circle Chart. The circles represent the 18th, 19th and 20th centuries.

#### Teachers

- ✓ Concentric Circle Chart will be decided according to the target of the activity.
- ✓ The circles can represent time, distance, generations, and so on.
  - distance: sort out activities which spread from local to nationwide.
  - generations: sort out changes in values going from students' generation back in time to their grandparents' generation.

### 2 Generate ideas “ Explain how a household tool changed through the generations. ”



#### Students

- ✓ To visualize the relation better, you can arrange them and connect them with a line.

### 3 Develop your thoughts “ Explain how a household tool changed through the generations ”

We investigated the sources of light people use in their daily lives.

Before the 18th century, people used candles and oil lamps. In the 19th century, they used gaslights and incandescent light bulbs.

Fluorescent lights appeared in the 20th century and are still used even in our school. In the late 20th century, the LED light was invented. LED lights are the start of a new era, because of their long lifespan and energy efficiency. The evolution of technology and tools not only can make life convenient but also reducing damage to the environment. I would like to investigate if other tools have followed a similar progression.

#### Advice

- ◆ You will explain how things change according to the chart.



# Plot Diagram summarize

## Merit

Plot Diagrams helps students to summarize. This diagram is used to outline a story. Students will organize the plot (important points) and locate the climax of the story. This diagram can be helpful for writing an original story or planning a presentation.

### 1 Choose an appropriate thinking tool “Where is the climax in the story?”



The climax of the story is where it becomes most interesting and exciting. Where is the climax in the story of the tortoise and the hare?

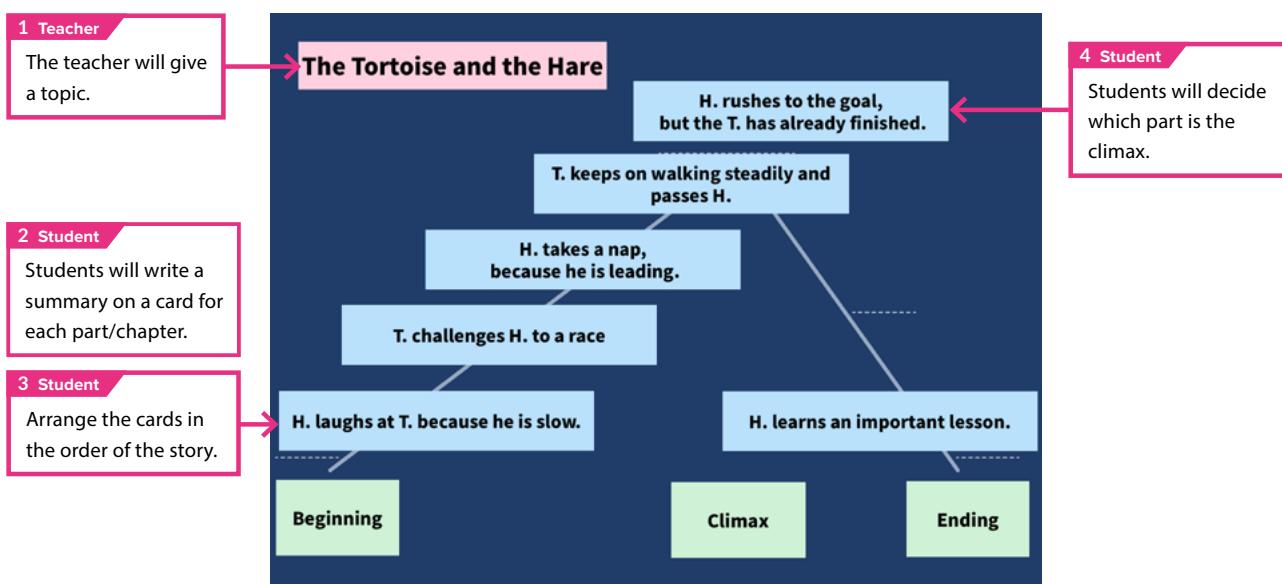


Arrange the events of “The Tortoise and the Hare” on a plot diagram and figure out where the climax is.

#### Students

- ✓ You can make a summary of the story by combining the information on all the cards.

### 2 Generate ideas “Arrange an outline for ‘The Tortoise and the Hare’”



#### Students

- ✓ Prepare a card for each incident in the story.
- Prepare a card for each topic in your presentation.

