School Year '19 - '20

School-wide
Lesson Study

Nurturing students who can make connections among their ideas through problem solving

国立市立国立第五小学校

Rationale for the research theme

Societal Background

* Decreased working age population
* Further advancement of globalization
* Increased need for collaboration and mutualism with people with diverse value systems;
* Rapid informatization and technological advancement
* Evolution of artificial intelligence

Qualitative transformation of Schooling

* New National Course of Study
* From "what to teach" to "what to be learned"
* Focus on capacity building
* Collaboratively solving problems

Integrating and further developing knowledge and skills acquired → Solving problems while reasoning, judging and expressing themselves

Based on the current state of our students

We want students to make use of their prior learning that are necessary for problem solving.

Challenge is connecting ideas

- Capacity to reason based on prior knowledge
- Capacity to notice the merits of an idea
- Disposition to make use of good points of other's ideas
- Capacity to share own ideas in public

.We want students to recognize and accept difference in the ways we express our ideas

We want students to be able to communicate their ideas in a way others can understand.

We want to develop this disposition in subjects other than math as well, including specials.

Based on the current state of our students

Nurturing students who make connections while learning through solving problems

Nurturing students who can connect mathematical ways of reasoning/observing as they learn

Capacity to connect each others' ideas and capacity to connect mathematics are mutually empowering.
Designing lessons where students enjoy making connections.

Nurturing students who can make connections among their ideas through problem solving

What does it mean for “students to make connections”?

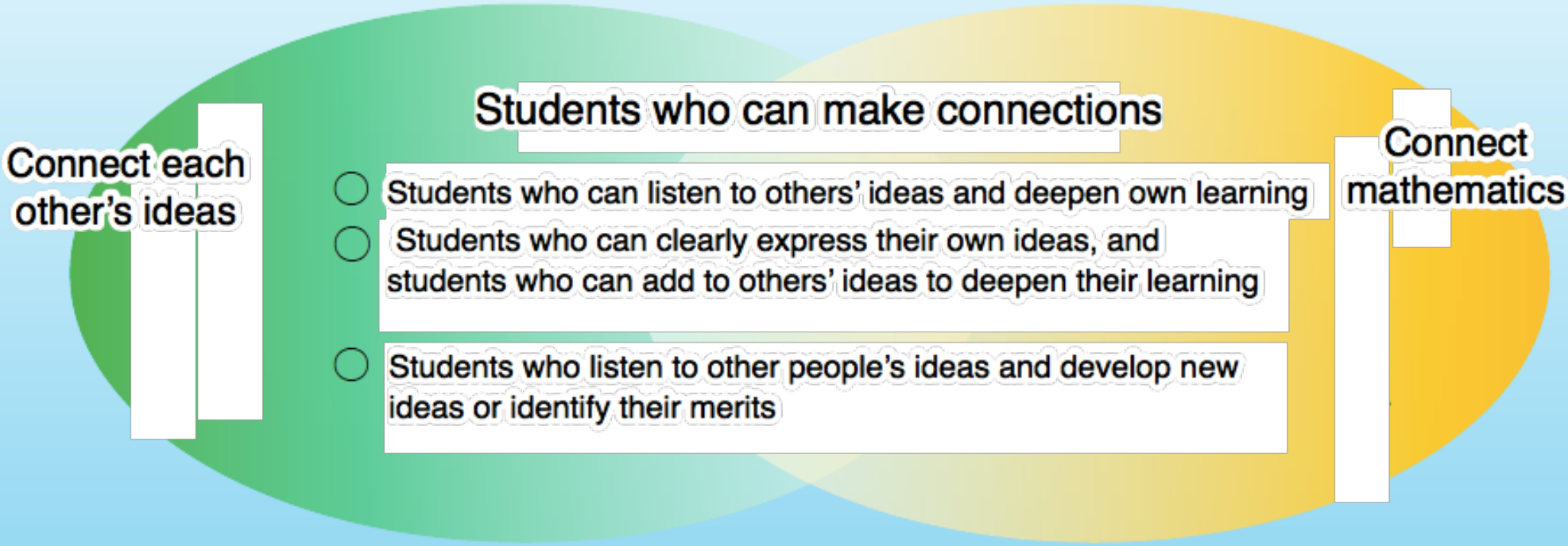


Image of desired students by developmental levels

[Middle Grades]
Students who can explain diverse ideas.

