**Measures**: Time

**16. Time 2**

This unit allows children to explore timetables and schedules in a range of formats, and to use these to interpret and calculate information relating to time.

**Unit Information**

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| **Learning**  **Outcome(s)** | Through appropriately engaging learning experiences, children should be able to solve and pose practical tasks and problems involving the interpretation and calculation of time. |
| **Mathematical Concept(s)** | * Greenwich Mean Time is used as the standard time against which all the other time zones in the world are referenced. * Speed is measured as distance travelled per unit of time. |
| **Mathematical Language** | Time, timetable, schedule, earlier, later, frequency, table, chart, data |
| **Prior**  **Knowledge** | * How to convert between minutes and hours, and seconds and minutes (and vice versa). * Time can be presented using 12-hour or 24-hour formats. * How to read both analogue and digital clocks. * How to read bar charts, pie charts and line graphs. |
| **Potential**  **Misconceptions** | * Timetables all take the same format. [Children will be most familiar with bus/train timetables, but examples in this Unit use a variety of formats that look very different to what they might have seen before.] |

**Unit Overview**

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|  | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** |
| **Focus of New Learning** | Interpret and describe information provided in timetables and schedules. | Continue to interpret and describe information provided in timetables and schedules. | Use charts to draw conclusions about time. | Use graphs and charts to draw conclusions about time. | Consolidate learning. |
| **Slides** | 16.1 | 16.2 | 16.3 | 16.4 |  |
| **Book** | p. 96 | p. 97 | p. 98 | p. 99 | pp. 100–101 |
| **Concrete**  **Resources** |  |  |  |  |  |
| **Digital Resources** |  | | | | |

**Lesson 1: Interpret and describe information provided in timetables and schedules.**

Teaching Slides 16.1 | Student Book p. 96

**Learning Experiences and Anticipated Student Responses**

**Introduction:**

* Begin the class with an explanation of sunrise and sunset, and ask the class what’s being shown in the timetable. They should link this to the video just shown.
* **Maths Talk:** “Between 1st Jan and 1st Feb it changes by half an hour. Between 1st Feb and 1st Mar it changes by about an hour. But between 1 Apr and 1 May it changes by over an hour. And between 1 Jun and 1 Jul it barely changes at all!”
* This is quite a complicated set of changes (e.g. seasons and changing the clocks in March and October – these do not need to be considered or explained). Encourage children to think about *how* the changes happen – i.e. they happen gradually, and not just a sudden change at the start of each month.
* **Maths Talk:** “I think that the winter months will have the fewest hours – like January or December. And the summer months will have the most hours of daylight – like June or July.”

**Part A:**

* Looking at the information shown in Part A, ask children to consider why different places have different amounts of daylight. Consider where there’s lots of snow (i.e. further from the equator) and where people go for a sunny holiday (i.e. places closer to the equator).
* Note that it is not essential that children understand the science behind this! Emphasise though the fact that different places do have different amounts of daylight.

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| **Anticipated Student Responses** | |
| 1. January and October | 1. April and July |

**Parts B:**

* Children may not be familiar with the concept of high and low tide – it may need a brief explanation. Again, as with earlier examples, the explanation does not have to be in-depth as this isn’t the purpose of this lesson – but explaining that the sea levels go up and down approximately (but not exactly) every 6 hours.
* Give the class scenarios – e.g. you’re at Wicklow at 8 p.m. What’s happening with the tide? (High tide was half an hour ago, so the tide is now going out).

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| **Anticipated Student Responses** |
| * At Galway, the next **high tide** will be at **about** **1:30 a.m**. (Exact answer is **1:28 a.m**.) * At Wexford, the next **high tide** will be at **about** **2:30 a.m.** (Exact answer is **2:14 a.m**.) * At Wicklow, the next **high tide** will be at **about 8:30 a.m.** (Exact answer is **8:23 a.m**.) |

**Part C:**

* Listen to children’s explanations of why they agree or disagree with Blaze. Ensure they are paying attention to the times on the chart.

