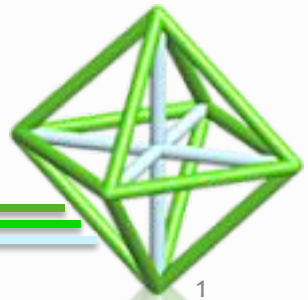
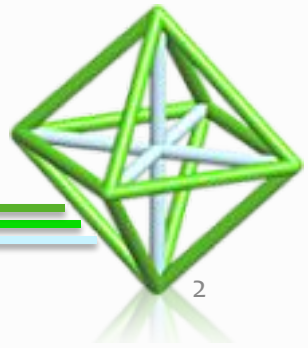
Reflecting on Practice: Mathematics and Motivation

Session 1

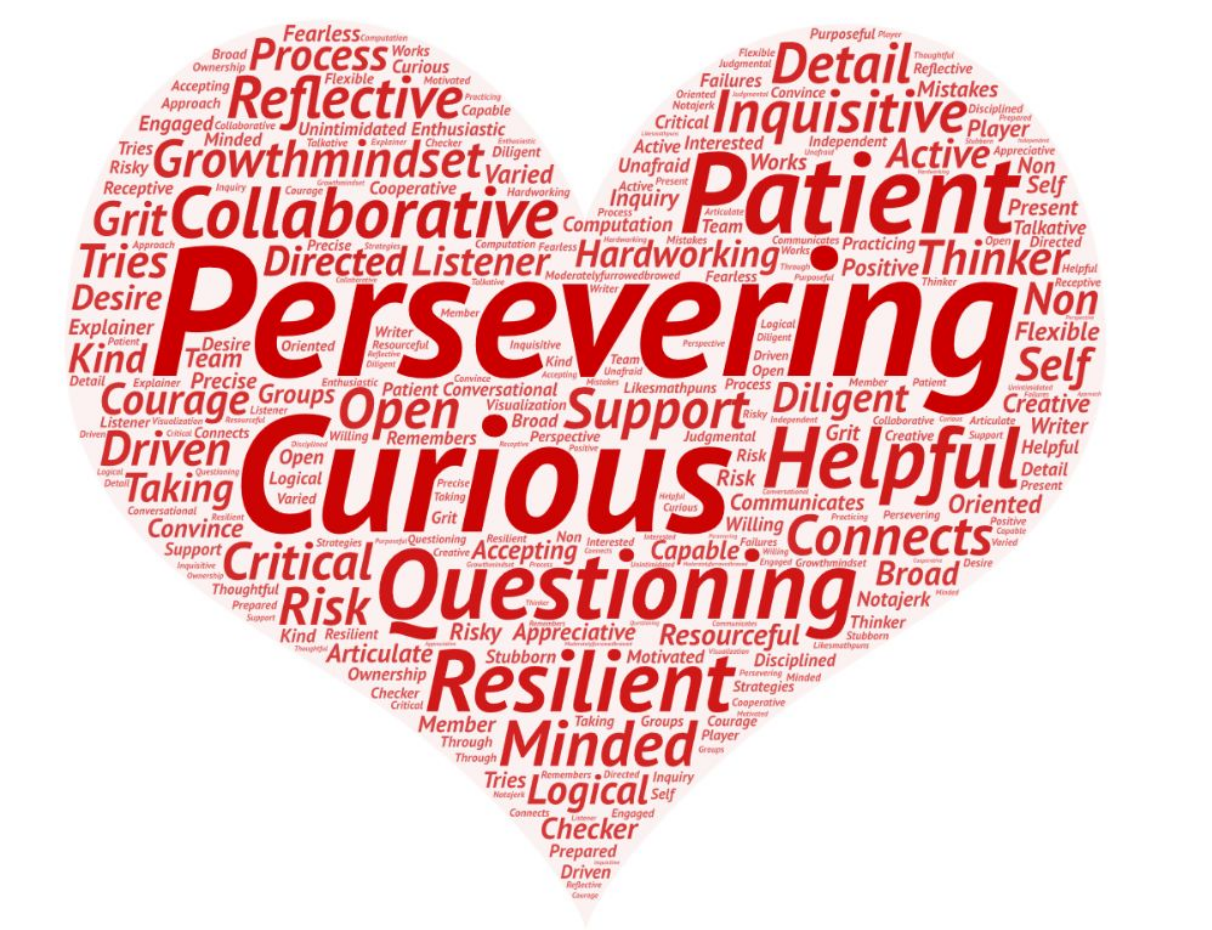
PCMI Outreach



In your notebook, write down what you think are the characteristics of a good math student.