#### Teachers

- ✓ It will be easier for students to make the plot diagram after making all the cards that represent the parts of the story or presentation.

### 3 Develop your thoughts “Explain where the climax of ‘The Hare and Tortoise’ is.”

I chose the fable of the tortoise and the hare. I think the last scene where the hare finds the tortoise waiting for him at the finish line is the climax, because the unexpected win of the tortoise comes as a surprise to the readers. Another possibility would be the scene where the tortoise unexpectedly catches up with the hare, because the readers feel satisfied to find out that the tortoise's efforts are rewarded.

In either case, the initial expectations of the readers is overturned. If we locate the climax it can also help us to think about and understand the author's message.

#### Advice

- ◆ Develop your thoughts by connecting your impression of the climax.
- ◆ The climax will be the main assertion of a story, and of a presentation.
- When you structure a presentation, make sure it naturally flows towards your main assertions.



# Rake Chart multiple viewpoints

## Merit

Rake Charts help students to see one specific topic from multiple viewpoints.

### 1 Choose an appropriate thinking tool “How can you describe autumn?”



I noticed that the school yard changed a lot between summer and autumn.

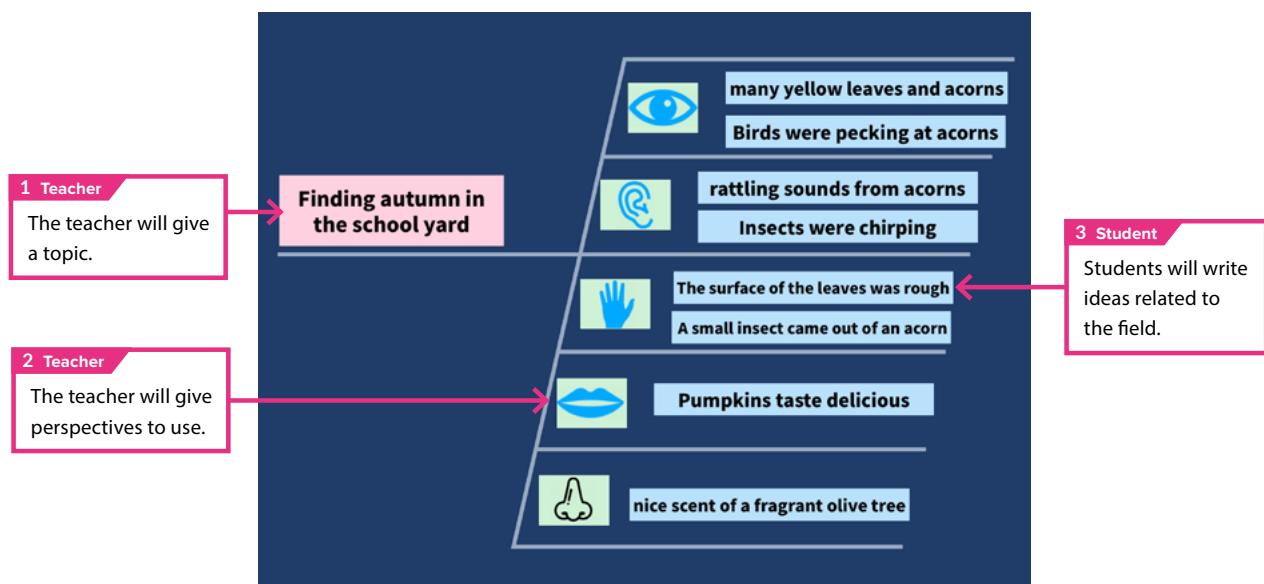


What changes can you find? Use all of your five senses to find various signs of autumn in the school yard. You can use a rake chart to organize your findings.

#### Teachers

- ✓ The rake chart is useful when analyzing the causes of some phenomena, or for generating essay contents.

### 2 Generate ideas “What signs of autumn can you find?”



#### Teachers

- ✓ When you set five senses as viewpoints for young students, using symbols can help them to understand.

### 3 Develop your thoughts “Tell us the signs of autumn you discovered.”

I found many yellow and red leaves in the school garden.

There were many acorns, too. When I shook an acorn, I could hear a small sound and a small insect came out.

There was a small hole on the surface. An insect was eating the acorn. Insects eat acorns and birds eat insects.

Autumn is a season rich in nutrition for both insects and birds.

