

# GRAPHIC ORGANISERS

AND OTHER

# VISUAL STRATEGIES



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# Index of Activities

This chart shows the standards that are covered in each chapter.

<b>NUMBERS AND OPERATIONS</b>	<b>Standards are covered on pages</b>
Understand numbers, ways of representing numbers, relationships among numbers and number systems.	9, 14, 17, 20, 24
Understand meanings of operations and how they relate to one another.	14, 20, 24, 41
Compute fluently and make reasonable estimates.	31, 52, 71, 87, 91

<b>ALGEBRA</b>	<b>Standards are covered on pages</b>
Understand patterns, relations and functions.	28, 31, 34, 37, 41, 56
Represent and analyse mathematical situations and structures using algebraic symbols.	20, 28, 34, 37, 41, 52, 56, 61
Use mathematical models to represent and understand quantitative relationships.	9, 17, 24, 34, 37, 41, 68, 71, 74
Analyse change in various contexts.	28, 31, 34, 41, 56

<b>GEOMETRY</b>	<b>Standards are covered on pages</b>
Analyse characteristics and properties of two- and three-dimensional geometric shapes, and develop mathematical arguments about geometric relationships.	44, 47, 52, 61, 74
Specify locations and describe spatial relationships using coordinate geometry and other representational systems.	56
Apply transformations and use symmetry to analyse mathematical situations.	47, 56
Use visualisation, spatial reasoning and geometric modelling to solve problems.	24, 44, 47, 52, 56, 61, 71, 74

<b>MEASUREMENT</b>	<b>Standards are covered on pages</b>
Understand measurable attribute of objects and the units, systems and processes of measurement.	44, 52, 64, 68, 71, 74, 91
Apply appropriate techniques, tools and formulas to determine measurements.	44, 52, 61, 64, 68, 71, 74, 91

<b>DATA ANALYSIS AND PROBABILITY</b>	<b>Standards are covered on pages</b>
Formulate questions that can be addressed with data, and collect, organise and display relevant data to answer them.	31, 79, 82, 87, 91
Select and use appropriate statistical methods to analyse data.	79, 82, 87
Develop and evaluate inferences and predictions that are based on data.	79, 82, 87, 91
Understand and apply basic concepts of probability.	87, 91

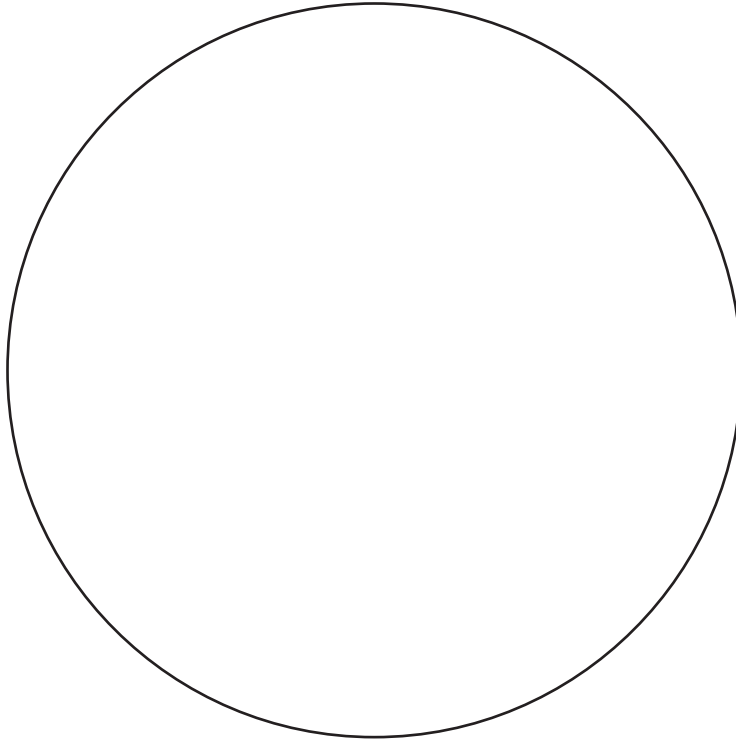
<b>PROBLEM SOLVING</b>	<b>Standards are covered on pages</b>
Build new mathematical knowledge through problem solving.	9, 17, 28, 31, 34, 52, 61, 82, 87, 91
Solve problems that arise in mathematics and in other contexts.	9, 17, 28, 31, 34, 52, 61, 82, 87, 91
Apply and adapt a variety of appropriate strategies to solve problems.	9, 17, 28, 31, 34, 52, 61, 82, 87, 91
Monitor and reflect on the process of mathematical problem solving.	9, 17, 28, 31, 34, 52, 61, 82, 87, 91

