

Unit Overview: Grandma's Soup

Inquiry Question: How can we grab 100 pieces of macaroni?

Summary of learning goals

This Inquiry (How can we grab 100 pieces of macaroni?) presents students with a real life, purposeful context in which they have multiple opportunities to count large collections of objects and develop efficient counting strategies. Students become aware of the ambiguous nature of a 'handful' and investigate how different sized hands and different grabbing techniques will result in different quantities of macaroni. They compare hand sizes and the number of macaroni pieces they grab and order their total numbers from the smallest to largest number in a horizontal display. Students place their totals on a number line and compare both different representations. Through many iterations of counting, as they attempt to grab 100 pieces of macaroni, students realise the need for efficient strategies to count large numbers of objects (about 100). They select what they believe to be the best counting strategy, report to the class and justify their decisions using evidence gathered.

Australian Curriculum: Mathematics (Year 1)

ACMNA012: Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by 2s, 5s and 10s starting from zero.

- Developing fluency with forwards counting in a meaningful context.

ACMNA013: Recognise, model, read, write and order numbers to at least 100. Order these numbers on a number line.

- Modelling numbers with a range of materials.
- Identifying numbers that are represented on a number line and placing numbers on a number line.

ACMNA014: Count collections to 100 by partitioning numbers using place value.

- Understanding partitioning of numbers and the importance of grouping in tens.

Summary of lessons

Who Is This Unit For?

This Inquiry is for children who need repeated opportunities to count collections (of about 100) to develop efficient counting strategies. No prior experience with measuring and comparing capacity using uniform informal units is required. It is helpful if students are reasonably confident with the sequence of number names, can write numerals for two digit numbers, and have some experience of skip counting.

Lesson 1: Discover

Students hear the story of Grandma's Soup and discover that the problem with the recipe is the ambiguity of the term 'handful' as a unit of measurement. They investigate the numbers of pieces of macaroni in their own handfuls by grabbing a handful and counting the pieces. They each write the total on a cut-out tracing of their own hand and order them from smallest to largest.

We value your feedback after these lessons via <https://www.surveymonkey.com/r/CV2TXTT>



Lesson 2: Devise

Students are informed that Grandma’s handful was 100 pieces of macaroni. A cut-out of Grandma’s hand is added to the display of hands from the Discover phase. Using a number line is suggested, and students write their totals on a class number line, and compare it to the hands display. Next, students make several attempts to grab 100 pieces of macaroni. They record each attempt on a number line, and use its relative location to guide their next attempt. Students use different counting strategies and attempt to find the most efficient way to count.

Lesson 3: Develop

Students use the evidence they have gathered to have a last ‘grab’ of macaroni. From all the grabs in their group, they select the one closest to 100. They recount this selected grab using a variety of strategies and collectively decide on their most efficient strategy for counting numbers around 100. They gather pictorial evidence of both the count and the counting strategy to use as evidence in the Defend stage.

Lesson 4: Defend

Groups present their best handful and the counting methods to the class with prompting questions from the teacher where required. They demonstrate counting a collection using skip counting and justify their most efficient method. Students actively listen to others, ask clarifying questions and provide feedback.

Reflection on this sequence

Rationale

It is often difficult to provide real life experiences for counting to 100. Large collections of most small objects should be measured (not counted) as is the case with the macaroni in a recipe. The challenge of counting macaroni for a recipe and grabbing exactly 100 creates a need for reiterations of counting as students explore how to grab as close to 100 pieces of macaroni as possible. Problems associated with counting large numbers in 1s or 2s will become obvious, creating the need to employ more efficient strategies. Two different representations of their totals (line of hand cut-outs in numerical order from smallest to largest and the number line), introduce the students to a comparison of data representations and the relative location of numbers. Students have multiple opportunities to order and sequence numbers, and to place numbers on number lines.