I would like to learn what kind of hunter-prey relationships there are among the creatures and sort them out.

#### Advice

- ◆ After describing your findings from each viewpoint, integrate them to develop more profound thoughts of your own.



# Analysis Chart structure / analyse

## Merit

Analysis Charts help students to structure their ideas and have a perspective.

First, analyze the texts and divide the information into “facts” and “hearsays.”

Then, analyze what the author wants to say.

Students can use this chart for constructing their own opinions from the collected information.

## 1 Choose an appropriate thinking tool “How can you critique a speech?”

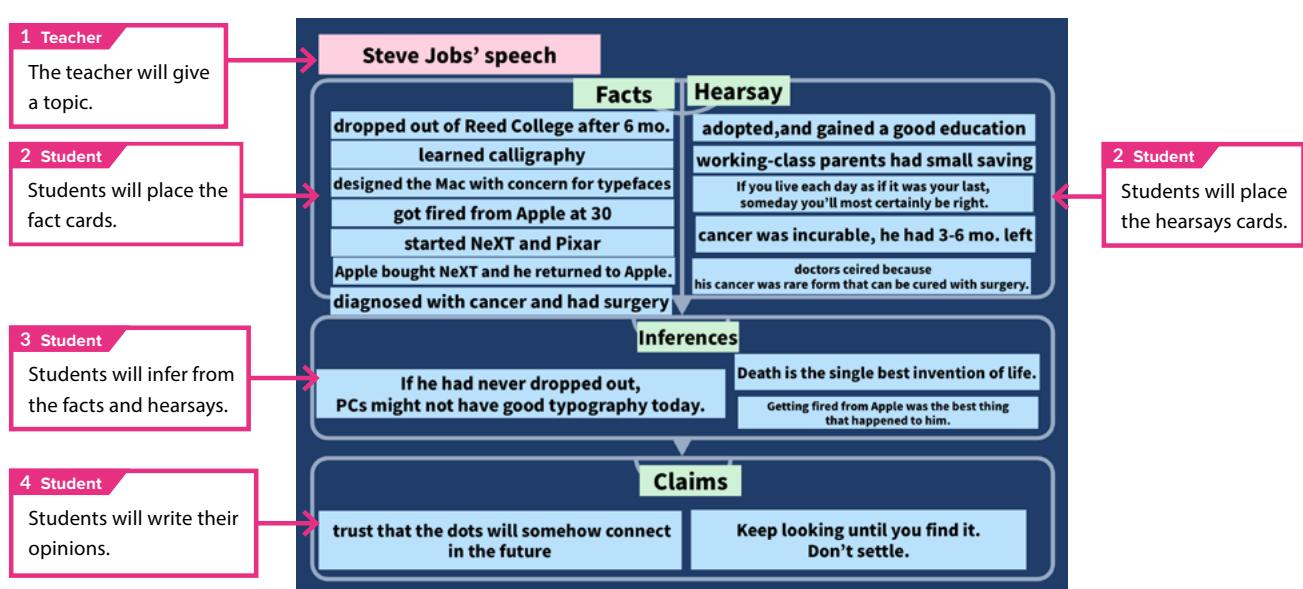


I want to deeply understand a good speech.  
I chose the speech by Steve Jobs at Stanford University.



Read a good speech and analyze the contents using an information analysis chart.

## 2 Generate ideas “Analyze good speech”



### Students

- ✓ Facts should be data from reliable sources and/or concrete experiences with observations.
- ✓ Hearsays include information from someone, sometimes in the style of a quotation.
- ✓ Inference is about what the author or you infer from the facts and hearsays. Students should use verbs such as “think” and “judge.”

### Teachers

- ✓ Let students think about the importance of facts and reliability of hearsay.

## 3 Develop your thoughts “Explain your opinion about the good speech.”

Steve overcame three big difficulties. It is surprising that he reflects on them as positive opportunities.

The episodes and stories about his parents and wife color the speech. His speech is interesting for the students of Stanford University. His message gives everyone a strong impression. I hope I will be able to connect the dots of my past, one day. I never want to be self-conceited.

### Advice

- ◆ You can construct your opinion based on the relationships among facts, hearsays, inferences and claims.



# Diamond Ranking compare / order

## Merit

Diamond Rankings help students compare and organize information.

You can use this chart to choose the best idea among many candidates based on multiple criteria, such as, importance and urgency.

