

A close-up photograph of several green fern fronds, showing the intricate, feathery structure of the leaves. The fronds are vibrant green and appear to have small droplets of water on their surfaces. The background is dark and out of focus, making the ferns stand out.

RICH MATHEMATICAL TASK BOOKLET

MEASUREMENT TIME

YEAR 7 - 8
EVEN YEARS

Teacher Booklet

Task 1

Record 6 things you all do over 24 hours.

Record what time you start and finish each of these things in hours and minutes on a 24-hour clock. Record the duration of each of these things, in minutes, hours and seconds.

Now make a timeline which shows the start and finish and duration of each of these activities.

Match the start and finish time with what they would look like on an analogue clock.

Teacher Notes

Before the launch ask the students:

What can you do in

a minute?

Ten seconds?

Thirty seconds?

Five minutes?

This is a whole class activity and students should list such things as hopping (left foot, right foot), skipping, writing name, lifting heavy book up and down, blinking, clicking. Provide the opportunities for the students to note the accuracy of their estimations. Record the successful ideas on the board, in a table for each of the times.

Have digital, 24-hour clocks and analogue clocks for students to use.

Facilitate the students to notice that when measuring time we use different bases (for example, 60 seconds, minutes, 12 hours, 24 hours, 12 months, 7 days)

Expect students to represent using both 24-hour clocks and analogue clocks with accurate markings. Facilitate students to discuss how 24 hour time works. What explanations do they develop for how to convert to 24 hour time?

When discussing duration of time, how does subtraction of time work? Notice who is able to subtract time correctly. Can students make conjectures about what happens when we are adding and subtracting time vs when we are adding and subtracting using base 10? How does it differ?

For the independent task, use the task below.

Big Ideas

There are multiple ways to measure time and some units of time measurement are more appropriate than others within different contexts.

Time is displayed in different ways depending on the context.

Numbers that are used to measure time repeat themselves in a cycle.

Time measurements can be compared when they are converted into the same unit.

The magnitude of the attribute to be measured and the accuracy needed determines the appropriate measurement unit for time.

Conversion between units of time are more difficult than conversions between metric units because of the number systems used.

Shareback

Select students to share who are able to represent in multiple ways time and duration of time.

Connect

How does an analogue clock match the duration of a year? What about a 24-hour clock? What do you notice about the different durations of time we measure?

Suggested Learning Outcomes

Represent time using digital and analogue clocks

Represent time using digital and analogue language (such as quarter to)

Investigate duration of events and time between events

Explain relationships between units of time

Independent Tasks

Create a timeline for these birthdays

- 18 December 2026
- 29 October 2025
- 13 March 2026
- 17 February 2025
- 30 June 2025
- 27 June 2026
- 18 March 2025

What is the difference in time between your first date on the timeline and the mid-point date?

What is the difference in time between your first and last dates in months and days?

Curriculum Links

During Year 7

Reading, interpreting, and using timetables and charts that present information about duration

During Year 8

Estimating and measuring length, area, volume, capacity, mass (weight), temperature, time, and angle, using appropriate units

Reading, interpreting, and using timetables, charts and results that present information about duration.

Converting times to a given unit (e.g. hours and minutes to minutes)

Mathematical Language

Morning, afternoon, evening, night, day, tomorrow, yesterday, after, before, longer, shorter, equal, seconds, minutes, hours, week, month, year, decade, time, measurement, timeline, midday, midnight, noon, analogue clock, digital clock, clockwise, anticlockwise, circular numberline, circumference, intervals, quarter hour, half an hour, three quarters of an hour, duration

Anticipations

Solutions, Misconceptions

Task 2

Represent your answers on both an analogue clock and a 24-hour clock.

1. Our umukai was put down seven and a quarter hours ago. If it is 12.15 P.M now, what time was it put down? It needs another four and a half hours to finish cooking. What time will it be lifted?

2. If the umukai was put down at 4:45, what time would it be lifted if it needs 11 and a half hours to cook?

If the women started preparing all the other food for the umukai at 9:55 the previous day and finished preparing it at 18.17, how long had the preparation taken?



Teacher Notes

Have available both analogue and 24-hour clocks for students to use.

Facilitate the students to notice the need to use timelines as a way to represent time duration.

Have them recognise that when talking about time measurement and duration they use the base of 60, 24, and 12. Support them to notice how fractions of time are related, such as quarter and half an hour, and how this can be measured from any starting point, not just o'clock.