Characteristics of a Good Math Student

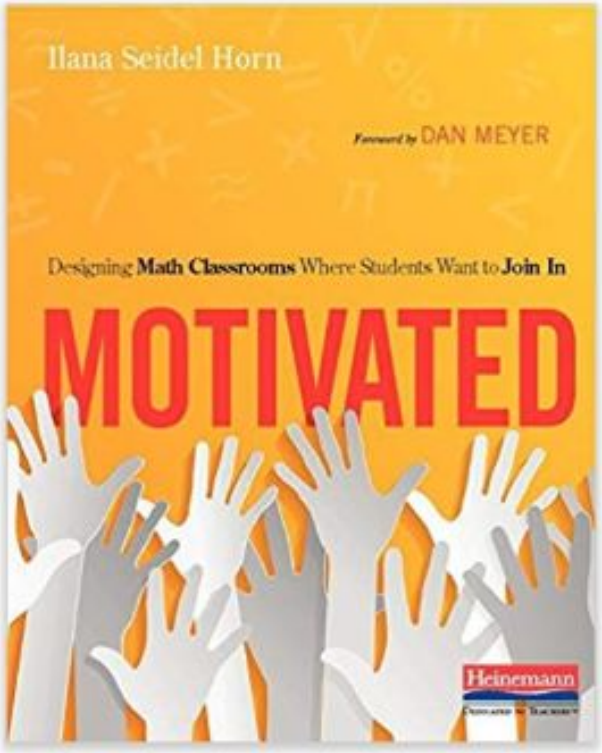


RoP: Student Motivation

Teachers will leave with a framework for thinking about motivation & strategies to help students want to engage with mathematics.

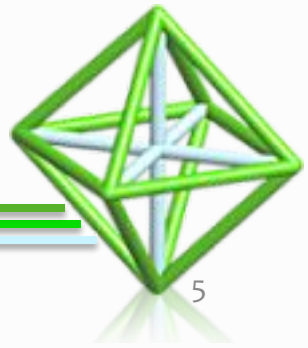
Specifically, we will focus on:

- Meaningfulness
- Belongingness
- Accountability

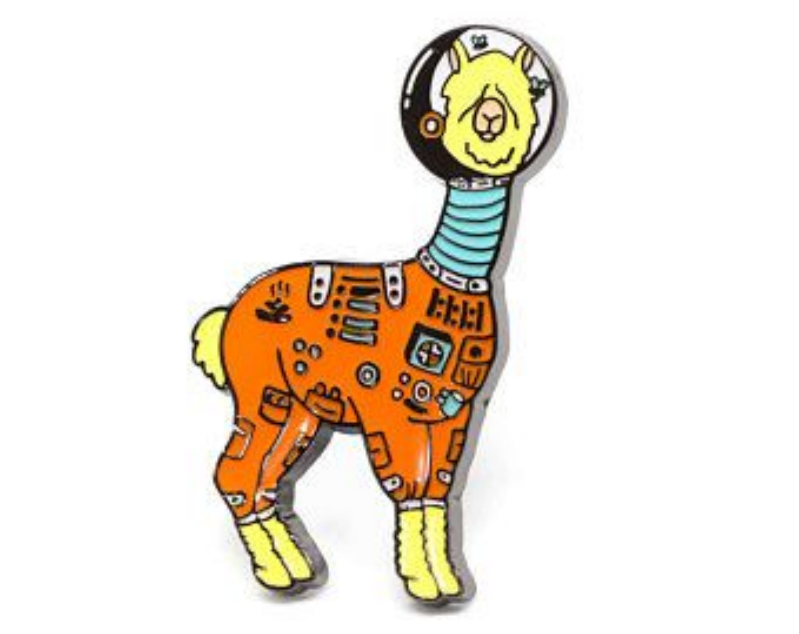


Introduce yourself to the rest of your table.
Share:

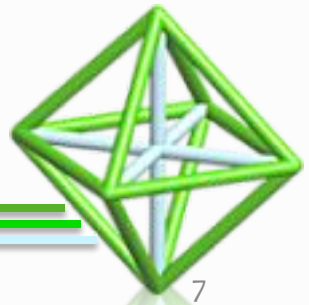
- Name
- School
- Where you're from
- Grades and courses you teach
- What is your favorite number and why?



