

## **Virtual Manipulatives**

Virtual manipulatives can be used to support the effective teaching and learning of mathematical concepts.

The use of manipulatives leads to an improvement in a child's ability to make connections between mathematical concepts, thereby deepening their understanding of a mathematical concept.

When used in a classroom, they can enhance learning by allowing the teacher to demonstrate key concepts to support understanding, creating a bridge between the concrete, the pictorial and the abstract.

The links to the virtual manipulatives below are those that children will be most familiar with in classrooms, such as base ten materials, bead strings, place value counters, arrow cards, geoboards etc.) All of the websites or apps include simple, clear instructions on their respective page.

## Arrow Cards

<https://mathsbot.com/manipulatives/placeValueCard>

Select 'tidy' to start again.

Click + or - to change number on the arrow card.

The interface features a purple header bar with the title "Place Value Cards" and a close button. Below the title are controls: a "Tidy" button, a "Digits:" label with a numeric input showing "5", and minus/plus buttons. To the right are "Zoom out" and "Zoom in" buttons. The main workspace contains two sets of arrow cards. On the left, a stack of five cards represents powers of ten: a red card with "1", a yellow card with "10", a green card with "100", a blue card with "1000", and an orange card with "10000". On the right, a single horizontal arrow card displays the number "52473", with each digit in a different colored box (5: orange, 2: blue, 4: green, 7: yellow, 3: red). Callout boxes provide instructions: "Select 'tidy' to start again." points to the Tidy button; "Click + or - to change number on the arrow card." points to the plus/minus buttons; "Select maximum number of digits." points to the digits input field; and "Drag arrow cards onto the screen to select them." points to the stack of power-of-ten cards.

Place Value Cards

Tidy Digits: 5 - + Zoom out Zoom in

1  
10  
100  
1000  
10000

52473

Select maximum number of digits.

Drag arrow cards onto the screen to select them.

## Base 10

<https://apps.mathlearningcenter.org/number-pieces/>

Select ones, tens or hundreds.

Select blank numberlines.

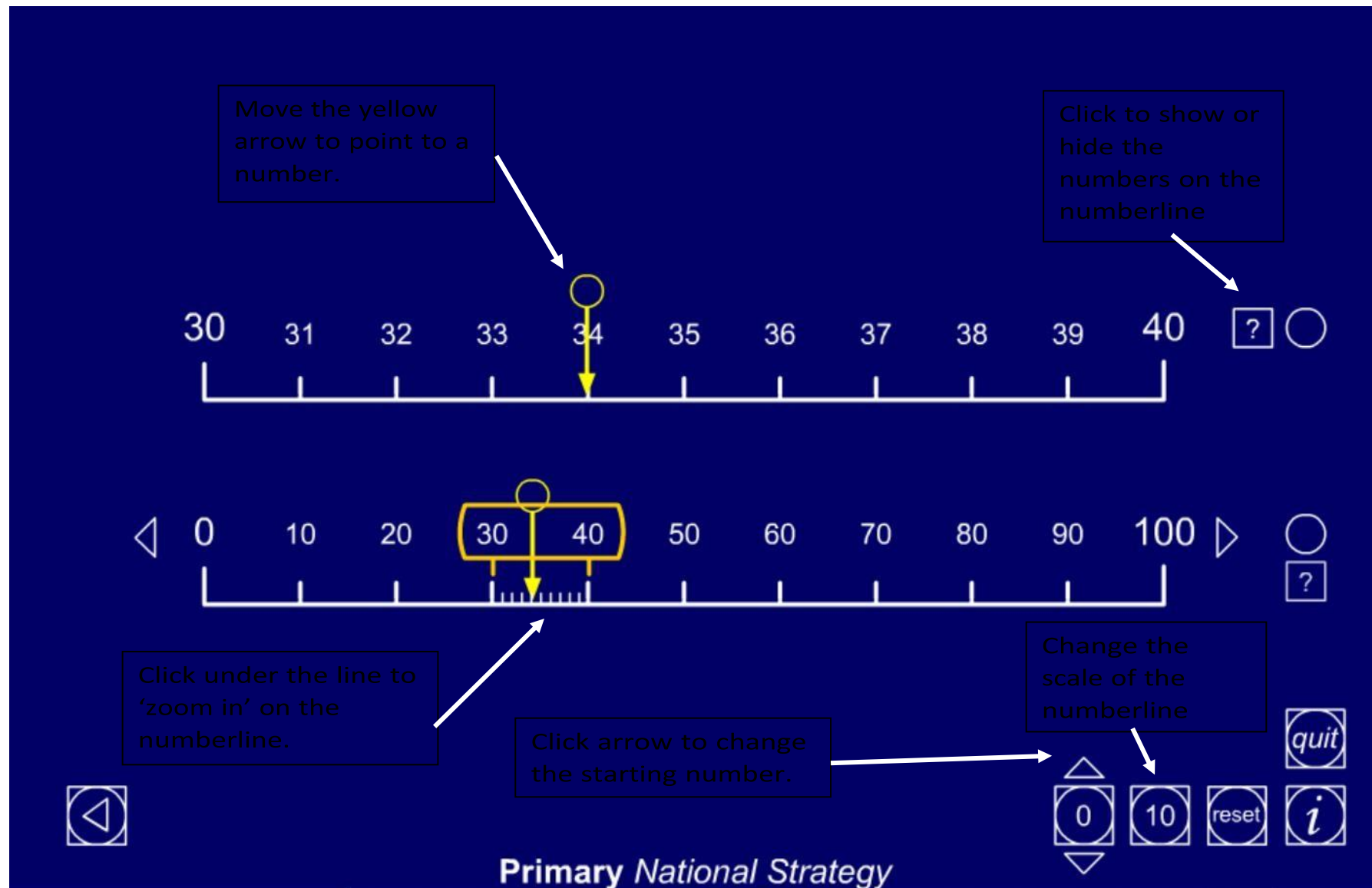
Join or break pieces.