For the independent task, you will need the task below.

Shareback

Select students to share who are able to explain and justify their reasoning using appropriate representations.

Big Ideas

A clock is a circular number line - the hands move gradually around this number line.

On an analogue clock the hour hand shows the approximate time in the day and the minute hand shows a more exact time.

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Connect

How is the base different from our number system when we are using minutes and hours on an analogue clock and a 24-hour clock?

Suggested Learning Outcomes

Represent time using digital and analogue clocks

Represent time using digital and analogue language (such as quarter to)

Investigate duration of events and time between events

Explain relationships between units of time

Independent Tasks

Every year our school has a fiafia night.

If it starts at 5.45 P.M. and goes for 2 hours and 22 minutes. What time does it end?

At the school down the road their fiafia night starts at 18.55 and goes until 20.17.

Which school has a longer fiafia night?



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Anticipations

Solutions, Misconceptions

Task 3

Emilia and Freya are running in the local 5km parkrun.
Emilia crosses the start line at 8:00 am. Her time for each kilometre is:

- 1 km – 6 minutes 21 seconds
- 2 km – 6 minutes 36 seconds
- 3 km – 6 minutes 42 seconds
- 4 km – 6 minutes 30 seconds
- 5 km – 6 minutes 11 seconds

Freya started at the back of the group and crosses the start line at 8:06 am. Her time for each kilometre is:

- 1 km – 5 minutes 41 seconds
- 2 km – 5 minutes 45 seconds
- 3 km – 5 minutes 42 seconds
- 4 km – 5 minutes 46 seconds
- 5 km – 5 minutes 30 seconds

Who finished the park run first?

Teacher Notes

Before the launch facilitate a discussion about when students have seen smaller units of time being used such as swimming and running races. e.g. Charlotte swam 100m freestyle in 1:08.96 - How do you explain this time? Facilitate a discussion to explain that milliseconds are base 10 not base 60 like seconds.

For the task, encourage the students to notice the need to use timelines as a way to represent measurement of time.

Expect students to represent using timelines as a way to explain and support their reasoning.

For the independent task, use the task below.

Shareback

Select students to share who are able to explain and justify their reasoning in calculating the durations, and finish times for the two runners.

Connect

Discuss the idea of duration. For this task we needed to calculate total duration, in order to determine the completion time.

Duration can be calculated by knowing a start and finish time, for example: A swimmer starts at 2:15:30 pm and finishes at 2:17:12 pm. How long was their race?

How are milliseconds and decimal numbers linked?

Big Ideas

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During Year 8

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Suggested Learning Outcomes

- Investigate duration of events and time between events
- Explain relationships between units of time, fractions and decimals

Mathematical Language

duration,
milliseconds,

Independent Tasks

These are the race results from a Formula 1 race. How long did Lando Norris and Charles Leclerc take to complete the race?

POS.	NO.	DRIVER	TEAM	LAPS	TIME / RETIRED
1	1	 Max Verstappen	 Red Bull Racing	56	1:34:00.161
2	4	 Lando Norris	 McLaren	56	+7.959s
3	16	 Charles Leclerc	 Ferrari	56	+15.373s

Anticipations

Solutions, Misconceptions

Task 4

Losi needs to accompany her Nan to the Hastings hospital for an appointment. They are going to take the bus from Flaxmere. The closest stop is opposite 292 Flaxmere Avenue. The Hospital appointment is at 10.30 and should take about an hour. Nan has said that they can then go to Kmart at Bay Plaza as a thank you for helping out today. They will also have some lunch at Bay Plaza and then go home to Flaxmere.

Create a plan for Losi and her Nan showing where and what time they need to catch the bus at each stop and what time they will get home. Show how long they will spend at the hospital and at Bay Plaza.

