# 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

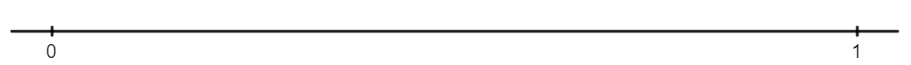
**Note:** warm up section omitted.

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:
2. 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.
3. 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 smaller than ?** |

* Which fractions were the easiest to mark?

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
|  | * **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 |
| **were easier to mark because each was halfway of a section of the number line.** | * **How would you mark ?** * **How did you mark ?** * **How could we mark 1 ?** * **What do you notice about each of the denominators?** |

* Which fractions were more difficult to mark?

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
|  | * **Do you agree?** * **What makes these fractions different to ?** |

* Why were some fractions more difficult to mark?

|  |  |
| --- | --- |
| Anticipated response(s) | ‘Bounce’ opportunities |
| **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 and ?** * **How did you use to help mark ?** |

**Note:** observations of student responses can be recorded anecdotally to inform future planning and differentiation opportunities.

[Lesson continues as is ...]

## References

This resource contains NSW Curriculum and syllabus content. The NSW Curriculum is developed by the NSW Education Standards Authority. This content is prepared by NESA for and on behalf of the Crown in right of the State of New South Wales. The material is protected by Crown copyright.

Please refer to the NESA Copyright Disclaimer for more information <https://educationstandards.nsw.edu.au/wps/portal/nesa/mini-footer/copyright>.

NESA holds the only official and up-to-date versions of the NSW Curriculum and syllabus documents. Please visit the NSW Education Standards Authority (NESA) website <https://educationstandards.nsw.edu.au> and the NSW Curriculum website <https://curriculum.nsw.edu.au>.

[Mathematics K–10 Syllabus](https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-k-10-2022/overview) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2022.

**© State of New South Wales (Department of Education), 2024**

The copyright material published in this resource is subject to the Copyright Act 1968 (Cth) and is owned by the NSW Department of Education or, where indicated, by a party other than the NSW Department of Education (third-party material).

Copyright material available in this resource and owned by the NSW Department of Education is licensed under a [Creative Commons Attribution 4.0 International (CC BY 4.0) license](https://creativecommons.org/licenses/by/4.0/).

[](https://creativecommons.org/licenses/by/4.0/)

This license allows you to share and adapt the material for any purpose, even commercially.

Attribution should be given to © State of New South Wales (Department of Education), 2024.

Material in this resource not available under a Creative Commons license:

* the NSW Department of Education logo, other logos and trademark-protected material
* material owned by a third party that has been reproduced with permission. You will need to obtain permission from the third party to reuse its material.

**Links to third-party material and websites**

Please note that the provided (reading/viewing material/list/links/texts) are a suggestion only and implies no endorsement, by the New South Wales Department of Education, of any author, publisher, or book title. School principals and teachers are best placed to assess the suitability of resources that would complement the curriculum and reflect the needs and interests of their students.

If you use the links provided in this document to access a third-party's website, you acknowledge that the terms of use, including licence terms set out on the third-party's website apply to the use which may be made of the materials on that third-party website or where permitted by the Copyright Act 1968 (Cth). The department accepts no responsibility for content on third-party websites.