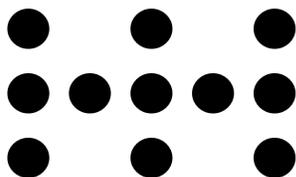# Four Ways to Start A Culture of Math Discourse

Dot Images (also known as Quick Images)

Show the image to students for a few seconds and have them decide how many dots there are. Next ask students how they saw the dots. Record the various student responses… "I saw 3 vertical lines of three plus 2 in between", "I saw a 5 die twice with 3 extra dots", etc… Be ready with one way that you saw the dots in case students don't start sharing.

Which One Doesn't Belong
(There are lots of these out there ranging from very basic to calculus level. Start with ones that are less intimidating math-wise.)

NUMBER 35

from Ilona Vashchyshyn

Show students the image, then ask them to come up with reasons why each one might not belong to the rest of the set. Challenge them to come up with several reasons why each one doesn't belong to the other three.

In this example, students might notice the colors, the odd/even numbers, the number of pixels used to make the number, etc…

Fermi Problems
Ask questions that do not have an exact answer. These questions would be mathematical in nature, but the emphasis and discussion would be on the problem solving process rather than the actual numbers.

Examples:
- o How many water balloons could you fill with the water in Lake Iliamna?
- o How many US pennies would it take to make a life-size model of an average dog salmon?

Worked Problems
Use examples of problems that have already been solved (either correctly or incorrectly) and ask students to discuss the methods used to solve the problem. This takes the cognitive load off of symbol manipulation and allows students to focus on the bigger concepts behind the problems.

This might include solving one problem different ways and asking students to talk about what is the same and what is different, as well as which method is more efficient.

It might also include students analyzing a worked problem to find mistakes and evidence of misconceptions.