“All math word problems sound to me like ‘You have 3 space helmets and you want to buy 5 albino alpacas. How many miles will it take?’ I don’t know what to do because alpacas don’t wear space helmets.”

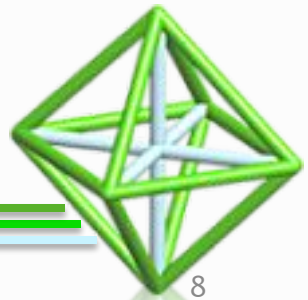


$$3x + 5y = 15$$



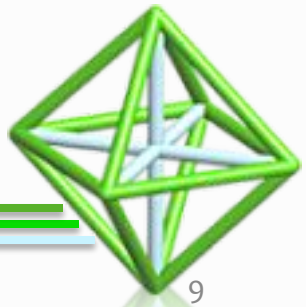
What do you notice?

$$3x + 5y = 15$$



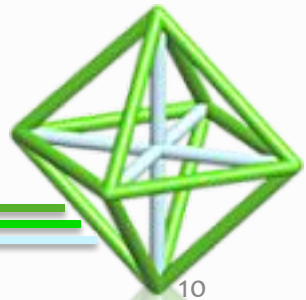
What do you notice?
What do you wonder?

$$3x + 5y = 15$$



Imagine that your goal for the day would be for students to figure out x and y intercepts.

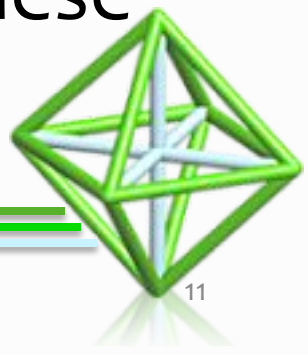
As a teacher, where do you go from here?



- Why is asking "*what do you notice?*" a good idea?

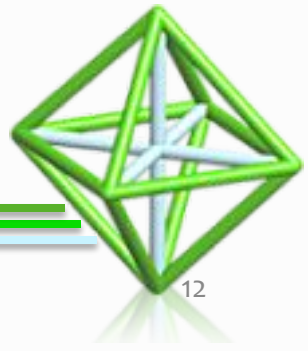
- Why is asking "*what do you wonder?*" a good idea?

- What are some challenges to making *Noticing* and *Wonderings* work in your classroom? How would you deal with these challenges in your classroom?



Noticing and wondering

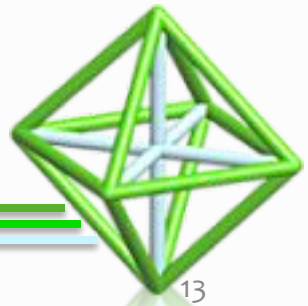
- Can be done in mathematical contexts as well as in "rich" interesting contests; *What do you notice?* and *What do you wonder?*
- Can typically be done with minimal risk
- If you structure the way you use "*What do you wonder about?*", students' ideas can lead to the mathematics related to the goal you want to investigate
- Used every day might lead to boredom & gaming the strategy



Solve the system of equations

$$x + 2y = 3$$

$$4x + 5y = 6$$



Solve the system of equations

$$x + 2y = 3$$

$$4x + 5y = 6$$

And this one

$$7x + 8y = 9$$

$$10x + 11y = 12$$

What do you notice and wonder about the relationship between the two systems?

