Mathematics Online Interview links with the Victorian Essential Learning Standards

Domain: Mathematics

Dimension: Measurement, chance and data

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<th>Level</th>
<th>Standards and Progression points</th>
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| 0.5   | At 0.5, the work of a student progressing towards the Measurement, chance and data standard at Level 1 demonstrates, for example:  
- use of descriptive terms such as **longer**, **taller** and **heavier** to compare length and mass of pairs of familiar objects  
- use of **yesterday**, **today** and **tomorrow** and the ability to name the corresponding days  
- awareness that a clock changes in response to time in a daily cycle  
- use of a die or similar device to determine the range of outcomes in a game  
- interpretation of pictographs, and collection and sorting of items or data in preparation for the creation of a pictograph | Using the Mathematics Online Interview, when a student is successful on:  
- Question 45 (a) (b)  
  *Compare string and stick*  
- Question 49 (a) (b)  
  *Sort objects into ‘heavy’ and ‘light’*  
- Question 38  
  *Discuss features and purposes of a clock*  
this is indicative of a student having achieved **part of** this progression point. |
| 1.0 Standard | At **Level 1**, students compare length, area, capacity and mass of familiar objects using descriptive terms such as **longer**, **taller**, **larger**, **holds more** and **heavier**. They make measurements using informal units such as paces for length, handprints for area, glasses for capacity, bricks for weight. They recognise the continuity of time and the natural cycles such as day/night and the seasons. They correctly sequence days of the week. They use informal units such as heartbeats and hand claps at regular intervals to measure and describe the passage of time. They recognise and respond to unpredictability and variability in events, such as getting or not getting a certain number on the roll of a die in a game or the outcome of a coin toss. They collect and display data related to their own activities using simple pictographs. | Using the Mathematics Online Interview, when a student is successful on:  
- Question 45 (b) (c)  
  *Compare string and stick*  
- Question 49 (c - f)  
  *Predict and check which is heavier*  
- Question 40 (a) (b)  
  *Days and months (some of these)*  
this is indicative of a student having achieved **part of** this Standard. |
### 1.25
At 1.25, the work of a student progressing towards the Measurement, chance and data standard at Level 2 demonstrates, for example:
- informal measurement of length by making, describing and comparing personal units
- use of a clock to determine the hour
- ordering of days, weeks, months and years
- understanding of distinction between cold, cool, warm, hot and boiling
- awareness that some events are equally likely to occur; for example, a head or a tail showing when a coin is tossed

Using the Mathematics Online Interview, when a student is successful on:
- Question 39 (a)
  *Name 2 o’clock when shown on an analogue clock*
- Question 40 (a) (b)
  *Days and months* most of these

this is indicative of a student having achieved part of this progression point.

### 1.5
At 1.5, the work of a student progressing towards the Measurement, chance and data standard at Level 2 demonstrates, for example:
- use of uniform units for length; for example, cm as a unit for measuring length
- informal measurement of area and mass by making, describing and comparing personal units
- knowledge of the relationship between analogue and digital clocks
- knowledge of the outcomes of chance events such as rolling a die
- interpretation of pictographs, bar and column graphs

Using the Mathematics Online Interview, when a student is successful on:
- Question 46 (a)
  *Measure straw with paper clips*
- Question 49 (a) (b)
  *Sort objects into ‘heavy’ and ‘light’*
- Question 50
  *Use teddies to measure mass of container*

this is indicative of a student having achieved part of this progression point.

### 1.75
At 1.75, the work of a student progressing towards the Measurement, chance and data standard at Level 2 demonstrates, for example:
- informal measurement of capacity by making, describing and comparing personal units
- construction of a time line for daily activity and use of a diary for recording daily events
- drawing of an analogue clock to match a given digital time and of reading an analogue clock to the nearest half hour
- ordering of familiar events in terms of their probability between impossible and certain
- collection and recording of categorical and numerical data

Using the Mathematics Online Interview, when a student is successful on:
- Question 39 (b)
  *Name 9:30 when shown on an analogue clock*

this is indicative of a student having achieved part of this progression point.
### 2.0 Standard

At **Level 2**, students make, describe and compare measurements of length, area, volume, mass and time using informal units. They recognise the differences between non-uniform measures, such as hand-spans, to measure length, and uniform measures, such as icy-pole sticks. They judge relative capacity of familiar objects and containers by eye and make informal comparisons of weight by hefting. They describe temperature using qualitative terms (for example, cold, warm, hot). Students use formal units such as hour and minute for time, litre for capacity and the standard units of metres, kilograms **and seconds**.

Students recognise the key elements of the calendar and place in sequence days, weeks and months. They describe common and familiar time patterns and such as the time, duration and day of regular sport training and tell the time at hours and half-hours using an analogue clock, and to hours and minutes using a digital clock.

Students predict the outcome of chance events, such as the rolling of a die, using qualitative terms such as certain, likely, unlikely and impossible. They collect simple categorical and numerical data (count of frequency) and present this data using pictographs and simple bar graphs.

Using the Mathematics Online Interview, when a student is successful on:

- Question 46 (a) (b) *Measure straw with paper clips* saying unit
- Question 51 *Predict, check whether tomato tin is more or less than 1 kg*
- Question 39 (a) (b) *Name 2:00 and 9:30 when shown on an analogue clock*
- Question 40 (a) (b) *Days and months all of these*
- Question 40 (c) (d) *Day before and month after*

this is indicative of a student having achieved **part** of this Standard.