### 1 Choose an appropriate thinking tool “ How can we implement the 3Rs? ”

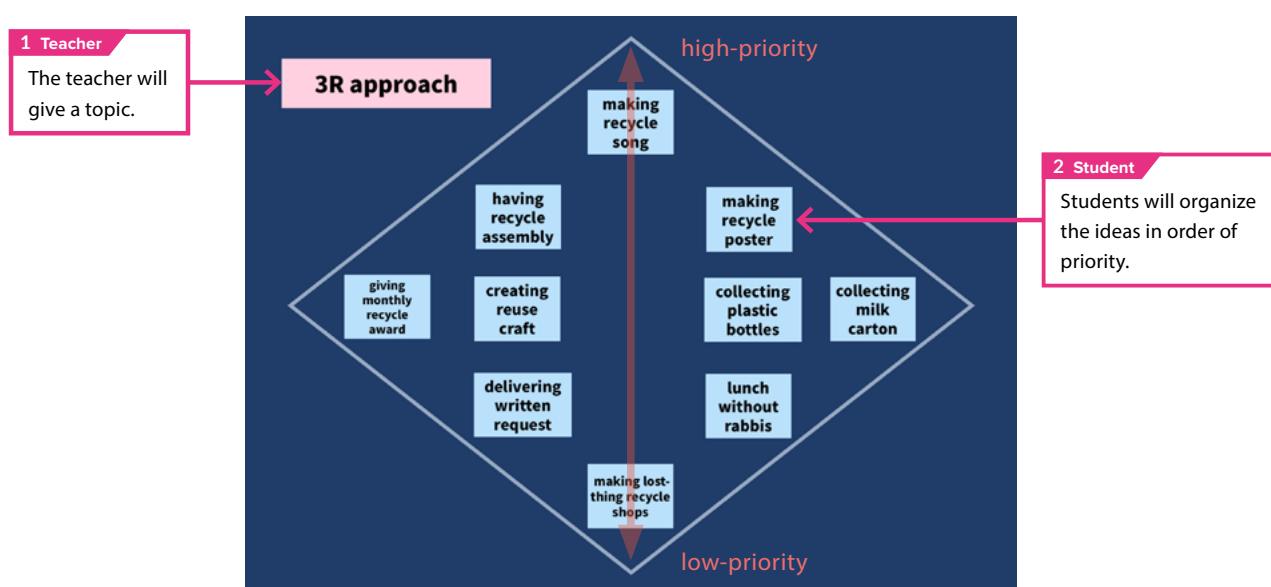


We learned about reuse, reduce and recycle.  
Then we thought about activities we can do related to the 3Rs. We came up with 10 ideas.



You can use Diamond Ranking to rank the ideas. That way you can prioritize the best idea.

### 2 Generate ideas “ Decide one best 3R-related activity from among all the options. ”



#### Students

- ✓ Determine the relative priority among all ideas and place each of them on the chart to form a diamond shape.
- ✓ The best one will be put at the top of diamond.

#### Teachers

- ✓ The criteria of priority can be “feasibility”, “worth doing”, etc. It can be changed in each comparison.

### 3 Develop your thoughts “ Explain how you chose the best 3R-related class activity. ”

I determined the priorities based on criteria such as feasibility and impact on people's thinking.

Making posters to encourage recycling and having a school-assembly to talk about recycling have higher priority, because they are effective for spreading our message to the people around our school. However, a song about recycling will reach more people, because songs can be sung and heard everywhere. It will be more effective than the other ideas. I determined making a recycling song and publishing it as a top-priority.

#### Advice

- ❖ You will explain to the class what candidates you had and the reason why you chose one over the others.

# Choosing the best tool for each learning activity



## Thinking Tools are tools to assist in the thinking process

**Thinking tools can open the door to creative and logical thinking, both of which promote deeper exploration of topics.**

**The process of thinking can be broken down into more concrete procedures, such as comparing, classifying, or predicting.**

**We use these procedures, which we call “thinking skills”, to connect and structure our knowledge with the goal of gaining a deeper understanding of some ideas.**