Solve the system of equations

$$x + 2y = 3$$

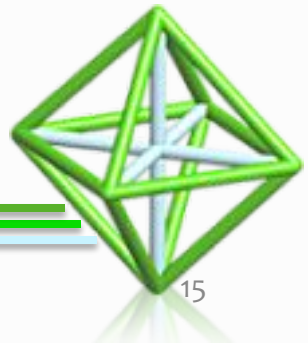
$$4x + 5y = 6$$

And this one

$$7x + 8y = 9$$

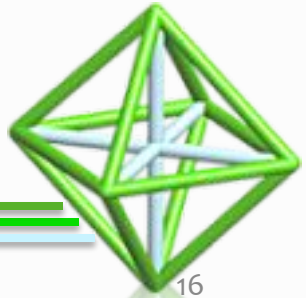
$$10x + 11y = 12$$

Create a T chart on your whiteboard with your noticings and wonderings

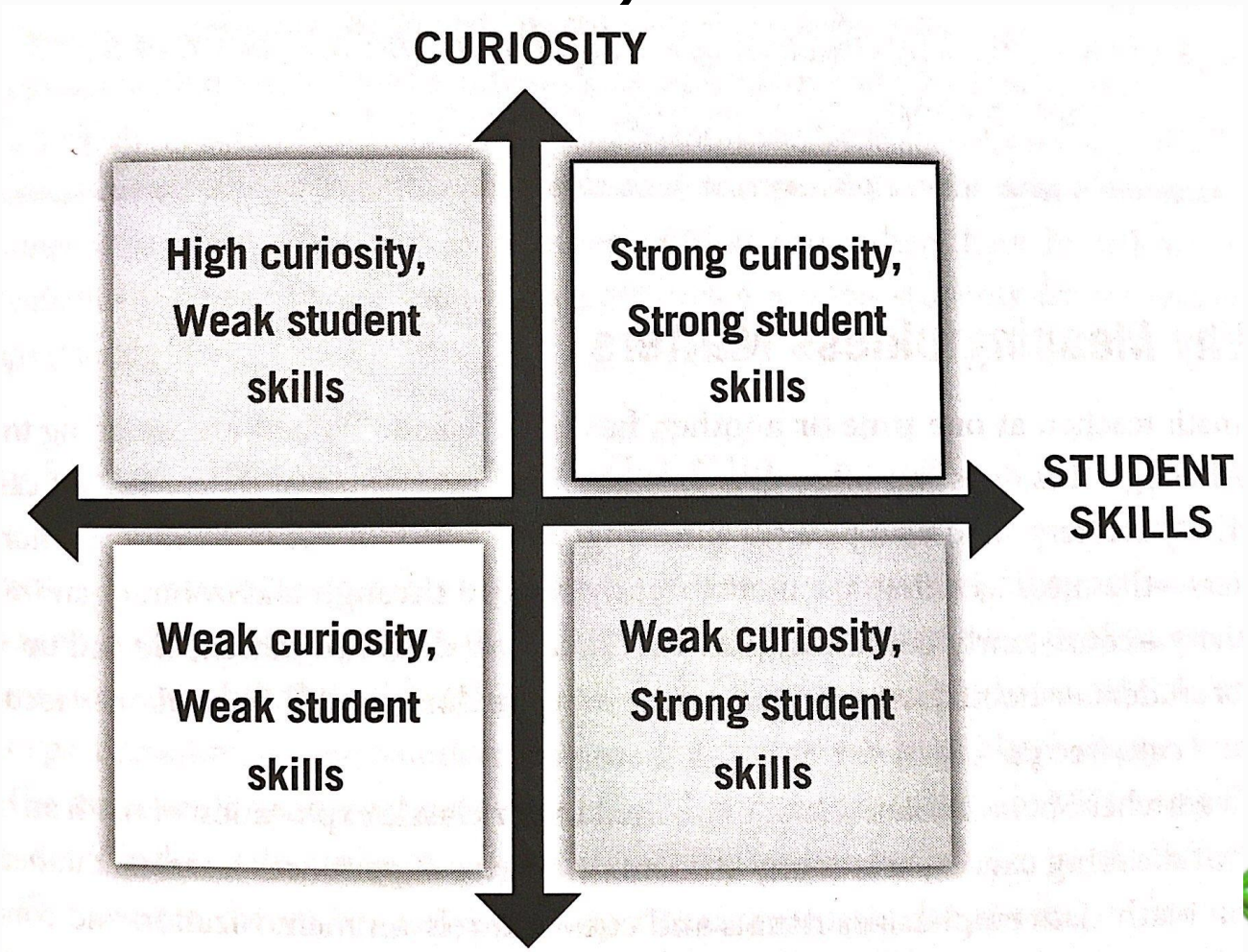


Use one of the wonderings/conjectures made by your group and create a convincing argument that the conjecture is true.

Write your conjecture on your whiteboard and make sure to show your work :)



How does this diagram relate to the work we just did?

