# Map masterpiece

|  |  |
| --- | --- |
| Year levelStrand(s)Lesson lengthCD Code: | * Year 5
* Number
* 65 mins
* [AC9M5N04](https://v9.australiancurriculum.edu.au/f-10-curriculum.html/learning-areas/mathematics/year-5/content-description?subject-identifier=MATMATY5&content-description-code=AC9M5N04&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&subjects-start-index=0&view=quick)
 |
| Lesson summary | In this fifth lesson in the series, students explore the world of house and garden design while delving into the fascinating realm of percentages. They use a 10 x 10 grid to plan and depict their dream house and garden.This lesson was developed in collaboration with the Australian Association of Mathematics Teachers (AAMT). |
| Learning intention | We are broadening our understanding of fractions by expressing them as percentages within a mapping and design concept. |
| Success criteria | By the end of this lesson, students can:* convert fractions out of 100 to percentages, and vice-versa
* identify what percentage of a diagram is shaded
* shade a diagram to show a specific percentage.
 |
| Why are we learning about this? | In the real world, percentages are everywhere. Examples include how much money might be saved at sales at the shops, interest rates charged on bank accounts and loans, and increases to wages each year when people (hopefully) get a pay rise. This lesson provides an introduction for students to the meaning of the word percentage and how to represent simple percentages. |
| Prerequisite student knowledge and language | * Basic arithmetic skills (addition, subtraction and multiplication)
* Some background information about numerators, denominators and other basic fractional knowledge
* Exposure to the concept of ‘bird’s-eye’ view is advantageous
 |
| **Resources** | * Teacher’s slides (PowerPoint)
* Grid paper (10 x 10 grid)
* Art supplies (coloured pencils/pens/crayons)
* Google Maps (or similar)
* Scootle resource: <https://www.scootle.edu.au/ec/viewing/L133/index.html>
 |

Curriculum information

|  |  |
| --- | --- |
| Achievement standard | Students represent common percentages and connect them to their fraction and decimal equivalents. |
| Content description(s) | Students recognise that 100% represents the complete whole and use percentages to describe, represent and compare relative size; connect familiar percentages to their decimal and fraction equivalents. [AC9M5N04](https://v9.australiancurriculum.edu.au/f-10-curriculum.html/learning-areas/mathematics/year-5/content-description?subject-identifier=MATMATY5&content-description-code=AC9M5N04&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&subjects-start-index=0&view=quick) |
| General capabilitiesCross-curriculum priority | Numeracy* Number sense: Interpreting fractions ([Level 6](https://v9.australiancurriculum.edu.au/f-10-curriculum.html/learning-areas/mathematics/year-5/general-capability-snapshot?subject-identifier=MATMATY5&content-description-code=AC9M5N04&general-capability-code=N&element-code=NN&sub-element-index=0&sub-element-code=NNInF&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&subjects-start-index=0&view=quick))

Critical and Creative Thinking* Generating: Create possibilities ([Level 4](https://v9.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/critical-and-creative-thinking/slideout?code=CCTGENA4&element=1&sub-element=0))
 |
| Areas of challenge | Some students may:* not have had much experience with the concept of ‘bird’s-eye view’ and, as such, may have limited understanding. Make it meaningful and relatable by using Google Maps to show your school, the local shops, local park or oval, or even students’ homes.
* find it challenging to grasp the concept of percentages, their relationship to fractions, and the fact that there are many different and interchangeable representation, for example, $50\%=\frac{50}{100}=\frac{1}{2}$ for the same proportion. Suggest that all numbers can be represented many ways, for instance, $20 could be a represented as one $20 note or two $10 notes, or the number 20 could be represented in different ways using Unifix blocks.
* find it difficult to label and represent percentages on their grid paper. Refer to percentages as fractions out of 100, relate to 100 cents in a dollar, ask students how many squares are in the grid, remind students about the meaning/origin of the % symbol (see explicit teaching).
 |
| Strategies | * Explicit teaching
* Mathematics investigation
* Classroom talks
* Concrete, Representational, Abstract model (CRA)
 |