<b>REASONING AND PROOF</b>	<b>Standards are covered on pages</b>
Recognise reasoning and proof as fundamental aspects of mathematics.	31, 44, 52
Make and investigate mathematical conjectures.	14, 31, 44, 52, 91
Develop and evaluate mathematical arguments and proofs.	44, 52
Select and use various types of reasoning and methods of proof.	44, 52

<b>COMMUNICATION</b>	<b>Standards are covered on pages</b>
Organise and consolidate mathematical thinking through communication.	9, 14, 31, 34, 37, 44, 47, 61, 64, 68, 79, 87, 91
Communicate mathematical thinking coherently and clearly to peers, teachers and others.	9, 14, 31, 34, 37, 44, 47, 61, 64, 68, 79, 87, 91
Analyse and evaluate the mathematical thinking and strategies of others.	9, 14, 31, 34, 37, 44, 47, 61, 64, 68, 79, 87, 91
Use the language of mathematics to express mathematical ideas precisely.	9, 14, 31, 34, 37, 44, 47, 61, 64, 68, 79, 87, 91

# Spotlight on Students

**Directions:** Make a circle graph of the student population at your school.



**Directions:** On another sheet of paper, design a flag that symbolises “a circle of learning”. Include your circle graph as part of the design. You must also include the following circles, either in the border or as part of the central design. Use a pencil to label each of the circles by its corresponding letter (a, b, c, d, e, f, g).

- a. At least one circle with a radius of 4 cm
- b. At least one circle with a diameter of 7.62 cm
- c. At least two circles that share a centre point
- d. At least two circles with radii that are the same but do not share a centre
- e. At least two circles that have only one point in common
- f. At least two circles with a radius of  $x$  and a radius of  $2.5x$ , where  $x = 2$  cm
- g. At least four circles divided into parts less than  $180^\circ$

# Measurement

## Size It Up: Measurement and Estimation

### Materials

Size it Up activity  
 Estimation Cards activity  
 Items to measure  
 Measuring devices

### Skills Objectives

Display familiarity with the commonly used units of measuring for length, area, volume and capacity and make reasonable estimates for quantity. Develop an idea about levels of accuracy when estimating and measuring objects for different situations.



Students complete the **Estimation Cards** to aid in developing ideas about estimating the measurement of certain objects. Then, in the **Size it Up** activity they estimate and record measurements for various objects and record their evaluation of the levels of accuracy they achieved on the table.

1. Read the following definitions aloud, and ask students to secretly write the word or term they think is being defined: *the distance between two points* (length); *the amount a container can hold* (capacity); *the units that are typically used to express the weight of an object* (kilograms). Read the answers aloud for students to self-check. Ask: *What do you think we're going to study today?* (types of measurements)

2. Give each student one copy of the **Estimation Cards activity (page 66)** and one copy of the **Size it Up activity (page 67)**. Explain to students that we will be estimating measurements for different items and then recording the actual measurement and comparing the answers.
3. Tell students they are going to draw or cut out pictures of items representing different types of measurement. Items should represent about one unit of each measure. For example, the width of one finger  $\approx$  one centimetre; the weight of a paper clip = one gram etc. Have the students draw or paste their pictures in the spaces provided on the Estimation Cards sheet.
4. Now the students have an idea about estimation, demonstrate the steps to complete the Size it Up table. First, select an item to be measured, such as a book. Decide on which property of the item to be measured. In our example, we have decided to measure the book's weight.
5. Have the students write down what units they will use to record the measurement in (grams).
6. Each student will estimate the measure of the item using the Estimation Cards as a visual aid. The students record their estimation in the space provided.
7. Now, have the students take an actual measurement, for example, weight the book on a weighing scale. Record the actual measurement in the space provided.
8. The students will now evaluate the accuracy of the estimate by comparing it against the actual measurement. Students record their comments in the spaces provided. Students should consider different levels of accuracy required for different situations.

## Extended Learning

Have students draw or cut out pictures of items representing different types of measurement. For example, for capacity, items might include a water bottle, a soft drink can and a glass of milk. Have them also draw items that represent about one unit of each measure. For example: the width of one finger  $\approx$  one centimetre; the width of two fingers  $\approx$  one inch; the length of one shoe  $\approx$  one foot; the weight of a pair of shoes  $\approx$  one pound; the weight of a paperclip  $\approx$  one gram; the weight of a kitten  $\approx$  400 grams.