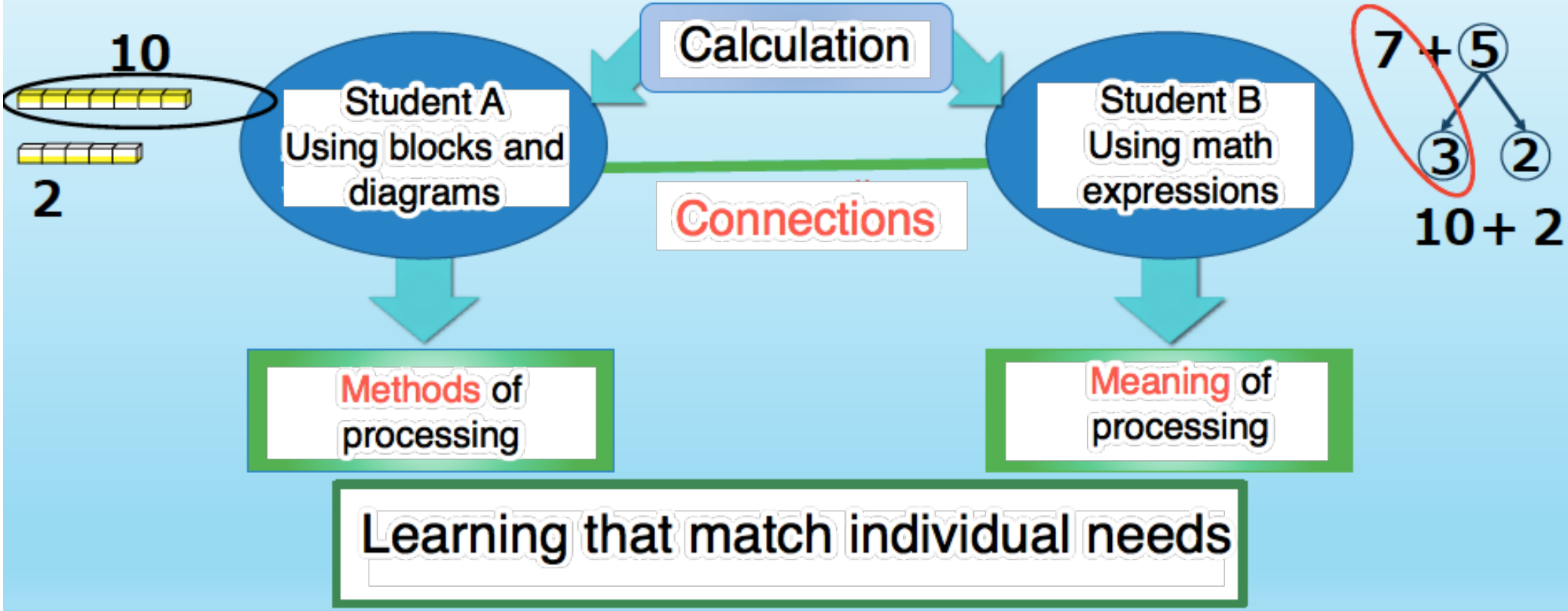
[*Tsukushi*]
Students who can express own feelings and ideas.

