

OUT AND ABOUT

OUTDOOR ACTIVITIES FOR KEY STAGE 2 MATHEMATICS

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HANDLING DATA

Number Sort

Learning focus

- Sort and classify numbers for two criteria
- Represent results on Venn, Carroll and tree diagrams
- Interpret Venn, Carroll and tree diagrams

Key vocabulary

- Venn diagram
- Carroll diagram
- Tree diagram
- Sorting
- Set
- Subset
- Intersection
- Belongs
- Property
- Same
- Different

Resources

- Number tiles: stones or log slices with painted numbers (a selection from 0-100)
- Chalk
- Sticks or pieces of string



Activity

Introduce the activity by laying out a selection of number tiles (such as stones or log slices with painted numbers) on the school grounds. Include a range of numbers within 0-100. Invite a child to choose two numbers and discuss similarities and differences.

What is the same?

What is different?

Repeat for different pairs of numbers and elicit a range of properties such as: odd/even, has/does not have two digits, is less than/is not less than 25, is/is not a multiple of 6, and so on.

Construct a Venn diagram by using two large hoops or by using chalk to draw two large circles on the school grounds. Choose two criteria – for example, 'multiples of 3' and 'even number' – and label the Venn diagram.

Invite children to select a number tile, one at a time, and place it in the correct region of the Venn diagram. They should be able to give reasons for their actions.

Where does this number go? Why did you put it there?

What can you tell me about this number? Is it a multiple of 3? Is it even?

What can you say about the numbers in the intersection?

Why do they belong there?

What can you say about the numbers outside the two hoops? Why do they belong there?



Encourage children to use the **'property' / 'not property'** structure when referring to the properties of numbers. For example: 9 is a multiple of 3 and it is not even; 17 is not a multiple of 3 and it is not even.

To continue, assign children to small groups and give each group a selection of numbers to sort. Each group must choose two criteria to sort their numbers. They must construct and label their own Venn diagram and then sort their numbers into the correct regions. Once completed, they could take a photograph of their diagrams. They could also record interesting facts about their diagrams.

Encourage the children to share and discuss their sorting experiences. Other members of the class could suggest other numbers to go in each region. One child could also decide to move a number to the wrong region and challenge others to spot the mistake.

Teaching point

It is important to label the overall diagram (defining the set) and its categories. The **'property' / 'not property'** structure should be used when referring to the different regions of the diagram.

The same activity could be repeated with a Carroll diagram. Construct a large Carroll diagram using long sticks or pieces of string. Choose two new criteria. Pupils should label their Carroll diagram using the **'property' / 'not property'** structure. For example: 'less than 50' / 'not less than 50' and 'square numbers' / 'not square numbers'. Pupils should then place their numbers in the correct cells. As before, encourage children to share and discuss their sorting experiences.



Teaching point

Some children may need support when placing numbers in their Carroll diagram. They may find it easier to sort for the first criterion and place these numbers on the Carroll diagram before sorting again for the second criterion.

The same activity could be repeated with a tree diagram. Construct a large tree diagram using chalk or pieces of string on the school grounds. Choose two new criteria. Children should label their diagram accordingly, using the **'property' / 'not property'** structure, and then sort their numbers. They should then 'travel' each number through the branches until it ends up at the end of a branch. Again, encourage pupils to share and discuss their sorting experiences.



Teaching point

Tree diagrams begin with one criterion and branch out according to whether the member of the set meets the criterion or not. A second criterion is then chosen for each branch and the members of the set are sorted again. This continues until all the members of the set have been sorted. Each member ends up at the end of a branch and its properties can be easily identified.

When the children have had experience of Venn, Carroll and tree diagrams, it would be worth taking time to compare and contrast the different formats.

For example, suppose the children sort a set of numbers using the criteria 'odd' and 'multiple of 5'. Display photographs of the different diagrams.

*What is the same? What is different?
How many regions are there in each diagram?*

It is helpful for children to recognize that each diagram displays the same information.

Taking ideas further

Children could use other contexts for their sorting experiences. For example, they could sort natural resources such as leaves, or commercial 2D and 3D shapes. They could also use laminated cards with their names for sorting experiences involving themselves.

Children could progress to sorting experiences involving three criteria.

Assessment opportunities

Are the children able to:

- Use Venn, Carroll and tree diagrams to sort numbers for two criteria
- Choose appropriate criteria to sort numbers
- Talk about how the information is represented in Venn, Carroll and tree diagrams