This unit has been developed around the 4D Guided Inquiry model with four phases—Discover, Devise, Develop and Defend. Throughout the inquiry, students use evidence they have gathered to support, justify and convince their peers that their solution answers the inquiry question. All the lessons stress the need to gather mathematical evidence and the importance of explicitly connecting the inquiry question, the evidence and the conclusion, as shown in the Evidence Triangle below. The 4D Guided Inquiry model requires the teacher to support and scaffold students through each phase. Further information is given in the *Mathematical Inquiry into Authentic Problems Teachers’ Guide*.

reSolve Mathematics is Purposeful

Problem Solving: Students use materials to model an authentic problem. They discuss the reasonableness of the answer.

Reasoning: Students have many opportunities to reason about and justify the effectiveness of their counting strategies. They explain direct and indirect comparisons of quantities.

Fluency: Students skip count by 2s, 5s and 10s. They order numbers and locate numbers on a number line.

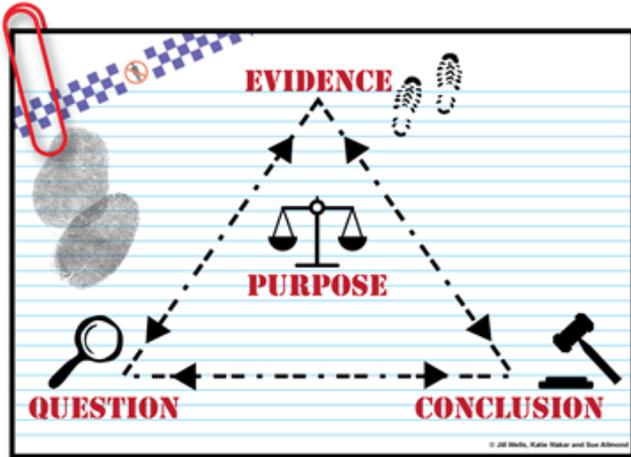
Understanding: Students connect numerals and quantities and partition numbers in a variety of ways.

reSolve Tasks are Challenging Yet Accessible

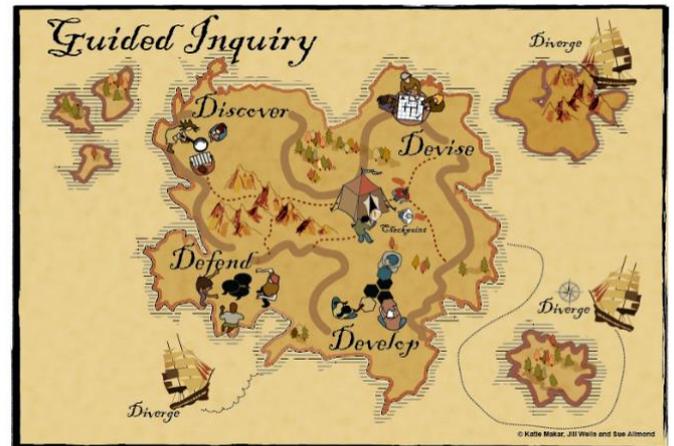
Grabbing a handful of macaroni provides students with a real life opportunity to count large numbers of objects, (bridging 100) and have some control over how they count. As students are initially expected to count freely, using strategies of their choice, differentiation is imbedded in the process. Students are then exposed to different strategies as they share with each other and the class. As new counting methods are discussed, there is opportunity to practise and develop fluency with peer assistance. As all stages of the Inquiry involve peer discussion, checking each other’s count, and placement of numbers on the number lines, the task is challenging yet accessible at all levels.

reSolve Classrooms Have a Knowledge Building Culture

Students will work collaboratively through the Inquiry phases as they investigate the different possibilities and gather evidence. They revisit the question in order to re-evaluate their plans. They may need to modify or change their thinking and show resilience when faced with challenges. As challenges become a normal part of their experience, students become able to work through confusion and rethinking. Taking opportunities for students to share ideas helps develop a classroom environment where: individual focus is diminished in favour of joint responsibility for collective knowledge advancement of the community; all individuals legitimately contribute to the advancement of knowledge in the classroom; and, all groups share and receive knowledge. Students take on many of the responsibilities that might normally be undertaken by a teacher: planning, providing the solution process and negotiating between their own ideas and understandings and those of others.



Evidence Triangle



4D Guided Inquiry map