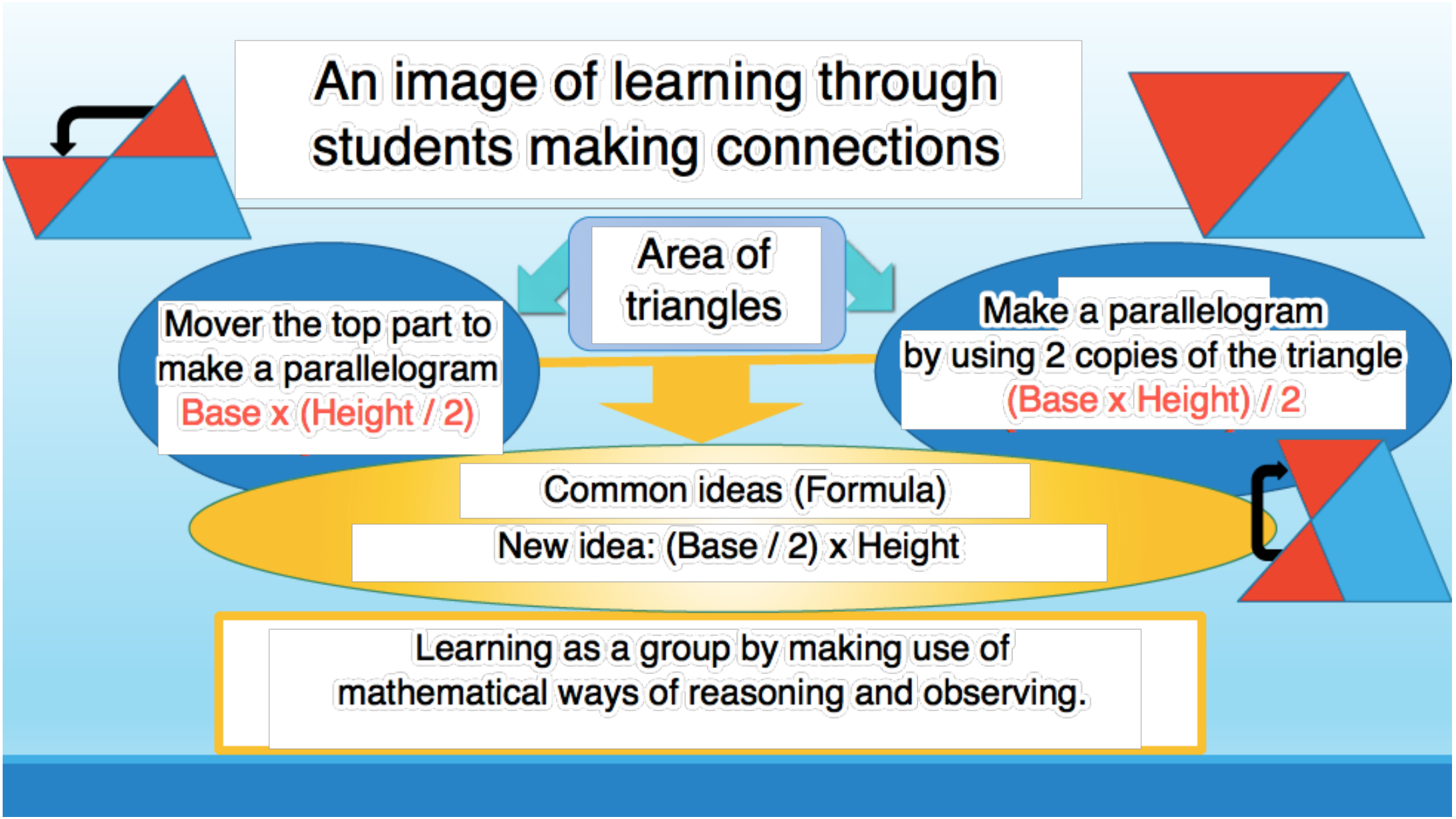
[Primary Grades]
Students who can communicate own feelings and ideas.

[Upper Grades]
Students who can select appropriate ideas for the given problem.

[Specials]
Students who can communicate and sense feelings and ideas.

An image of learning through students making connections




An image of learning through students making connections
Area of triangles
Mover the top part to make a parallelogram
Base x (Height / 2)
Make a parallelogram by using 2 copies of the triangle
(Base x Height) / 2
Common ideas (Formula)
New idea: (Base / 2) x Height
Learning as a group by making use of mathematical ways of reasoning and observing.

