# Resource in focus – Mathematics Stage 4

## Effective in-class questioning

This resource showcases an excerpt from the Mathematics Stage 4 sample [Unit 4 – additive thinking – Lesson 7 – seeing double](https://education.nsw.gov.au/teaching-and-learning/curriculum/mathematics/planning-programming-and-assessing-mathematics-7-10/mathematics-7-10-units#:~:text=DOCX%20415%20KB)-,Stage%204,-These%20units%20and). Sample units are optional resources that present ‘one way’ of designing teaching and learning experiences. They can be adopted and adapted for your school context.

The example below demonstrates **one way** that activities in a lesson may be adapted to strengthen opportunities for effective questioning. It focuses on Lesson 7 – seeing double. This lesson sits within a 12-lesson unit.

**Note:** possible adaptations are represented in **bold red**.

### Launch: Lesson 7 – seeing double

**Note:** warm up section omitted.

The table below contains the suggested learning intentions and success criteria for the lesson.

|  |  |
| --- | --- |
| Learning intention | Success criteria |
| * To be able to add and subtract fractions when one denominator is a multiple of another.
 | * I can identify fractions where one denominator is a multiple of another.
* I can add and subtract fractions where one denominator is a multiple of another.
* I can use visual representations to aid in addition of fractions.
 |

1. Assign visibly random groups of 3 ([bit.ly/visiblegroups](https://powerfullearning.com/visible-random-groups-why-this-is-the-next-thing-you-need-to-do-for-group-work-in-your-classroom/)) and have students stand at vertical non-permanent surfaces (VNPS) ([bit.ly/VNPSstrategy](https://saskmath.ca/vertical-non-permanent-surfaces-and-mini-white-boards/)).
2. Each group draws a number line on their VNPS and labels 0 to 1 (see Figure 1).

Figure 1:number line from 0 to 1



1. Read out, or write on the board, the following list of fractions that students are to mark and label on the number line:
* $\frac{1}{2}$
* $\frac{1}{4}$
* $\frac{1}{8}$
* $\frac{1}{3}$
* $\frac{1}{6}$
* $\frac{3}{4}$
* $\frac{3}{11}$
1. Students perform a gallery walk ([bit.ly/DLSgallerywalk](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/555#.XyH_HIJCYt4.link)) to see how other groups marked the fractions on their number lines.
2. Pose the following questions to students, using a questioning technique such as Pose-Pause-Pounce-Bounce questioning strategy (PDF 557 KB) ([bit.ly/pausepouncebounce](https://oakland.edu/Assets/Oakland/cetl/files-and-documents/TeachingTips/HandsDown.pdf)). **Plan an anticipated response and ‘bounce’ opportunity for each question according to your class context. Sample anticipated responses and bounce opportunities are provided below.**

**Teacher note: ensure you allow an appropriate amount of wait time for students to form responses. Consider planning specific students to call on.**

* **What do you notice about the order of the fractions?**

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
| **The larger denominators are smaller numbers.** | * **Do you agree? Why or why not?**
* **Is this always the case? How do you know?**
* **Why is** $\frac{1}{4}$ **smaller than** $\frac{1}{2}$**?**
 |

* Which fractions were the easiest to mark?

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
| $$\frac{1}{2},\frac{1}{4},\frac{1}{8}$$ | * **Why would [name] say these are the easiest to mark?**
* **Which fraction did you mark first? Why?**
* **What do these fractions have in common?**
 |

* Why were some fractions easier to mark?

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
| $\frac{1}{2},\frac{1}{4},\frac{1}{8}$ **were easier to mark because each was halfway of a section of the number line.**  | * **How would you mark** $\frac{1}{16}$**?**
* **How did you mark** $\frac{3}{4}$**?**
* **How could we mark 1** $\frac{1}{4}$**?**
* **What do you notice about each of the denominators?**
 |

* Which fractions were more difficult to mark?

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
| $$\frac{1}{3},\frac{3}{11}$$ | * **Do you agree?**
* **What makes these fractions different to** $\frac{1}{2},\frac{1}{4},\frac{1}{8}$**?**
 |

* Why were some fractions more difficult to mark?

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
| $\frac{1}{3},\frac{3}{11}$ **were difficult to mark because we couldn’t use the existing fractions to help.** | * **How did you go about marking them?**
* **Why is it difficult to compare** $\frac{1}{4}$ **and** $\frac{1}{3}$**?**
* **How did you use** $\frac{1}{3}$ **to help mark** $\frac{1}{6}$**?**
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**Note:** observations of student responses can be recorded anecdotally to inform future planning and differentiation opportunities.

[Lesson continues as is ...]

## References

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