Mathematics Foundation

Practical Application

Timetabling

Year 12 Unit 3

Brief Description:

This practical application allows students to demonstrate their understanding, problem solving and reasoning in the context of constructing a weekly timetable for school. Students will need to use the mathematical thinking process throughout this assessment.\*

Syllabus Dot Points:

3.4.11 read and use various forms of more complex calendars and timetables with both   
12-hour and 24-hour time

3.4.14 use the relationship between time units to convert one unit to another; for example,   
1½ minutes = 90 seconds, 2¼ hours = 135 minutes

3.4.15 solve simple problems involving elapsed time in situations involving combinations of time units

3.4.16 communicate information (oral and written) about time using language and symbols consistent with the context.

Recommended Time:

1-2 lessons

Further Instructions:

To further support students, a timetable template, broken into 20 minute increments is provided.

\*Students should be explicitly taught the Mathematical Thinking Process in conjunction with learning of course content, not just in assessment form. Copies of MAWA classroom posters are available at <https://drive.google.com/file/d/1c3GfM1o4cSBrzyWaFFIYlAmPU3-KS-rx/view>

Timetable

You have recently begun home-schooling and you have to develop your own timetable for the school week. Your parents have agreed that your school hours will be between 9:00am and 3:20pm, Monday to Friday. They have allowed you to choose one day to either start late (9.40am) or finish early (2.40pm).

You may take two breaks each day, one for 20 minutes, and the other for 40 minutes.

The subjects and time allocations are:

|  |  |  |  |
| --- | --- | --- | --- |
| * Mathematics | 4 hours | * Physical exercise | 2 hours |
| * Science | 4 hours | * Computing/IT | 2 hours |
| * English | 4 hours | * Music | 2 hours |
| * Humanities | 4 hours | * Graphic Design | 2 hours |
|  |  | * Photography | 2 hours |

You don’t have to study every subject each day, however, there is a minimum of 40 minutes and a maximum of 80 minutes on any one subject per day.

Is it possible to create a timetable that fits all the given criteria?

***You must support your statement with mathematical reasoning and evidence.***

Your investigative report should include the following:

* An introduction restating the problem to be solved
* Clear working out for any calculations made
* A timetable showing whether the task is possible or not (you may use the given timetable template)
* Use of correct units
* A concluding summary of your findings, linking back to the original question (2-3 sentences).

Weekly Timetable

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY |
| 9:00 – 9:20 |  |  |  |  |  |
| 9:20 – 9:40 |  |  |  |  |  |
| 9:40 – 10:00 |  |  |  |  |  |
| 10:00 – 10:20 |  |  |  |  |  |
| 10:20 – 10:40 |  |  |  |  |  |
| 10:40 – 11:00 |  |  |  |  |  |
| 11:00 – 11:20 |  |  |  |  |  |
| 11:20 – 11:40 |  |  |  |  |  |
| 11:40 – 12:00 |  |  |  |  |  |
| 12:00 – 12:20 |  |  |  |  |  |
| 12:20 – 12:40 |  |  |  |  |  |
| 12:40 – 1:00 |  |  |  |  |  |
| 1:00 – 1:20 |  |  |  |  |  |
| 1:20 – 1:40 |  |  |  |  |  |
| 1:40 – 2:00 |  |  |  |  |  |
| 2:00 – 2:20 |  |  |  |  |  |
| 2:20 – 2:40 |  |  |  |  |  |
| 2:40 – 3:00 |  |  |  |  |  |
| 3:00 – 3:20 |  |  |  |  |  |

Sample Solution

|  |  |
| --- | --- |
| **Interpret the task & key information** | |
| You have recently begun home-schooling and you have to develop your own timetable for the school week. Your parents have agreed that your school hours will be between 9am and 3.20pm, Monday to Friday. They have allowed you to choose one day to either start late (9.40am) or finish early (2.40pm).  You may take two breaks each day, one for 20 minutes, and the other for 40 minutes.  The subjects and time allocations are:   |  |  |  |  | | --- | --- | --- | --- | | * Mathematics | 4 hours | * Physical exercise | 2 hours | | * Science | 4 hours | * Computing/IT | 2 hours | | * English | 4 hours | * Music | 2 hours | | * Humanities | 4 hours | * Graphic Design | 2 hours | |  |  | * Photography | 2 hours |   You don’t have to study every subject each day, however, there is a minimum of 40 minutes and a maximum of 80 minutes on any one subject per day.  Is it possible to create a timetable that fits all the given criteria?  To be able to solve this problem, I need to create a timetable that has all of the given subjects and their correct time allocations. I am going to write my subjects into the given timetable in pencil so I can move subjects around if they don’t fit. I will also be ticking each subject off as I go to make sure I don’t miss anything. | |
| **Specific behaviours** | **Marks** |
| Highlights important information | 1 |
| Restated problem in their own words | 1 |
| States at least one mathematical strategy that they may use | 1 |
| **Total** | **/3** |

