'Even and Odd Orcharding'

This task was developed in collaboration with teachers at Branxton Public School, NSW in 2018.

Branxton Public School is a CHOOSEMATHS Partner School.

Australian Curriculum (Mathematics) Connections:

Investigate the conditions required for a number to be even or odd and identify even and odd numbers (ACMNA051)

Investigate and use the properties of odd and even numbers (ACMNA071)

Detail and Elaborations:

- model even and odd numbers of up to two digits using arrays with two rows

- compare and describe the difference between models of even numbers and models of odd number

- recognise the connection between even numbers and the multiplication facts for two

- describe and generalise the conditions for a number to be even or odd

- recognise the significance of the final digit of a whole number in determining whether a given number is even or odd

- identify even or odd numbers of up to four digits

Part 1 – Get your head around it!

A fruit farmer like to plant the apple trees in her orchard in straight lines. She likes her lines of trees to have an equal number of trees.

(a) She has 24 new apple trees to plant in a field.

   Draw (or use counters) to show how she could plant out her field.
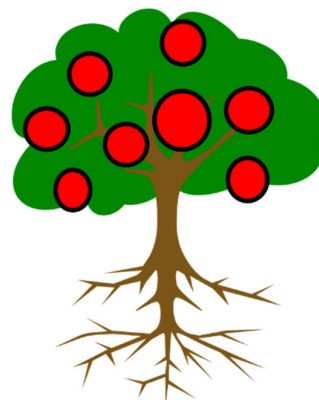
(b) In another field, she plants oranges.

She wants 27 orange trees and she still wants 2 rows of trees. Draw out her two rows of trees.

What do you notice about her 2 rows of trees? _____

What would need to happen to make her two rows **equal**? _____

_____

Part 2 – Show what you know!

Each season the farmer plants different numbers of orange trees.

However, she always likes to have 2 **even** rows in her fields.

One year she has to plant 25 orange trees; the next year 38 orange trees; the year after that, 29 orange trees.

Draw (or use counters) to show what will happen when she tries to plant each of these numbers of trees into two rows of trees.

(a) **How will the farmer know** whether she can plant any given number of trees into **2 equal rows**?

_____

_____

(b) **Why is the number '2' important for working out 'even' and 'odd' numbers?**
If you would like to, use a diagram to explain.

_____

(c) **Will the farmer be able to plant two equal rows of orange trees** if she needs:

(i) 36 trees? **Yes / No**

(ii) 127 trees? **Yes / No**

(iii) 4 361 trees? **Yes / No**

(iv) 7 990 trees? **Yes / No**

What is a **quick way** to work each of these out? _____

_____

Part 3 – Solve problems!

The farmer plants plum trees in straight lines.
She also likes her plum trees to be in **equal rows**.

(a) She has **21** trees to plant in two small fields.
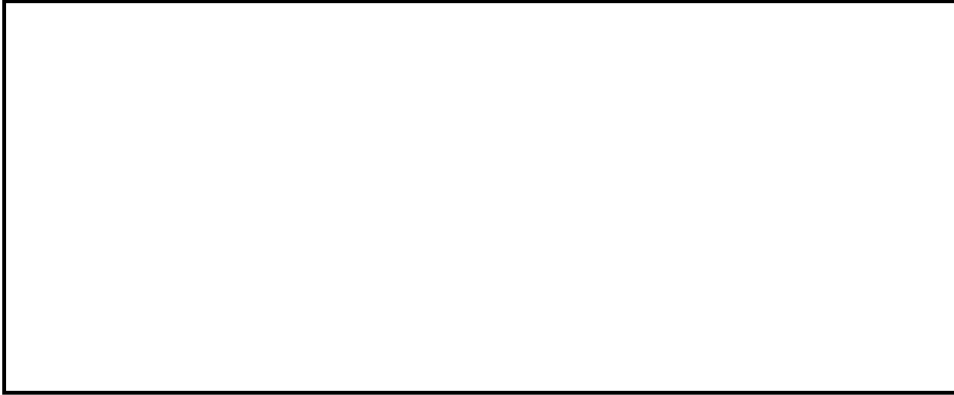   One field is smaller than the other.

   **Draw (or use counters) to show how she could plant her
    21 trees**, making sure that they are in **equal rows**.

Field 1
Field 2

(b) If she plants trees in **rows of 6**, **show a way of planting the trees** so she has
      between 45 and 50 trees altogether.

(c) Find another **odd number of trees more than 40**, with which the farmer can plant her trees in **equal rows**.

Part 4 – Think hard and show reasons!

(a) Whenever I **multiply any even number** by any other number (whether even *or* odd), my answer is **always** even.

Provide **3 examples** of this and *prove* (by showing your working out) that each answer is still **even**.

Example 1: _____

      Proof: _____

Example 2: _____

      Proof: _____

Example 3: _____

      Proof: _____

(b) Whenever I multiply any odd number by any other number…

- sometimes, my answer is **even**, and

- sometimes, my answer is **odd**.

Provide **no more than 5** examples of multiplying an **odd** number by another number (this other number – which is called a 'multiplier' - could be even *or* odd – you choose).

Example 1: _____

Example 2: _____

Example 3: _____

Example 4: _____

Example 5: _____

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Can you find, show or write a rule that explains whether my answer will be even or odd when I multiply an odd number by another (even or odd) number?

_____

_____

_____

_____

Grading and Student Self-Assessment Rubric – Year 3 Even and Odd Numbers

Maths Thinking	Maths Skill and Understanding	My Check In	Teacher Check In
I can use Reasoning with *Even and Odd Numbers*	Explain and analyse the conditions required for a number to be even or odd, and use these properties to establish 'even' or 'odd' rules for larger numbers. ***To show this successfully, I can:*** ☐ *Notice the importance of the last digit of a whole number in deciding whether a given number is even or odd.* ☐ *Explain why multiples of even numbers are also even.* ☐ *Explain why multiples of odd numbers are either even or odd, depending on the 'even' or 'odd' value of their multiplier.*		
I can Solve Problems using *Even and Odd Numbers*	I can solve problems, including worded problems, by recognising, describing or creating number patterns resulting from even or odd number repetitions (or 'multiples').		
I can attain Fluency with *Even and Odd Numbers*	Explain the mathematical properties needed for a number to be 'even' or 'odd'. ***To show this successfully I can:*** ☐ *Describe in words the conditions or properties needed for a number to be even or odd.* ☐ *Recognise the connection between even numbers and the multiplication facts for the whole number '2'.* ☐ *Identify even or odd numbers of up to four digits.*		
I can Understand *Even and Odd Numbers* *ACMNA051*	I can identify even and odd numbers and repeat these in a pattern. ***To show this successfully I can:*** ☐ *Model even and odd numbers of up to two digits using arrays with two rows.* ☐ *Compare and describe the difference between models of even numbers and models of odd numbers.*		