Annotate your images

The screenshot displays the 'Number Pieces' app interface. On the left, a vertical toolbar contains icons for selecting ones, tens, and hundreds blocks, as well as blank number lines. The main workspace features several yellow base 10 blocks: two vertical rods (tens), two horizontal rods (tens), and a cluster of nine small squares (ones). Below the blocks, a number line is shown with the digits '123' in red above it and three yellow blocks placed on the first three tick marks. A blue toolbar at the bottom contains various icons for undo, redo, copy, paste, zoom, and other editing functions. Four callout boxes with arrows point to specific features: 'Select ones, tens or hundreds.' points to the block selection area; 'Select blank numberlines.' points to the number line selection icon; 'Join or break pieces.' points to the 'Join or break pieces' button; and 'Annotate your images' points to the drawing tool icon.

## Numberline

<http://www.lancsngfl.ac.uk/curriculum/primarymaths/getfile.php?src=4313/decimal+number+line.com>



## Coins

<https://mathsbot.com/manipulatives/coin>

Click on the arrows to copy a selected coin.

Select 'tidy' to start again.

Coins

Tidy Scatter Delete

Zoom out Zoom in

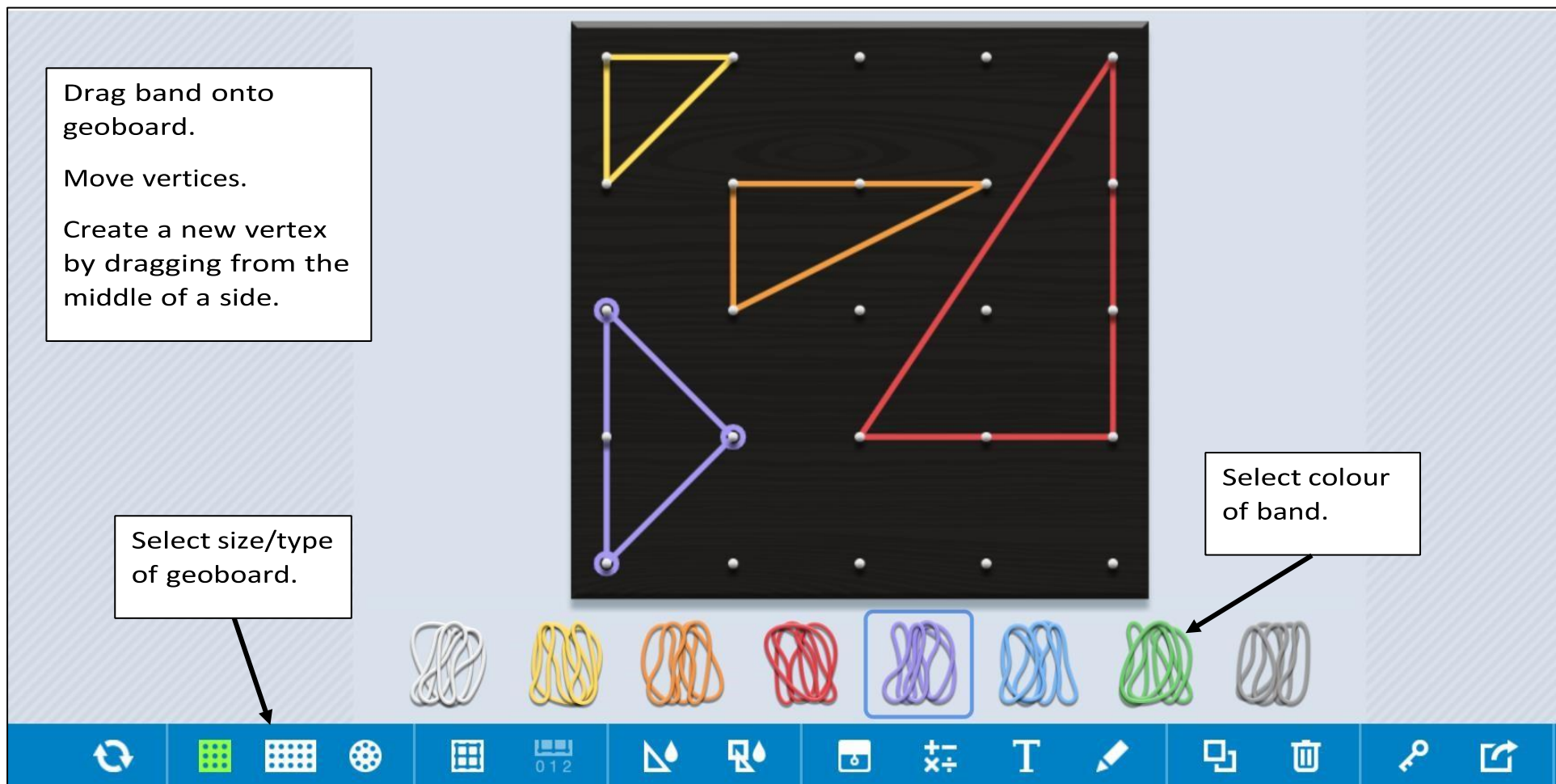
Currency: Sterling ▾

Copy

Drag coins onto the screen to select them.

## Geoboard

<https://apps.mathlearningcenter.org/geoboard/>



Place Value Counters

<https://mathsbot.com/manipulatives/placeValueCounters>

Use arrows to copy counters.

Click 'tidy' to start again.

Choose range of counters.

Place Value Counters

Counters: 0.1 to 1000

Show: None

Tidy

Zoom out

Zoom in

Snap to grid ☒

Exchange

Group

Base: 10

0.1

100

1

1000

10

1000

1000

1000

1000

1000

100

100

100

10

1

1

1

1

0.1

0.1

0.1

Choose a ten frame, grids or place value grids as background.

Ten Frames



<https://apps.mathlearningcenter.org/numberframes/>