**Extension activity:**

* Revisit Part A and work out precisely how many hours of daylight there are for Reykjavik for each day shown, and the difference between that and Dublin on these days.

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| **Anticipated Student Responses** |
| * 1 Jan – 3 hours 25 minutes of daylight. This is **3 hours 11 minutes less than in Dublin**. * 1 Apr – 13 hours 34 minutes of daylight. This is **31 minutes more than in Dublin**. * 1 Jul – 20 hours 49 minutes of daylight. This is **3 hours 56 minutes more than in Dublin**. * 1 Oct – 11 hours 18 minutes of daylight. This is **15 minutes less than in Dublin**. |

**Lesson 2: Continue to interpret and describe information provided in timetables and schedules.**

Teaching Slides 16.2 | Student Book p. 97

**Learning Experiences and Anticipated Student Responses**

**Introduction and Part A:**

* Show the ferry schedule to the class. This may look different to other schedules they’ve seen before, so first discuss what it all means.
* Ask the class the warm-up questions as shown on the slides.

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| **Anticipated Student Responses** |
| 1. a. Pembroke and Holyhead.   b. Rosslare.  c. 50 minutes.   1. Answers will vary. Some examples could include: If you wanted to go to Pembroke, which ferry ports could you depart from? If you wanted to take the ferry to Cherbourg in the afternoon, which ferry port would you depart from? If you arrived in Dublin on a Sunday to get the ferry, where would you be going? |

**Parts B and C:**

* Introduce the next timetable, for work shifts. Again, children are unlikely to recognise this style of timetable/schedule, so give them a few minutes to look at it and work out what it’s showing.
* **Maths Talk:** “I think the moon shows a night shift and the sun shows a day shift. I think that each shift might be 12 hours long.”
* Recap on months and how many days are in different months. This leads into the question of why there are only 28 days shown – this schedule doesn’t only work for Februarys!
* **Maths Talk:** “I think it shows 28 days because they have split up time into 4-week blocks. So it won’t usually match up with months.”

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| **Anticipated Student Responses** | |
| **Part B:**   1. Night shift 2. Off 3. Day shift 4. Teams A and D are off, B is working night shift, C is working day shift 5. 2 teams (C and D) 6. Days 8, 9, 10, 19, 20, 21 | **Part C:**   1. False – e.g. Team A on Day 10 finish a day shift, and start a night shift on Day 12, which is just one day off. 2. True – each team works 14 out of the 28 days. 3. True – each team works 7 night shifts. 4. False – each team works 7 day shifts. |

**Extension activity:**

* Look again at the schedule for Parts B and C. Children can create questions to ask each other about them.
* Once they’ve written some questions, they can ask either a partner or the whole class to answer them. Listen in to the questions to ensure that they are different to those asked in Parts B and C. Pick out any particularly creative or interesting questions.

**Lesson 3: Use charts to draw conclusions about time.**

Teaching Slides 16.3 | Student Book p. 98

**Learning Experiences Anticipated and Student Responses**

**Introduction:**

* Show the pie chart to the class. If needed, recap how to read a pie chart.
* Ask the class to say what they notice. Encourage them to think about the actual information being shown, rather than other factors such as colours or layout.
* Ask the children what they think their Monday might look like on a pie chart. Click on the Polypad icon to open the pie chart in browser and zoom out to see the data. Edit the data according to how children describe their Mondays.
* Do the same as above with the bar chart Polypad on the next slide.
* Then go through the characters’ statements, asking whether they are true or false. Children should be able to read, understand and compare the information shown on the pie chart and bar chart to answer.

**Part A:**

* Display the bar chart for Simon and Amanda’s working hours.
* This is a little more complicated than the bar chart in the intro, so an explanation of how to read it may be needed (or, ask children for their understanding of what it’s showing).
* Again, ask for class suggestions of what’s being shown.