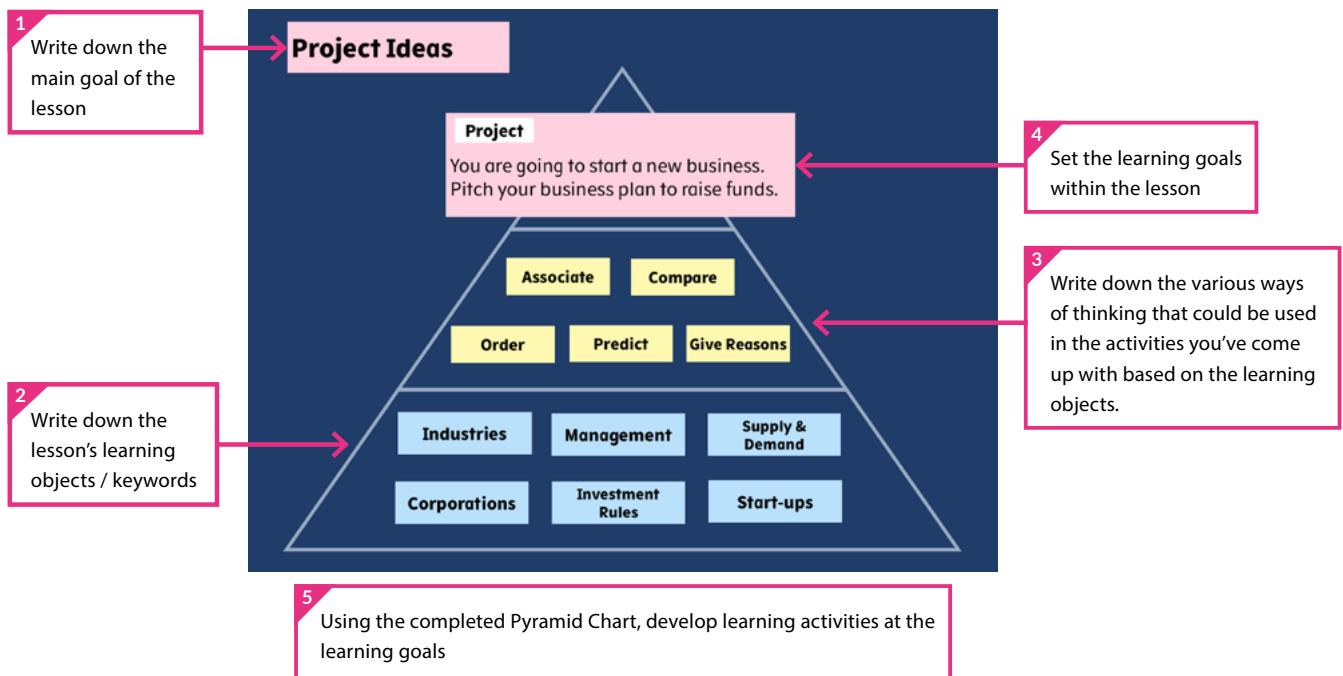
**Thinking Tools allow us to practice these thinking skills in a visual way.**

Thinking Skill	Thinking Tool	Content
ordering	 2 Axes Chart      Diamond Ranking	Rearranging multiple concepts according to certain perspectives or conditions.
comparing	 Venn Diagram      Data Chart      2 Axes Chart      Diamond Ranking	Finding the similarities and differences between multiple concepts.
classifying	 Y/X/W Chart	Grouping concepts based on certain shared characteristics.
thinking laterally		Finding the relationships between multiple concepts. Finding other concepts related to a certain concept.
thinking from multiple angles	 Y/X/W Chart      Butterfly Chart      Fishbone Diagram      PMI Chart      Rake Chart	Focusing on the multiple characteristics of a certain concept, and/or thinking about it from multiple angles.
giving reasons	 Jellyfish Chart      Data Chart	Finding or predicting the reasons behind, causes of, or evidence for something.
predicting /boarden/ plan learning/analyse	 Fishbone Diagram      Candy Chart      KWL Chart      Analysis Chart	Using what is already known to predict what will happen in the future. Forecasting results.
thinking specifically	 Pyramid Charts (top to bottom)	Giving concrete examples that fit the high level concepts/rules related to a certain concept, and breaking the concept down into the low level concepts and components that it is made up of.
generalizing		Discovering high level concepts and rules related to a concept, or combining multiple concepts into one.
structuring	 Pyramid Charts (top to bottom)      Pyramid Charts (bottom to top)      Analysis Chart	Organize your ideas in a (web, layered, etc.) structure.
summarizing		Simplify by narrowing down information to the most necessary parts.
noticing changes		Select a perspective and describe how something changes over time.