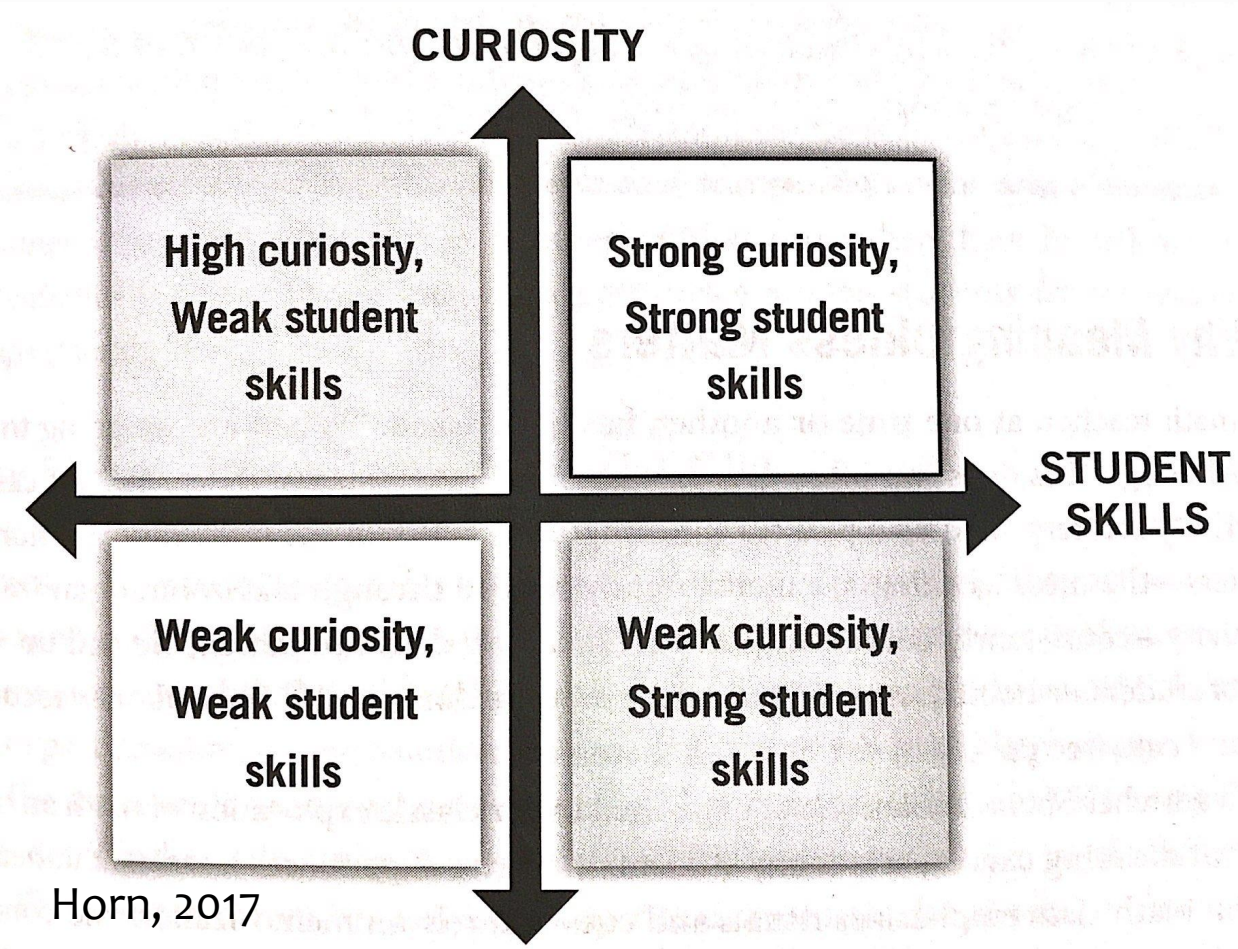


Horn, 2017

Take a few minutes at your table and discuss the question:

- How might approaching problems that provoke student curiosity give more students options to be part of the mathematical conversation?

Reflect back on the characteristics of a math student you wrote down earlier today. Do they connect to the diagram in any way? Should they?



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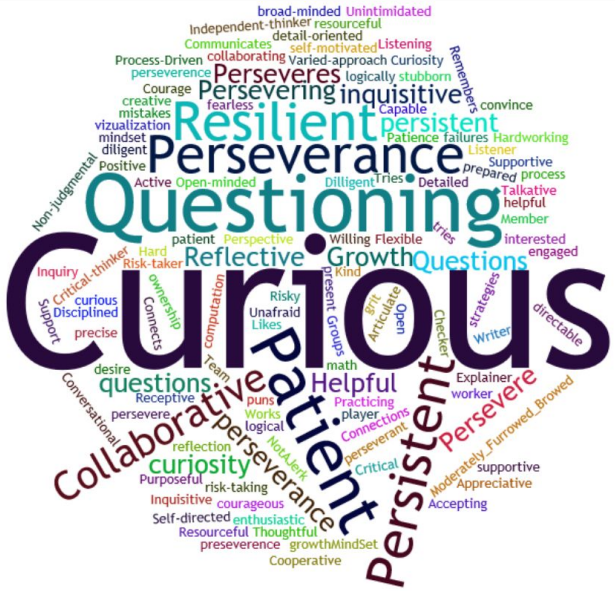