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| **Anticipated Student Responses** |
| 1. **Simon** works more hours over the week. 2. **Amanda** works on more days over the week. 3. The day of the week with the longest shift is **Thursday**. 4. The day of the week with the shortest shift is **Sunday**. 5. **Simon** has 2 days off per week. |

**Parts B:**

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| **Anticipated Student Responses** |
| 1. Sometimes. 2. Sometimes. 3. Sometimes. 4. Always. 5. Never. 6. Never. |

**Extension activity:**

* Look back at Part A and ask children to write three statements about the information in the bar chart that are false. Make sure that children keep their statements related to the data (i.e. nothing random or irrelevant!)

**Lesson 4: Use graphs and charts to draw conclusions about time.**

Teaching Slides 16.4 | Student Book p. 99

**Learning Experiences and Anticipated Student Responses**

**Introduction:**

* Share with the class the distance-time graph shown in the slides. A reminder of how to read these may be required.
* Ask the class how fast they think different ways of travelling are: for example walking, running, cycling, driving, on a train, on a plane.
* **Maths Talk:** “The graph shows how far away a person is from home. After 2 hours they were only 4.5 miles away, so this means they were probably walking.”
* Encourage children to make their own graph’s inspired by Megan’s.

**Part A:**

* This uses the same graph as in the intro.
* Some children may still struggle to understand the concept of the graph, despite attempting to make their own in at the beginning of the lesson. The graph looks mountain-shaped, so some may misread it and think it shows how far along a mountain a person has climbed.
* Reiterate that the vertical axis says “Distance from home (kilometres)” so always bear this in mind when trying to interpret the graph.
* Go through the characters’ true/false statements after Part A and ask for responses either verbally, or get them to write them down.

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| **Anticipated Student Responses** |
| 1. Megan was away from home for **4** hours. 2. The furthest distance Megan was away from home was **4.5** kilometres. 3. At 1p.m., Megan was **3** kilometres away from home. 4. On her way back, Megan was 1 kilometre away from home at **3:30** p.m. 5. At approximately **12:40** and **15:10** she was 2 kilometres away from home. 6. At 2.15p.m., Megan was approximately **3.5** kilometres away from home. |

**Part B and preceding activity:**

* Introduce a new data set – this shows winning times at cross-country cycling events at the Olympics.
* This is a great exercise in understanding the meaning of data, and spotting any potential misleading elements.
* **Maths Talk:** “The times are 30 minutes quicker, so yes the headline is correct.”, “The times are 30 minutes quicker, but it’s in a different place. Maybe some of the courses are flatter or easier to cycle.”
* There are lots of elements that could affect this type of race: terrain, weather, distance, ascent and descent, width of trail, number of competitors. Encourage children to suggest as many as they can think of.

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| **Anticipated Student Responses** |
| The approximate missing time is **01:26:02**. |

**Extension activity:**

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| **Anticipated Student Responses** |
| 1. 14 minutes 19 seconds; 2.6 km 2. 37 seconds; 0.4 km 3. 14 minutes 29 seconds; 9.1 km |

**Lesson 5: Consolidate learning.**

Student Book pp. 100–101

**Learning Experiences and Anticipated Student Responses**

**Part A, p. 100:**

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| **Anticipated Student Responses** |
| 1. June and July 2. Either of: June or July 3. Any one of: May, June, July, August, September 4. Either: July, August, September; or August, September, October 5. Any of:    * January, February & March    * February, March & April    * March, April & May    * April, May & June    * May, June & July   There are 5 possible answers |

**Part B, p. 100:**

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| **Anticipated Student Responses** |
| 1. 1 hour 25 minutes 2. 35 minutes 3. Friday 4. 15 minutes 5. Sport by 5 minutes 6. Open-ended question – answers will vary |

**Part A, p. 101:**

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| **Anticipated Student Responses** |
| 1. True 2. True 3. True 4. False 5. True 6. True |

**Part B, p. 101:**

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| **Anticipated Student Responses** |
| 1. True 2. False 3. True 4. False 5. True |