# Lesson development using a Pyramid Chart

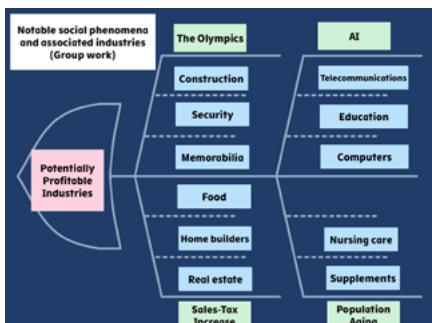
Thinking Tools can be used not only in a class environment, but for creating teaching materials or designing curriculum as well.

Let's look at an example using a Pyramid Charts to set learning goals.



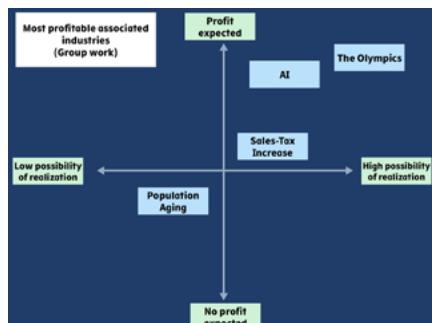
**Activity 1** Think of the industries associated with the future events you're focusing on (group work)

Think of industries associated with the social phenomena. Brainstorm using the Fishbone Chart.



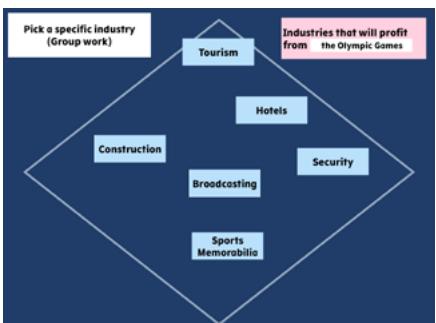
**Activity 2** Decide which has the most potential for profit (group work)

Using the 2 Axes Chart, compare along the two axes of "chance of success" and "potential for profit."



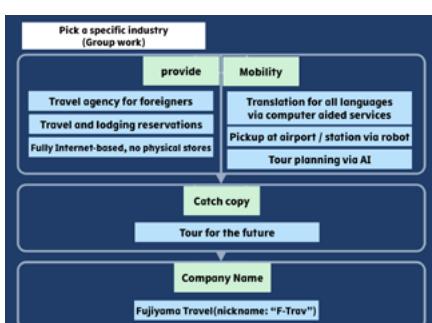
**Activity 3** Choose a specific industry (group work)

Using the Diamond Ranking, order the industries that are likely to produce a profit.



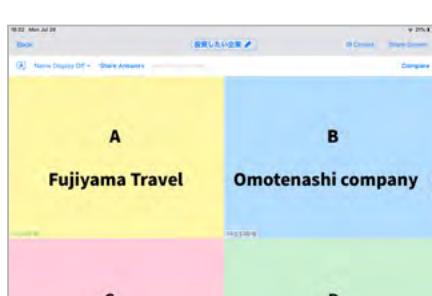
**Activity 4** Choose the details of your business and its name (group work)

Using the Analysis Chart, come up with company names related to the details of the business, and present them.



**Activity 5** Time to invest (vote)

Every student has \$100,000, and will use LoiLoNote School to vote on which company they want to invest in. The group that raises the most money wins.



Materials provided by: Aiko High School  
Makoto Wada



# Real examples using multiple Thinking Tools



Rearrange the cards from the completed Thinking Tool on another Thinking Tool, and begin to develop new thoughts. By changing Thinking Tools, you can see the ideas from a different perspective.

## 1 Choose an appropriate thinking tool “How will the opening of a large stores affect the surrounding neighborhood?”

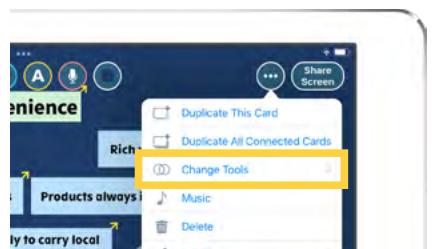


There's a new shopping mall in our neighborhood.



