**A Three Act Task**: Array-bow of colours   https://gfletchy.com/arraybow-of-colors/

Learning Targets: I can show my multiplicative thinking in pictures, numbers and words. (For teacher review, check out *the progression of multiplication*, from the *Making Sense Series* https://vimeo.com/149428217)

- using flexible computation strategies (e.g., decomposing, distributive principle, commutative principle, repeated addition, repeated subtraction)

- using multiplication and division in real-life contexts and problem-based situations

- whole-class number talks

Dot Card Number Talk: Invite students to look at the dot card and, without counting one by one, figure out how many dots there are. (Reminder to students to have their fists in a discreet position and put up a thumb when they think they know how many dots there are). Then, show the dot card. When most thumbs are up, invite willing students to share how many dots they see. Gather several answers on the board. Next, invite students to describe how they saw it. Consider how best to record each way of seeing. Paraphrase student responses, ask questions to clarify, and record students' thinking in pictures and numbers. *(from p.14-15 in Making Number Talks*
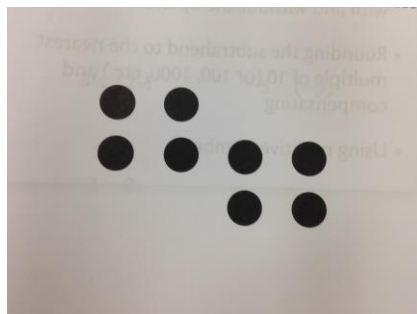
Matter, Humphreys and Parker, 2015)

Number Talk: 18 X 5
Invite students to look at the equation, and without pencil and paper, figure out the answer. (Reminder to students to have their fists in a discreet position and put up a thumb when they think they know the answer). When most thumbs are up, invite willing students to share their answers. Gather several answers on the board. Next, invite students to describe how they solved it. Consider how best to record each way of seeing and solving. Paraphrase student responses, ask questions to clarify, and record students' thinking in pictures and numbers.

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(Bring in small packages of Skittles to hand out at the end of this lesson)

Connecting: What is that word *array*? What does it mean?

ACT ONE: Watch the 25 second clip. As a whole group, invite students to think about and share what they noticed in the clip and what they wonder, and record their ideas.

What did you notice?	What do you wonder?

How many Skittles fit in the jar? Any suggestions? (Discuss the difference between an observation and an estimation). Invite students to estimate how many Skittles they think are in the jar come up with a *too low estimate* and a *too high estimate*. An estimate is a wonder! Students write their estimates on two different coloured post-its and walk them to the chalkboard. Teacher arranges the post-its in an array.

A too low estimate:	A too high estimate:

Scanning the estimates, collectively identify the range - the lowest estimate in the class and the highest of the estimates in the class.

Next, invite students to think about and share information they believe would be useful to know for solving this problem, and how to get that information. Record ideas shared. (e.g. How many

packages of Skittles/How many Skittles in each package) *Teachers open a package or two of Skittles to explore how many in a package.*

Arrange Random Groupings - model using an array to randomly sort students into groups of three.

ACT TWO: Looking at the photographs, invite students to first consider how many skittle packages were used. Share the photograph that tells the actual number of packages used, and the photograph showing how many skittles are in a package.

In random groups of three, using the vertical nonpermanent surfaces, invite students to figure out how many skittles filled the jar. Students are encouraged to show their thinking in pictures, numbers and words.

ACT THREE:
Share the video clip. Observe the strategy modelled for figuring out how many Skittles were in the jar. Pause the clip at 32 seconds. Invite students to share what they notice and wonder. The answer is not 812! What? How come? Head back to your boards and think some more

Pssssssst - What if not every small package has the same number of Skittles?
Most groups quickly find the answer to 58 x 14 is 812. The interesting challenge is addressing the variation in the Skittles packages. 14 Skittles in a package was the low end of the scale. The highest number of Skittles per package was 19. To account for this, some students added a constant at the end to account for there being "some" more Skittles (ie. 812 + 50). Some students changed their multiplication question – 58 x 16 (because 16 is between 14 and 19). Some did two calculations – 58 x 14 and 58 x 19 and then picked a number in between. This gave opportunities for some rich discussions in Act 3.

Bring the groups back together to share and reflect on their collaboration. What worked (What strategy did you use to work toward a solution)? What was difficult? What would you do differently next time?

If time, give each group a "*pour of the jar*" and invite them to organize them in an efficient way and the write an equation to match their arrangement.

Closure: Refer back to Number Talk dot card and invite students to consider "If this were a full array, how many dots would it have? What would it look like?"