youcubed at Stanford University

Building a Mathematical Mindset Community

Teachers and students believe *everyone* can learn maths at HIGH LEVELS.

- Students are not tracked or grouped by achievement
- All students are offered high level work
- "I know you can do this" "I believe in you"
- Praise effort and ideas, not the person
- Students vocalize self-belief and confidence

Communication and *connections* are valued.

- Students work in groups sharing ideas and visuals.
- Students relate ideas to previous lessons or topics
- Students connect their ideas to their peers' ideas, visuals, and representations.
- Teachers create opportunities for students to see connections.
- Students relate ideas to events in their lives and the world.

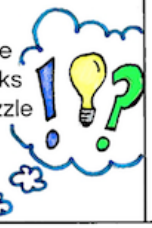
The maths is VISUAL.

- Teachers ask students to draw their ideas
- Tasks are posed with a visual component
- Students draw for each other when they explain
- Students gesture to illustrate their thinking

The maths is OPEN.

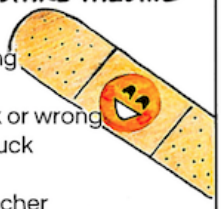
- Students are invited to see maths differently
- Students are encouraged to use and share different ideas, methods, and perspectives
- Creativity is valued and modeled.
- Students' work looks different from each other
- Students use ownership words - "my method", "my idea"

The environment is filled with *WONDER* and *CURIOSITY.*



- Students extend their work and investigate
- Teacher invites curiosity when posing tasks
- Students see maths as an unexplored puzzle
- Students freely ask and pose questions
- Students seek important information
- "I've never thought of it like that before."

The classroom is a `risk-taking`, *MISTAKE VALUING* environment



- Students share ideas even when they are wrong
- Peers seek to understand rather than correct
- Students feel comfortable when they are stuck or wrong
- Teachers and students work together when stuck
- Tasks are low floor/high ceiling
- Students disagree with each other and the teacher

Developed by Jo Boaler/Youcubed.org and Tulare County Office of Education

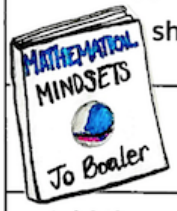
Recommendations for Task/Lesson Design

Open the task to encourage multiple methods, pathways and representations.

Pose a problem before teaching the method.

Design a task that allows all learners to contribute to the learning and have room for extension.

Make opportunities for students to authentically share their thinking with peers.



Add a visual component.

Add the requirement to convince and reason, be skeptical.

Powerful Questions to develop a deep level of understanding

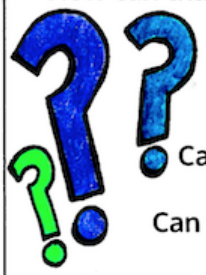
How do you see that idea?

Why does that answer make sense?

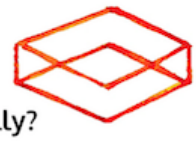
Why does that method work?

How is that method connected to others?

How can that idea be represented in different ways?



Can you prove it?



Can you prove it visually?

Can you justify your thinking?

Can you predict what would happen if....?

Did you make any interesting mistakes?

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