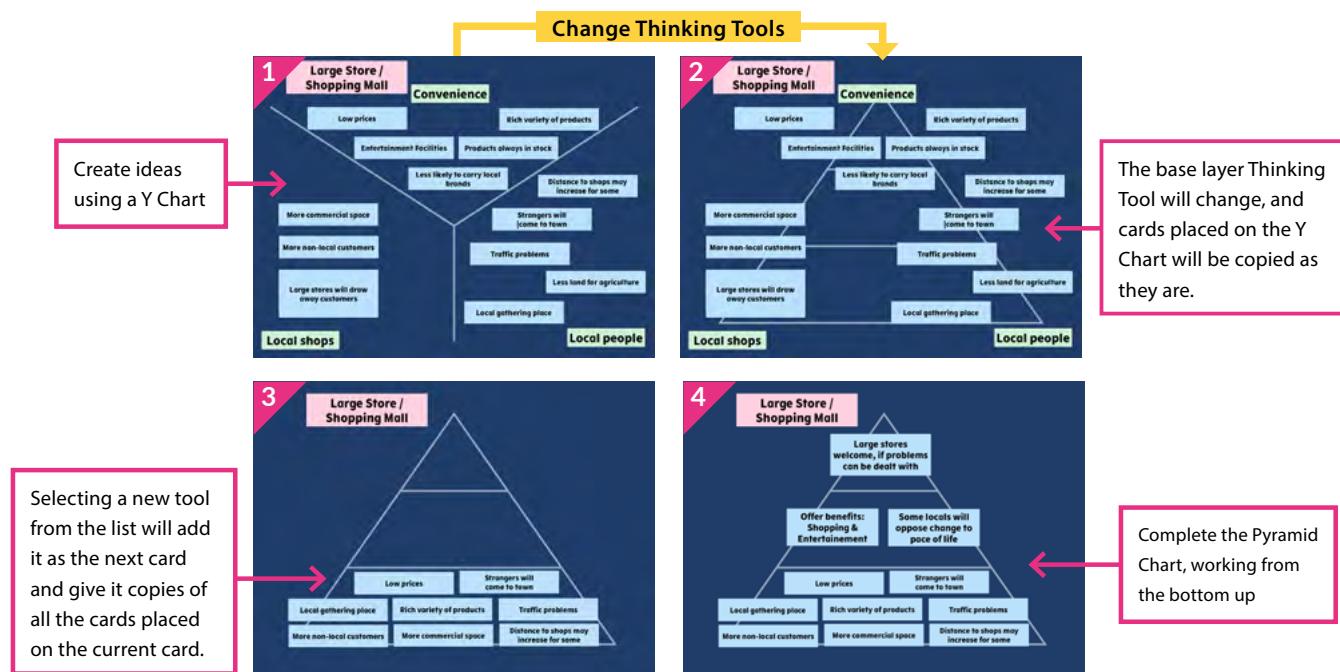
Let's think about how the opening of large stores or shopping malls will affect the surrounding neighborhood, using a Y Chart with the perspectives of “convenience,” “local shops,” and “local people.” Then you can use these ideas to come up with your own thoughts using a Pyramid Chart.

### Method



1. Tap the icon at the top of the editing screen
2. Select [Change Tools]
3. Selecting a new tool from the list will add it as the next card and give it copies of all the cards placed on the current card.

## 2 Generate ideas “Analyze good speech”



## 3 Develop your thoughts “Explain your opinion about the opening of large stores.”

Large shops and shopping malls offer convenience, because they have everything, so you can always find what you are looking for. They also offer a lot of entertainment options. However, when they open, they drive out older and smaller local businesses. This is bad for customers who preferred those local businesses. Also, large shopping facilities create more traffic congestion, as they draw customers from a wide area. If the local community can find ways to mitigate these negative effects, I am happy to welcome large stores and shopping malls in my neighborhood.

### Advice

- ◆ This can be used for broadening and refining ideas.
- ◆ It's useful for understanding ideas from a different perspective.

# Methods for generating a lot of ideas

When coming up with thoughts, it's important to generate lots of ideas.

Here are two methods for quickly creating cards and efficiently writing down ideas.