Hastings Library, Eastbourne Street	Outside Hawke's Bay Hospital, Omaha Road	Opposite 10 Wilson Road	Opposite Police Station, Swansea Road	Opposite 292 Flaxmere Avenue	24 Banger Street	Opposite Service Station, Swansea Rd, Flaxmere	82 Folkstone Drive	335 Omaha Road, opposite Hawke's Bay Hospital	KFC, Hetaurangi Street	Bay Plaza, Russell St	Opposite the Warehouse, Karama Road	Hastings Library, Eastbourne Street
7:45 am	7:50 am	7:55 am	7:58 am	8:01 am	8:03 am	8:15 am	8:16 am	8:20 am	8:22 am	8:30 am	8:32 am	8:37 am
8:15 am	8:20 am	8:25 am	8:28 am	8:31 am	8:33 am	8:45 am	8:46 am	8:50 am	8:52 am	9:00 am	9:02 am	9:07 am
9:05 am	9:10 am	9:15 am	9:18 am	9:21 am	9:23 am	9:35 am	9:36 am	9:40 am	9:42 am	9:50 am	9:52 am	9:57 am
9:35 am	9:40 am	9:45 am	9:48 am	9:51 am	9:53 am	10:05 am	10:06 am	10:10 am	10:12 am	10:20 am	10:22 am	10:27 am
10:05 am	10:10 am	10:15 am	10:18 am	10:21 am	10:23 am	10:35 am	10:36 am	10:40 am	10:42 am	10:50 am	10:52 am	10:57 am
10:35 am	10:40 am	10:45 am	10:48 am	10:51 am	10:53 am	11:05 am	11:06 am	11:10 am	11:12 am	11:20 am	11:22 am	11:27 am
11:05 am	11:10 am	11:15 am	11:18 am	11:21 am	11:23 am	11:35 am	11:36 am	11:40 am	11:42 am	11:50 am	11:52 am	11:57 am
11:35 am	11:40 am	11:45 am	11:48 am	11:51 am	11:53 am	12:05 pm	12:06 pm	12:10 pm	12:12 pm	12:20 pm	12:22 pm	12:27 pm
12:05 pm	12:10 pm	12:15 pm	12:18 pm	12:21 pm	12:23 pm	12:35 pm	12:36 pm	12:40 pm	12:42 pm	12:50 pm	12:52 pm	12:57 pm
1:05 pm	1:10 pm	1:15 pm	1:18 pm	1:21 pm	1:23 pm	1:35 pm	1:36 pm	1:40 pm	1:42 pm	1:50 pm	1:52 pm	1:57 pm
1:35 pm	1:40 pm	1:45 pm	1:48 pm	1:51 pm	1:53 pm	2:05 pm	2:06 pm	2:10 pm	2:12 pm	2:20 pm	2:22 pm	2:27 pm
2:05 pm	2:10 pm	2:15 pm	2:18 pm	2:21 pm	2:23 pm	2:35 pm	2:36 pm	2:40 pm	2:42 pm	2:50 pm	2:52 pm	2:57 pm
2:35 pm	2:40 pm	2:45 pm	2:48 pm	2:51 pm	2:53 pm	3:05 pm	3:06 pm	3:10 pm	3:12 pm	3:20 pm	3:22 pm	3:27 pm

Teacher Notes

For the task, have timetables printed for students to access (see copy masters). Facilitate students to notice and record how long the bus ride take so that the appointment can be reached on time. The bus operates on a circular route so support students to notice this.

For the connect, ask students to calculate time taken for bus rides between various stops.

For the independent task, use the task below.

Shareback

Select students to share who are able to explain and justify their solutions using appropriate representations of their timeline of the days activities.

Big Ideas

A clock is a circular number line - the hands move gradually around this number line.

On an analogue clock the hour hand shows the approximate time in the day and the minute hand shows a more exact time.

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Connect

Work out how long the bus ride is between:

- Hastings Library and KFC
- Wilson Road to The Warehouse
- The Warehouse to Swansea Road

Suggested Learning Outcomes

Represent time using digital and analogue clocks

Represent time using digital and analogue language (such as quarter to)

Investigate duration of events and time between events

Explain relationships between units of time

Independent Tasks

Use your local bus timetable to plan a trip from your house.
You must include going to a movie (note - you will need a movie timetable)
Your choice of two more activities.

You will need to include the times and duration of each activity, as well as the duration of the bus rides.

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Anticipations

Solutions, Misconceptions

Task 5

What is the time difference?