Research Approach

Strategies to design “lessons that promote connecting of ideas”

In order to “connect friends’ ideas”

Revising own idea based on others’ ideas

- Pair and small group discussion activities

  * To communicate own ideas
  * To make discussion more lively

  * To know diverse ideas
  * Multiple students share their ideas

- Examining different ways of expressing ideas

  * To make sense of friends’ ideas
  * To discover new ideas from friends’ ideas

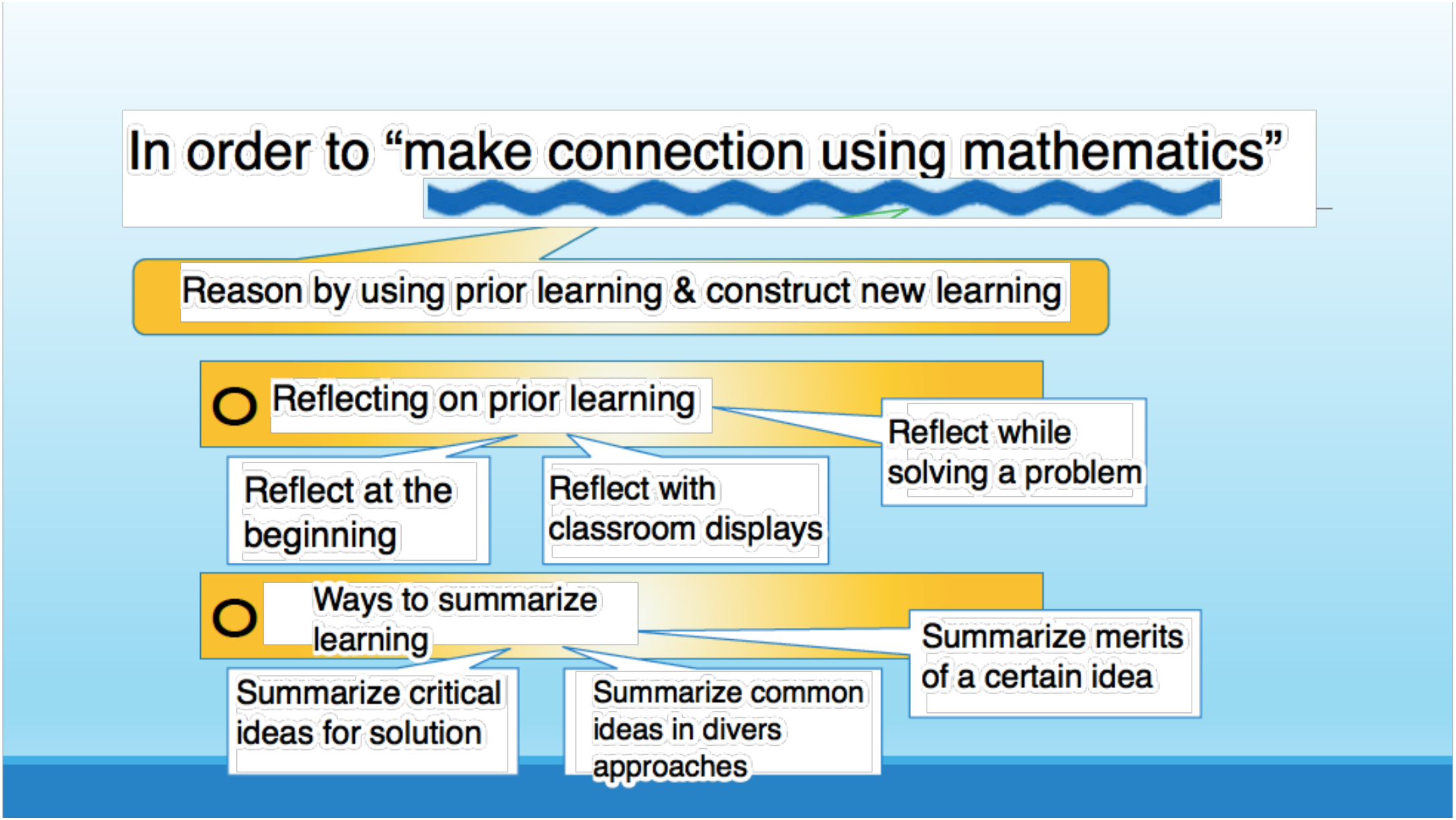
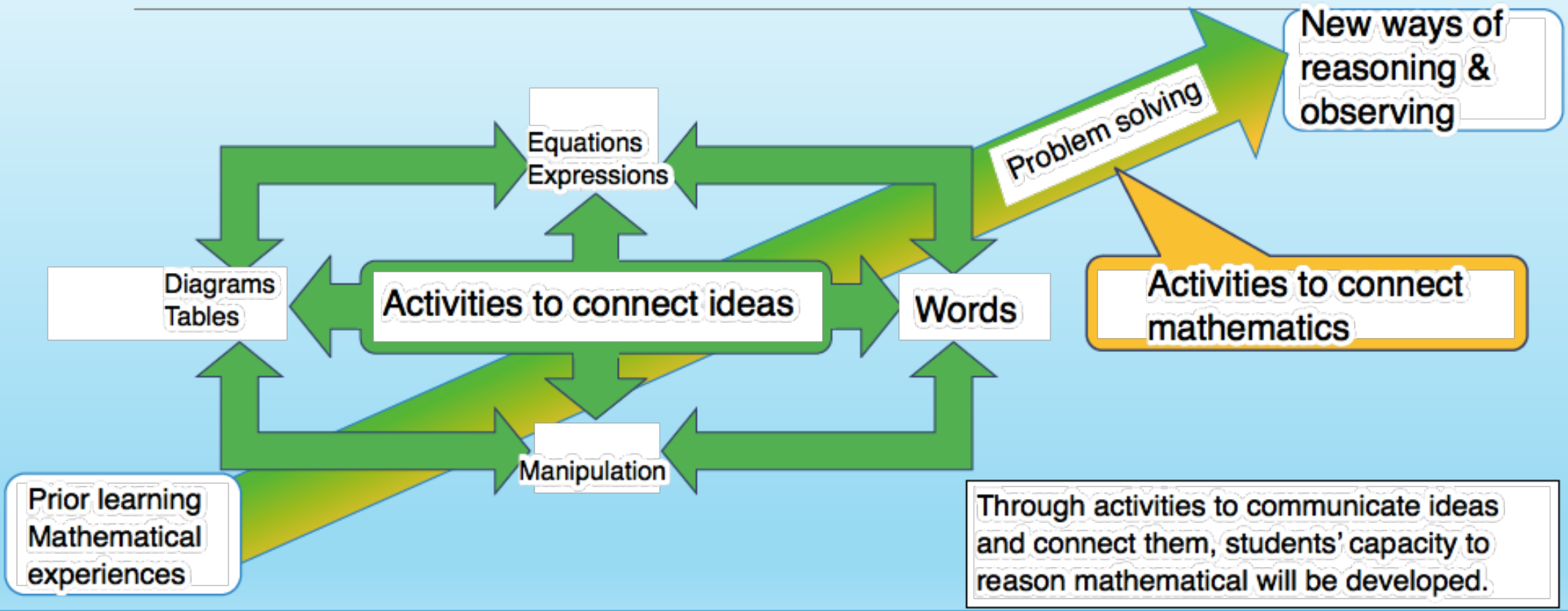

