ELEMENT 2.2

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.2 - Build a community of learners

The following suggestions for practice are extracts from the 'Transforming Tasks' module on the Leading Learning resource:

Strategy	From Tell to Ask
Technique	**Explore before explain:** Ask students to try their ideas first.

Level	Before	After
Primary	Example 1 — Calculate $45 \div 3$ $3\overline{)45}$ = 15 Example 2 — Calculate $72 \div 4$ $4\overline{)72}$ = 18	How can you divide larger numbers? Think about what you understand about division. Work with a partner, to have a go at one, or both, of these questions: Calculate $45 \div 3$ Calculate $72 \div 4$ Check your answers with a calculator.
Secondary	Example- Simplify: $\dfrac{a}{2} + \dfrac{2a}{3}$ $= \dfrac{a \times 3}{2 \times 3} + \dfrac{2a \times 2}{3 \times 2}$ $= \dfrac{3a}{6} + \dfrac{4a}{6}$ $= \dfrac{3a + 4a}{6}$ $= \dfrac{7a}{6}$ Questions: 1. $\dfrac{b}{5} + \dfrac{5b}{10}$ 2. $\dfrac{c}{2} + \dfrac{2c}{7}$	Use your skills with adding fractions, to challenge yourself to work with fractions that include variables. Work with a partner, to have a go at these two questions. 1. $\dfrac{b}{5} + \dfrac{5b}{10}$ 2. $\dfrac{c}{2} + \dfrac{2c}{7}$ **Prompts:** • How would you usually add fifths and tenths? • Would it help if you tried some fraction addition without variables? • Would it help if you drew a diagram?

How do you think the technique Explore before explain might support *Element 2.2 - Build a community of learners?*

There are many ways to articulate this relationship. One response to this question has been provided on the next page.

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How does the technique Explore before explain support *Element 2.2 - Build a community of learners?*

Using the technique of 'Explore, before explain' will not automatically lead to the development of a community of learners. This element is developed when the teacher sets up appropriate working arrangements during the student's exploration. Arrangements might include:

- students work with different (randomly selected, or teacher selected) groups of peers while they explore a new problem

- small groups of students take collective responsibility for developing a possible process/solution. Students know that any one person in the group could be called upon to explain the group's thinking. This leads to the group ensuring that everyone gets involved and understands the thinking.

NB. It is essential that students feel safe in their learning community for them to be able to work on an unfamiliar problem. They must feel supported and valued in their community, knowing that a selection of approaches will be listened to. Approaches can be valued and evaluated for their efficiency, transferability, ease of use, visual representation etc.

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The following suggestions for practice are extracts from the 'Transforming Tasks' module on the Leading Learning resource:

Strategy	From Tell to Ask
Technique	**Use dialogue:** Ask students to interact and build meaning through learning conversations.

Level	Before	After
Primary	The teacher asks: • Why do we measure things? • What things do we measure? • What do we measure with?	The teacher asks: **Do we really need to have a measuring system?** Community of Inquiry(COI)/Philosophy for Children (P4C) discussion. Listen to, and respond to, each other's ideas/questions/wonderings. Possible prompt questions to promote discussion: (Use only if needed) • What's a measuring system? • Is one type of measurement more important than another? • What form of measurement could we live without/did we live without? Why change? • Could we estimate measurements in cooking? Would we still need a measuring system to do that? COI process can be found online eg http://museumvictoria.com.au/education/community-of-inquiry/ *(handwritten note: Measurement COI • BIG QUESTION – 'Do we really need to have a measuring system for society to work well...')*
Secondary	Teacher: "I've noticed that some people are trying to add fractions by adding the numerators, then adding the denominators." $$\frac{b}{5} + \frac{5b}{10} = \frac{6b}{15}$$ This does not lead to the correct answer. The way to add fractions is: Start by finding the lowest common denominator...	What do you think? Does: $\dfrac{b}{5} + \dfrac{5b}{10} = \dfrac{6b}{15}$ Discuss your thinking with a partner. Think about these questions: 1. Do you think that $\dfrac{6b}{15}$ is more or less than $\dfrac{5b}{10}$? Would you expect that? 2. Could you test this for different values of b? If possible, discuss your ideas with another pair who thinks differently to you. 3. Share your ideas with the class. Has anyone changed their mind about $\dfrac{6b}{15}$ being the solution? Ask someone who has changed their mind to share their thinking about why they did that. What are other possible solutions? How could we test the accuracy of our ideas?

How do you think the technique Use dialogue might support *Element 2.2 - Build a community of learners?*

After reflecting on this question, compare your response to the answer on the next page

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Element 2.2 - Build a community of learners

How does the technique Use dialogue support *Element 2.2 - Build a community of learners?*

The quality of our lives depends on the quality of our thinking and on our ability to communicate and discuss what we think with others. Talk is intrinsic to literacy and to our ability to
form relationships with others. It is the foundation of both verbal and emotional intelligence. (Fisher, 2007).
There is much research that reflects Fisher's position about the importance of dialogue in learning and in forming relationships and hence a community of learners.

Community of Inquiry (COI), used in the Primary Years example, supports large groups of students to listen to, and build on, each other's questions and ideas. The purpose of a COI is to grapple with challenging questions and explore different perspectives or approaches. It is not intended to be a time for students to download disparate factc, processes and formulas. Instead, the purpose is to foster a culture of divergent thinking amongst the community of learners, unearthing the questions that we have as well as the insight that we bring. Teachers can intentionally use COI to develop skills in listening to peers and challenging opinions respectfully. Together with modelling appropriate COI behaviour, teachers may wish to explore appropriate sentence starters with students. For example I disagree with that thinking, rather than I disagree with Tom (challenging the thinking rather than the person). I'm not sure, but I'm wondering if…. (this can make the participant feel safe about sharing their idea, because they have declared that they are unsure).

NB Community of Inquiry has been used successfully with groups of Secondary Years students.

The Secondary Years example challenges students to work in pairs, or small groups, but the teacher can still be intentional about developing a community of learners through applying processes such as random pairing of students to work together in the initial stages of the lesson. Processes such as this need to be backed up by teachers ensuring that students are respectful about working with any member of the group.