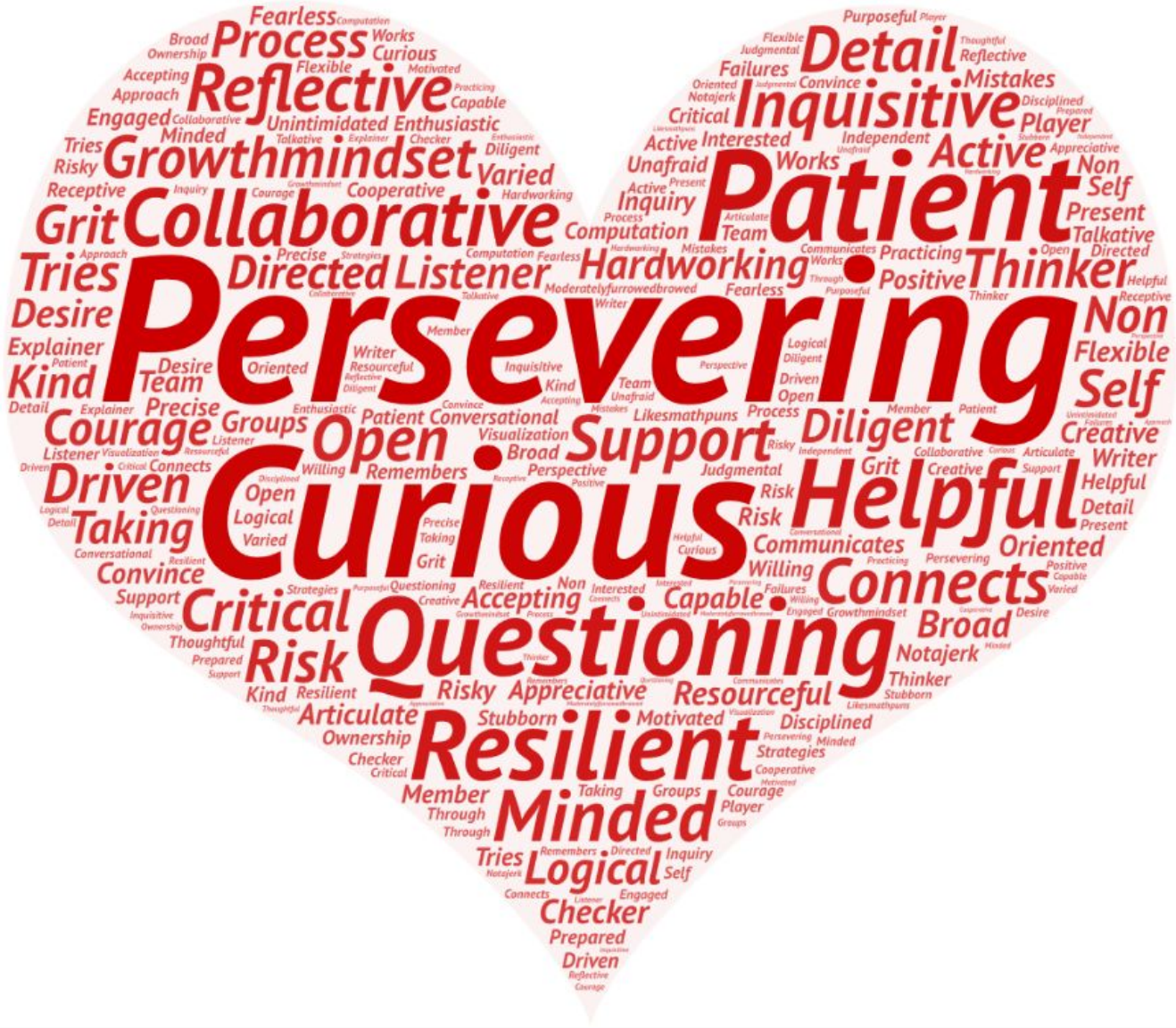

Word Cloud with like-words merged

References

- Horn, Ilana (2017). Motivated: Designing classrooms where students want to join in. Heinemann
- The *"What do you notice, what do you wonder" strategy originally came from Annie Fetter at the Math Forum.*