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### 2.25

At 2.25, the work of a student progressing towards the Measurement, chance and data standard at Level 3 demonstrates, for example:

- use of formal units of measurement; for example, metres to measure length, and hour, minute and second for time
- application of estimations using personal units, such as pace length and arm span, and comparison with measures using formal units, such as metres and centimetres
- use of ruler and tape measure (linear scale) and trundle wheel (circular scale) to validate estimates of length
- setting of temperature in Celsius on a circular scale; for example, on an oven, and estimation of temperature in degrees Celsius
- displays of data as a column or bar graph

Using the Mathematics Online Interview, when a student is successful on:

- Question 47 (a) (b) *Measure straw with ruler using correct unit*

this is indicative of a student having achieved **part** of this progression point.

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### 2.5

At 2.5, the work of a student progressing towards the Measurement, chance and data standard at Level 3 demonstrates, for example:

- estimation and measurement of mass, volume and capacity of common objects; for example, kilogram of flour, litre of soft drink

Using the Mathematics Online Interview, when a student is successful on:

- Question 39 (c) *Name 2:20 when shown on an analogue clock*

this is indicative of a student having achieved **part** of this progression point.
### 2.75

At 2.75, the work of a student progressing towards the Measurement, chance and data standard at Level 3 demonstrates, for example:

- calculation of area through multiplication of the length of a rectangle by its width
- estimation of angle in terms of quarter turns and half turns
- investigation of the fairness of events such as gambling and games through experimentation
- comparison of the likelihood of everyday events and linking of events with statements about how likely they are to occur
- understanding of the distinction between discrete and continuous scales

### 3.0 Standard

At **Level 3**, students estimate and measure length, area, volume, capacity, mass and time using appropriate instruments. They recognise and use different units of measurement including informal (for example, paces), formal (for example, centimetres) and standard metric measures (for example, metre) in appropriate contexts. They read linear scales (for example, tape measures) and circular scales (for example, bathroom scales) in measurement contexts. They read digital time displays and analogue clock times at five-minute intervals.

They interpret timetables and calendars in relation to familiar events. They compare the likelihood of everyday events (for example, the chances of rain and snow). They describe the fairness of events in qualitative terms. They plan and conduct chance experiments (for example, using colours on a spinner) and display the results of these experiments. They recognise different types of data: non-numerical (categories), separate numbers (discrete), or points on an unbroken number line (continuous). They use a column or bar graph to display the results of an experiment (for example, the frequencies of possible categories).

Using the Mathematics Online Interview, when a student is successful on:

- **Question 41**
  *Calendar questions*
- **Question 42**
  *Duration question using digital time*
- **Question 52**
  *Measure the mass of a container using 10 g weights*

this is indicative of a student having achieved **part** of this Standard.
### 3.25
At 3.25, the work of a student progressing towards the Measurement, chance and data standard at Level 4 demonstrates, for example:

- estimation and measurement of perimeter of polygons
- conversion between metric measurements for length; for example, 0.27m = 27cm
- estimation and measurement of angles in degrees to the nearest 10°
- use of fractions to assign probability values between 0 and 1 to probabilities based on symmetry; for example, Pr(six on a die) = 1/6
- identification of mode and range for a set of data

### 3.5
At 3.5, the work of a student progressing towards the Measurement, chance and data standard at Level 4 demonstrates, for example:

- estimation and measurement of surface area; for example, use of square metres, and area of land; for example, use of hectares
- awareness of the accuracy of measurement required and the appropriate tools and units
- subdivision of a circle into two sectors according to a given proportion for arc length
- design of questionnaires to obtain data from a sample of the population
- sorting of data using technology

### 3.75
At 3.75, the work of a student progressing towards the Measurement, chance and data standard at Level 4 demonstrates, for example:

- conversion between metric units; for example, L to mL, and understanding of the significance of thousands and thousandths in the metric system
- simulation of simple random events
- calculation and analysis of the stability of a sequence of long run frequencies where the number of trials increases, say from 5 to 10 to 20 to 100
- interpretation of pie charts and histograms
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<th><strong>4.0 Standard</strong></th>
<th><strong>4.25</strong></th>
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| At **Level 4**, students use metric units to estimate and measure length, perimeter, area, surface area, mass, volume, capacity, time and temperature. They measure angles in degrees. They measure as accurately as needed for the purpose of the activity. They convert between metric units of length, capacity and time (for example, L–mL, sec–min).

Students describe and calculate probabilities using words, and fractions and decimals between 0 and 1. They calculate probabilities for chance outcomes (for example, using spinners) and use the symmetry properties of equally likely outcomes. They simulate chance events (for example, the chance that a family has three girls in a row) and understand that experimental estimates of probabilities converge to the theoretical probability in the long run.

Students recognise and give consideration to different data types in forming questionnaires and sampling. They distinguish between categorical and numerical data and classify numerical data as discrete (from counting) or continuous (from measurement). They present data in appropriate displays (for example, a pie chart for eye colour data and a histogram for grouped data of student heights). They calculate and interpret measures of centrality (mean, median, and mode) and data spread (range). |
| At 4.25, the work of a student progressing towards the Measurement, chance and data standard at Level 5 demonstrates, for example:

- development and use of formulas for the area and perimeter of triangles and parallelograms
- determination of the internal and external angle sums for a polygon and confirmation by measurement
- estimation of the likely maximum and minimum error associated with a measurement
- appropriate use of zero to indicate accuracy of measurement; for example, a piece of timber 2.100m long is accurate to the nearest mm
- recognition of the mean value of a set of measurements as the best estimate, and that the range could represent the associated error |

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<th><strong>Using the Mathematics Online Interview, when a student is successful on:</strong></th>
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| - Question 43
  *Interpret TV guide to calculate duration*
| - Question 44 *Linking digital and analogue time*
| - Question 48 *Tear streamer to 1 m, estimate length of streamer*
| - Question 53 (a – d)
  *Using kitchen scales*

this is indicative of a student having achieved **part** of this progression point. |