Name \_\_\_\_\_ Date \_\_\_\_\_

### Estimation Cards

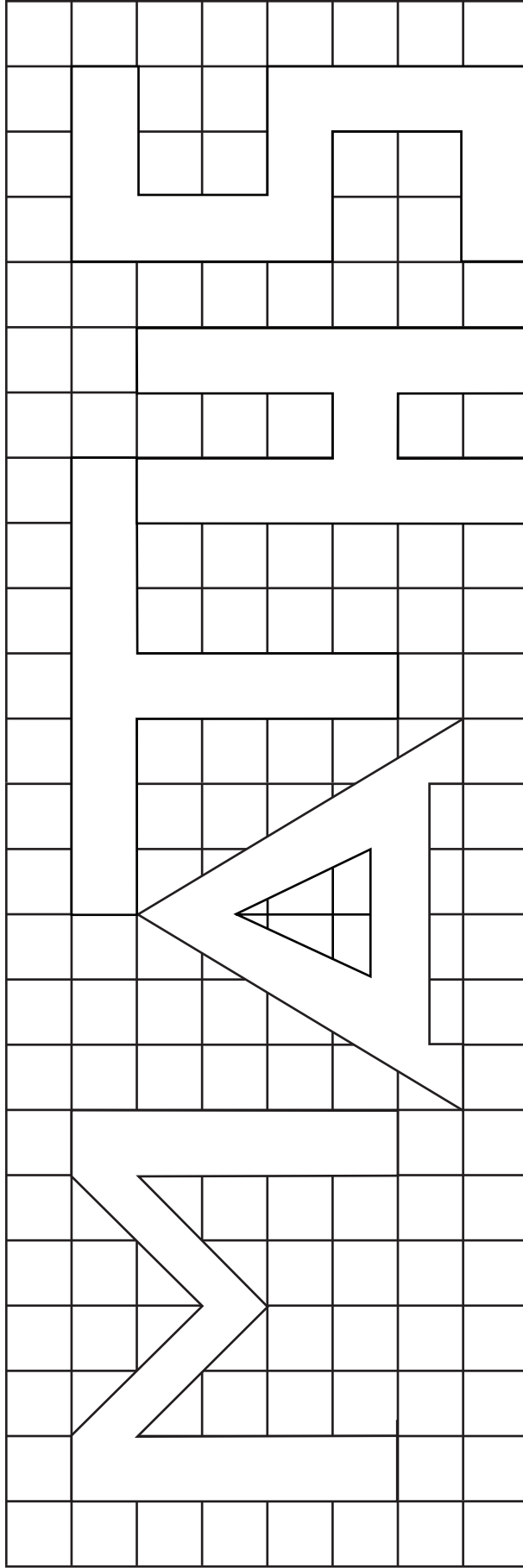
**Directions:** Draw an image in each box of something that represents an estimate of one of these units. Use these to help you in your estimation activity.

1mm	1cm	1m
1mm <sup>2</sup>	1cm <sup>2</sup>	1m <sup>2</sup>
1cm <sup>3</sup>	1m <sup>3</sup>	1g
1kg	1ml	1l

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# Maths Art

**Directions:** Colour the letters of the word *MATHS*. Estimate the perimeter and area of the entire word without using a ruler. (Each grid square = 1 cm.) Then use a ruler to measure and calculate the exact perimeter and area. How close are your estimates?



## Perimeter

Estimate: \_\_\_\_\_ Exact: \_\_\_\_\_ Difference? \_\_\_\_\_

## Area

Estimate: \_\_\_\_\_ Exact: \_\_\_\_\_ Difference? \_\_\_\_\_

# Dingo Maths 1

**Directions:** Use the dingo data to solve the problems below.

Dingo	Weight (kilograms)
Kramer	12
Bandit	17
Ginger	9
Rascal	8
Ebony	10
Midnight	9
Junior	7
Salinger	5
Thor	15
Scout	16
Topaz	6
Jonah	18
Sophie	20
Garfield	25

1. List the weights of the dingo in a row from least to greatest.

\_\_\_\_\_

2. Write the *minimum value*, the *median* and the *maximum value* for the data.

Minimum: \_\_\_\_\_ Median: \_\_\_\_\_ Maximum: \_\_\_\_\_

3. Find the *lower quartile* (middle value between the *minimum* and the *median*) and the *upper quartile* (middle value between the *median* and the *maximum*).

Lower Quartile: \_\_\_\_\_ Upper Quartile: \_\_\_\_\_

4. Use a number line and a ruler to make a box-and-whisker plot of the *minimum*, *lower quartile*, *median*, *upper quartile* and *maximum* values:

**Step 1:** Above the number line, draw dots for the five values in a row.

**Step 2:** Draw parallel, 1-cm vertical marks through each *lower quartile*, the *median* and the *upper quartile*. Connect the ends to make a two-part box.

**Step 3:** Make a “whisker” on each end of the box by drawing a line segment from the *lower quartile* to the *minimum* and from the *upper quartile* to the *maximum*.