The screenshot shows the Number Frames app interface. On the left is a toolbar with various options: a grid icon for frame size, single counter icons for 5s and 10s in red and blue, and a 'Start again' button. On the right is the workspace with three number frames. The first frame is a 1x5 grid with 3 red counters and the number 3 written next to it. The second frame is a 2x5 grid with 7 red counters and the number 7 written next to it. The third frame is a 2x10 grid with 16 red counters and the number 16 written next to it. At the bottom is a blue toolbar with icons for undo, redo, frame size, eraser, frame, math symbols, text, drawing tools, copy, delete, and share.

Select frame size. Choose between 5, 10, 20, 100 or create your own.

Select single counters, 5s, or 10s to place in your frame.

Choose between red or blue counters.

Start again.

Annotate your images with text or freehand.

## Bead String

<https://mathsframe.co.uk/en/resources/resource/69/itp-beadstring>

The interface features a horizontal bead string with alternating yellow and white beads. A white bead at the left end is connected to a vertical line, and a white bead at the right end is connected to another vertical line. A text box with an arrow pointing to the beads says: "Click on the beads to move them one at a time or in groups." Below the bead string, there are two text boxes with arrows pointing to a control panel. The first text box says: "Click to show/hide the number of beads." The second text box says: "Click to show/hide the number of beads the mouse is hovering over." The control panel includes a display showing the number "38", a grid of buttons (00, -1, -10, i, 00, +1, +10, reset), and a logo for "MATHSFRAME.CO.UK" in the bottom left corner.

Click on the beads to move them one at a time or in groups.

Click to show/hide the number of beads.

Click to show/hide the number of beads the mouse is hovering over.

Count on or back in ones or tens by clicking the buttons.

38

00	-1	-10	i
00	+1	+10	reset

MATHSFRAME.CO.UK