In order to “make connection using mathematics”
Reason by using prior learning & construct new learning
Reflecting on prior learning
Reflect at the beginning
Reflect with classroom displays
Reflect while solving a problem
Ways to summarize learning
Summarize critical ideas for solution
Summarize common ideas in divers approaches
Summarize merits of a certain idea

Image of a lesson



Results and further challenges

Results & Challenges "connecting friends' ideas"

Results

* We were able to observe students comparing and contrasting their ideas and learning from each other.

* Students are noticing merits of other people's ideas.

Challenges

* How to help students' discussion more focused

* Strategies to help students make connections and devising questions that might be effective

Results & Challenges "connecting using math"

Results

* Planning lessons that are intentionally connected to students' prior learning

Challenges

* Strategies to help students realize the necessary prior learning on their own

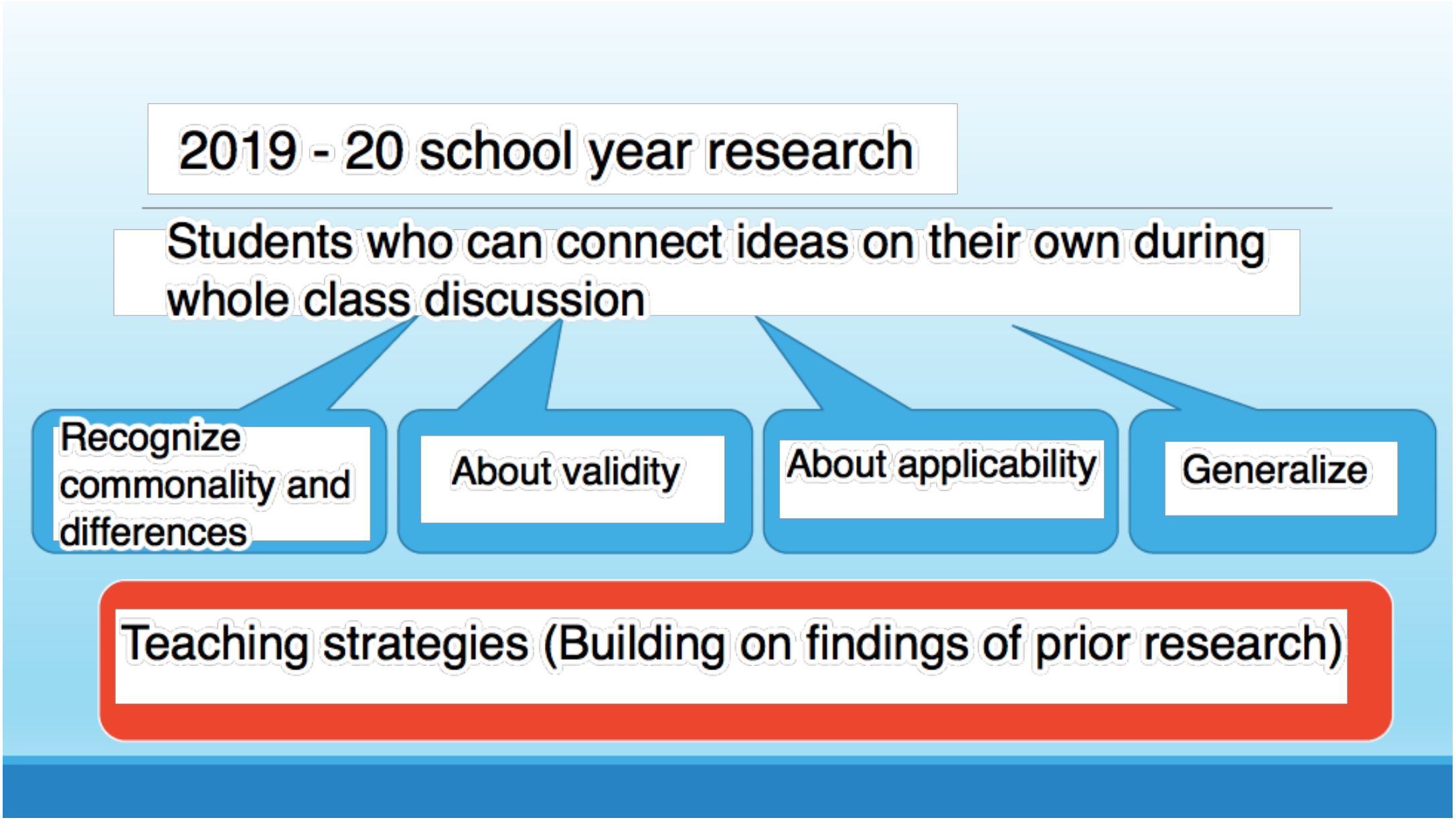
* Consolidating the basic and foundational ideas

2019 - 20 school year research

Challenges

* Strategies to help students realize the necessary prior learning on their own

* Consolidating the basic and foundational ideas


2019 - 20 school year research
Students who can connect ideas on their own during whole class discussion
Recognize commonality and differences
About validity
About applicability
Generalize
Teaching strategies (Building on findings of prior research)