## Quickly turning ideas into cards

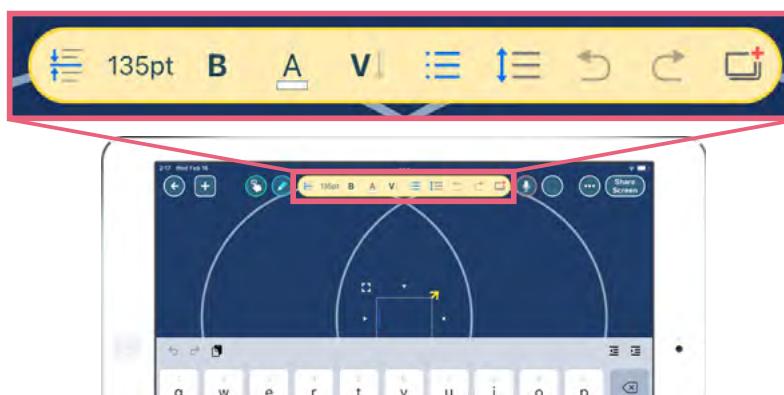
### Method 1 : Double tap on a Thinking Tool

When you double tap the screen on a Thinking Tool or photo card, you can add a text card.



### Method 2 : Tap on the icon

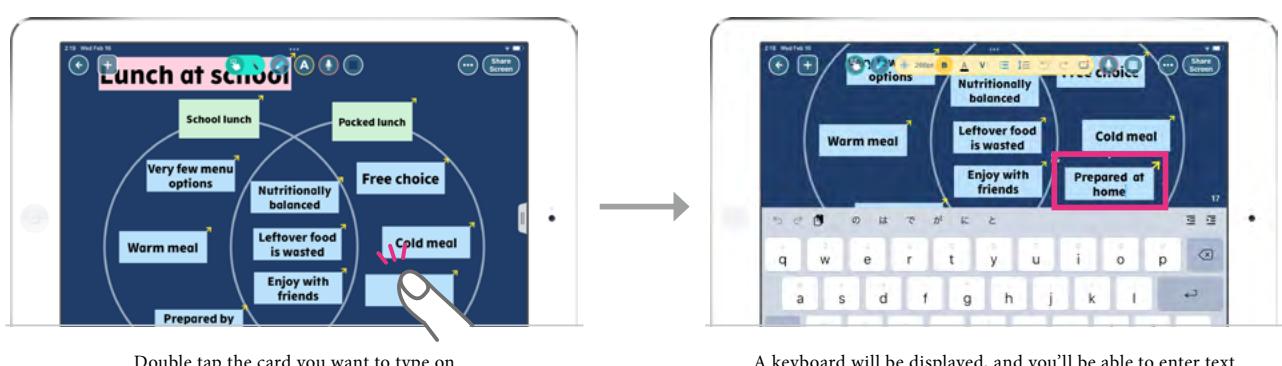
Tap the button on the far right, you can add a new text card.



## Jot down ideas while looking at the whole picture

Thinking Tools make it possible to look over your ideas so far and create new ones at the same time.

Simply double tap the text card you wish to edit while viewing the whole Thinking Tool. A cursor will appear, and you can type in your changes.



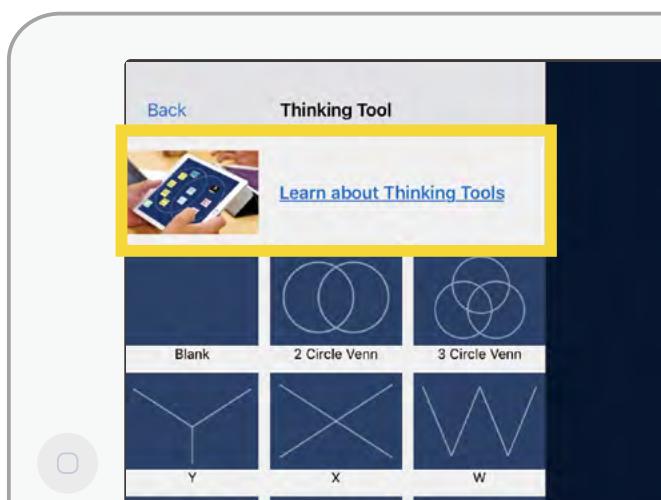
For more information about how to use the app,  
see “English LoLo Note School Manual.”

<https://scrapbox.io/enloilomanual/>





Help using Thinking Tools is available in the app.



## Learn about Thinking Tools

<https://n.loilo.tv/en/thinkingtool>

For examples of real lessons using the Thinking Tools, visit our website.



Access via QR code!

## **MEMO**

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