1. You get up at 6.16 A.M. and you go to bed at 9.05 P.M?
2. You go to the library at 12:47 and you leave it at 13: 25?
3. You have dinner at 6.39 P.M., and you clear the table at 19:21?
4. You go to bed at a quarter to 10 and wake up at 8:01?
5. This month is November 2025. Covid began in January 2020?
6. You were born in 2012, your mother was born in 1986, and your nana was born in 1961 and great grandmother was born in 1933?
7. This is 2025. The first Olympic games were believed to have begun 2800 years?
8. The next Winter Olympics are in 2026. The first Winter Olympics were held in 1924. How many decades ago was that?
9. My family all live in New Zealand, but my grandparents left Niue to live in New Zealand 5 and a quarter decades ago?
10. Abel Tasman was the first of the European explorers to visit New Zealand. He arrived almost 3 and a half centuries ago. If we are in 2022, when did he first come to New Zealand?

Teacher Notes

Facilitate the students to notice the need to convert across different measurements to calculate different durations of time.

For the independent task, use the task below.

Have access to the link and as needed print the different ones needed in <http://newzealandwars.co.nz/land-wars-timeline/full-timeline/>

Shareback

Select students to share who are able to explain and justify their reasoning.

Big Ideas

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Connect

What time measurement conversions do you use to calculate durations of time?

Suggested Learning Outcomes

Represent time using digital and analogue clocks

Represent time using digital and analogue language (such as quarter to)

Investigate duration of events and time between events

Explain relationships between units of time

Independent Tasks

Aotearoa has a sad history shown in the Land Wars which took place in the 18th Century.

Make a timeline beginning with the first events in the Land Wars in Wairau and include in your timeline the events in the Northern War, Wellington, and Whanganui.

What was the duration of time from the first event to the last event across the timeline?

What other lengths of time can you notice across your timeline. Record at least five of these.

<http://newzealandwars.co.nz/land-wars-timeline/full-timeline/>

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Converting times to a given unit (e.g. hours and minutes to minutes)

Mathematical Language

decade, time, measurement, timeline, duration

Anticipations

Solutions, Misconceptions

Task 6

Use the Air New Zealand flight chart to plan a return trip to Tonga and back for you and your family. The distance to fly from New Zealand to Tonga is 2383 km. The flight to Tonga takes approximately 2 hours and 55 minutes. The back from Tonga takes approximately 3 hours and 15 minutes.

Choose a day to travel on and a day to return.

Make a timeline which shows in both analogue and on a 24-hour clock the flight to Tonga and the flight back to New Zealand. Include on the timeline the distance you have travelled:

The time you need to be at the Airport to check in.

The time you need to be in the departure lounge ready for boarding.

The time you would board before take-off.

The time the meal is served a quarter of the way through the flight.

The time you have to get ready for landing after you have completed 5/6 of the flight.

The landing time.

The time it takes to get through immigration and collect your luggage.

Write some statements you can make from your timeline.

Teacher Notes

Facilitate the students to notice the way most timetables use a 24-hour clock for accuracy. However, many people convert this to an analogue time and so how time is recorded depends on the context.

For the independent task, you will need the task below.

Shareback

Select students to share who are able to use a timeline representation to explain and justify their statements.

Connect

The flight time between Auckland and Tonga is approximately 2 hours 55 minutes but when I googled it, it said 2.61 hours. Are both correct? Why or why not?

Big Ideas

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Suggested Learning Outcomes

Represent time using digital and analogue language (such as quarter to)

Investigate duration of events and time between events

Explain relationships between units of time

Independent Tasks

Assessment Task

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Anticipations

Solutions, Misconceptions

Assessment Task 1 - Measurement - Time - Year 7 / 8

Calculate these time differences.

Can you give the answer in at least two different time measurements e.g. days and hours ?

1. You get up at 7.16 A.M. and you go to bed at 9.05 P.M?
2. You start playing tag a 12:47 and you stop at 13: 25?
3. You have dinner at 6.39 P.M., and you do the dishes at 19:21?
4. You go to bed at a quarter to 9 and wake up at 7:01?
5. This month is December 2025. Covid began in February 2020?
6. I was born in 2013 my nana was born in 1967 and my great grandmother was born in 1945?
7. Queen Elizabeth the 2nd died in 2022. Her predecessor Queen Elizabeth the 1st died in 1663?
8. It is February. We had our Kapa Haka competition in April last year?
9. My family all live in New Zealand but my grandparents left Samoa to live in New Zealand 3 and a quarter decades ago?
10. Abel Tasman was the first of the European explorers to visit New Zealand. He arrived almost 6 and a half centuries ago. If we are in 2025, when did he first come to New Zealand?