Lesson structure

|  |  |
| --- | --- |
| Learning hook5 mins | * Open the teacher’s slides.
* Show students the percentages photo (slide 2). Ask students where and when they may have seen signs like this, and what they mean, to gain insight into their understanding of percentages. Expect answers such as, ‘in shops’, ‘at sale times’ and possibly ‘in banks’. Students may know that in shops, percentages often indicate a discount and may or may not recognise that a ‘50% discount’ is the same as a ‘half-price’ sale.
 |
| Explore55 mins | **Introduction** (10 mins)Start the lesson with some engaging questions: ‘*Have you ever looked at a map or a photo where you can see everything from above, just like a bird? What do you notice when you look at places from a bird’s-eye view? Why do you think it’s called a bird’s-eye view?’*Discuss what a school may look like from a ‘birds-eye’ view. (Emphasise that it's like looking at these places from the perspective of a bird flying high above). List the features that you may see including the playground, classrooms, school library, car park, lawn, canteen, toilets and gardens. (Note: students may have different terminology for these things or may list features not included here.)Use and online map such as Google Maps to find your school. Click ‘Layers’ to obtain a satellite image of your school and have students identify significant features. (Optional: This activity can be extended to explore features of the local environment, such as shopping strips, parks, waterways.)Learning intentions and success criteria: Display the learning intentions and success criteria for the lesson, emphasising the importance of percentages in everyday life.**Explicit teaching** (10 mins)Use teacher’s slides 3 to 6 to explain:* how percentages represent a fraction out of 100 and that the origin of the word ‘percent’ is ‘for each 100’, referencing cents in the dollar, years in a century, legs on a centipede
* that the symbol % means percent: the ‘/’ part shows the division while the two 'o’ symbols show how it’s out of 100’
* fractions and percentages can be used to represent the same share or proportion and simplified fractions can also be used, for example, $10\%=\frac{10}{100}=\frac{1}{10}$ and $50\%=\frac{50}{100}=\frac{1}{2}$
* that parts don’t need to be adjacent to form part of the same percentage if they share the same characteristics
* that by using percentages (out of 100), we can describe a great many more fractions than just using halves, quarters, thirds, etc.

**Mapping your design** (20 mins)Distribute grid paper (10 x 10 grid) and art supplies to each student.Instruct students that this grid of 100 squares represents their square design platform.Students choose to design something of their preference, for example, house (bedrooms, kitchen, bathroom, lounge room), garden (playground, animal area, vegetable plots), bedroom (bed, desk, play area) or classroom (desks, carpet area, teacher desk). Students begin creating their design using the grid, with the teacher providing design idea stimulus, as required.Encourage students to use percentages and fractions (out of 100) to depict features and landmarks on their bird’s-eye design.Provide guidance on how to label and represent percentages and fractions on the map, for example, $13\%=\frac{13}{100}$ to represent 13 squares in the playground coloured as a garden.Differentiation (extension): Open Questions – for example, ‘What could your map look like if the lounge room was $\frac{3}{10}$ of the house?’ ‘Can you simplify any of the fractions out of 100 that you have in your design eg $25\%=\frac{25}{100}=\frac{1}{4}?'$Differentiation (support): Closed Questions – for example, ‘I would like you to draw me a garden map that is a quarter (or 25%) playground, a quarter (or 25%) animals area, a half (or 50%) plants.**Sharing and discussion** (15 minutes)Have students share their maps and discuss the fractions and percentages they used to represent different features.Encourage students to compare their maps and discuss the different approaches they took in creating their designs.Consider having students present their map to their group/class.As a class, use the Playground Percentages learning object: <https://www.scootle.edu.au/ec/viewing/L133/index.html>, following the various prompts.(Optional: If someone in the community – parents, organisation – is involved in town planning, you may wish to have them speak with your class at this point.) |
| Summary and reflection5 mins | Summarise the lesson's key points.Invite students to reflect on what they've learned.* *‘What did you find most interesting about the various percentages and fractions in mapping your design?’*
* *‘What do we know about percentages?’*
* *‘Are there any simple fractions that you can now say as a percentage?’*
 |
| Assessment5 mins | Reserve time at the end of the lesson for students to reflect and demonstrate their learning. Use the Map masterpiece exit ticket on the teacher’s slides (slide 7). Have students use their new skills to work out the percentage of these coloured areas.You might find that some students have difficulty converting common fractions to percentages or equivalent fractions. |