|  |  |
| --- | --- |
| **Choose the mathematics & apply knowledge** | |
| The timetable is broken into 20 minute blocks so I am going to first work out how many lots of 20 minutes are for each subject.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | * Mathematics | | 4 hours (240 = 12 x 20 minutes) | | | * Physical exercise | | 2 hours (120 = 6 x 20 minutes) | | | | * Science | | 4 hours (240 = 12 x 20 minutes) | | | * Computing/IT | | 2 hours (120 = 6 x 20 minutes) | | | | * English | | 4 hours (240 = 12 x 20 minutes) | | | * Music | | 2 hours (120 = 6 x 20 minutes) | | | | * Humanities | | 4 hours (240 = 12 x 20 minutes) | | | * Graphic Design | | 2 hours (120 = 6 x 20 minutes) | | | | Break 1  Break 2 | | 20 minutes  40 minutes (2 x 20 minutes) | | | * Photography | | 2 hours (120 = 6 x 20 minutes) | | | |  | MONDAY | | TUESDAY | WEDNESDAY | | THURSDAY | | FRIDAY | | 9:00 – 9:20 | Maths | | Maths | Maths | | Maths | | English | | 9:20 – 9:40 | Maths | | Maths | Maths | | Maths | | English | | 9:40 – 10:00 | Maths | | Maths | Maths | | Maths | | English | | 10:00 – 10:20 | Phys Ed | | Phys Ed | Phys Ed | | Music | | English | | 10:20 – 10:40 | Phys Ed | | Phys Ed | Phys Ed | | Music | | HASS | | 10:40 – 11:00 | Science | | Science | Science | | Science | | HASS | | 11:00 – 11:20 | Science | | Science | Science | | Science | | HASS | | 11:20 – 11:40 | Science | | Science | Science | | Science | | HASS | | 11:40 – 12:00 | BREAK | | BREAK | BREAK | | BREAK | | BREAK | | 12:00 – 12:20 | English | | HASS | English | | HASS | | Music | | 12:20 – 12:40 | English | | HASS | English | | HASS | | Music | | 12:40 – 1:00 | English | | HASS | English | | HASS | | IT | | 1:00 – 1:20 | English | | HASS | English | | HASS | | IT | | 1:20 – 1:40 | BREAK | | BREAK | BREAK | | BREAK | | BREAK | | 1:40 – 2:00 | BREAK | | BREAK | BREAK | | BREAK | | BREAK | | 2:00 – 2:20 | Music | | IT | Graph Des. | | Photography | | IT | | 2:20 – 2:40 | Music | | IT | Graph Des. | | Photography | | IT | | 2:40 – 3:00 | Photography | | Graph Des. | Graph Des. | | Photography | | FINSH EARLY! | | 3:00 – 3:20 | Photography | | Graph Des. | Graph Des. | | Photography | |  | | |
| **Specific behaviours** | **Marks** |
| Converts hours to minutes | 1 |
| Correctly identifies how many sets of 20 minutes are required for each MESH subject | 1 |
| Correctly identifies how many sets of 20 minutes are required for each Option subject | 1 |
| Timetables 4 hours for each MESH subject | 1 |
| Timetables 2 hours for each Option subject | 1 |
| Includes the correct number of breaks | 1 |
| Finishes early or starts late on one day | 1 |
| Complies to 40 – 80 min lessons each day | 1 |
| **Total** | **/8** |

|  |  |
| --- | --- |
| **Communicate** | |
| After trying out a few combinations, I finally created a timetable that worked. It was made easier by breaking into 20 minute sections first. I managed to fit in all the MESH subjects by putting them into larger chunks, then putting in the shorter ones. I also found it easier to have my break times at the same time each day otherwise I was getting myself confused. My timetable finished early on Fridays as that’s when I’m most tired. | |
| **Specific behaviours** | **Marks** |
| Concludes that timetable is possible | 1 |
| Relates back to original information | 1 |
| Work is organised is easy to understand | 1 |
| Writes at least two sentences. | 1 |
| **Total** | **/4** |

**Sample Marking Checklist**

MTP Checklist Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- |
| **Interpret the task and key information**   * has identified key information * can rewrite problem in their own words * has identified any information that is not needed, or is missing * asked for clarification |
| **Choose the mathematics**   * identified all the mathematics required * chose an effective strategy: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Apply existing mathematical knowledge**   * followed through with their plan * showed all working (even when a mistake was made/changed their mind) * appropriate use of units applied * worked independently |
| **Interpret results**   * solutions answer the original problem * has identified what worked and what did not * has checked work by using a different method |
| **Communicate**   * work is organised allowing for partner/teacher to understand * can explain their work when asked * has written a concluding statement linking back to the original problem |
| **COMMENT:** |