

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, highlighting the texture of the ferns.

RICH MATHEMATICAL TASK BOOKLET

MEASUREMENT TIME

YEAR 5-6
EVEN YEARS

Teacher Booklet

Task 1

Put each time on a timeline from AM - PM.
Convert each time to the 24hour time.



Teacher Notes

This is a whole class activity and is designed to allow you to notice the knowledge or misconceptions your students have about time.

Notice the students who can: accurately read analogue clocks, understand digital clock and convert to 24 hour times.

Facilitate the students to notice AM and PM on their clocks.

For the independent task, you will need pictures of analogue clocks or an analogue clock and long strips of paper for students to make their timelines.

Shareback

Select students who have successfully ordered the times on their timeline.

Select students who have converted their times to 24 hour Time.

If no one is able to convert to 24hour time introduce conversion as the connect.

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.

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.

Curriculum Links

Telling the time on analogue and digital clocks

Finding the duration of periods of time involving a.m. and p.m. notation and 24-hour time

Mathematical Language

analogue clock, digital clock, clockwise, anticlockwise, circular numberline, circumference, intervals, quarter hour, half an hour, three quarters of an hour, duration

Connect

Why is 24 hour time used?

When have you seen time represented in 24hour time?

Suggested Learning Outcomes

Recognise time using digital and analogue clocks

Convert time to 24-hour time.

Order times on a timeline.

Independent Tasks

How many minutes are there between each hour on an analogue clock?

Make a number line of an analogue clock which shows from 8 A.M. to 9 A.M.

Make sure you put all the markings in between. Record what the markings mean and then record the number they represent. What do you notice?

Use your timeline to show the activities you do between 8 and 9 o'clock on a school morning.

Anticipations

Solutions, Misconceptions

Task 2

With your group record 6 things you all do over a day.

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.

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

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

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

Curriculum Links

Measuring duration in both 12- and 24-hour time systems

Finding elapsed time in minutes across an hour.

Measuring duration in both 12- and 24-hour time systems

Mathematical Language

Morning, afternoon, evening, night, day, tomorrow, yesterday, after, before, longer, shorter, equal, seconds, minutes, measurement, timeline, midday, midnight, noon,

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

Investigate duration of events and time between events

Explain relationships between units of time

Independent Tasks

You and your friends are discussing your birth dates. You are born on 23 March. Jo is born on 28 March. Celia is born on 14 April. Julia is born on 7 May. Ramona is born on 17 April.

Create a timeline. Record who is youngest by how many days and months. Record who is the oldest by days and months.

Anticipations

Solutions, Misconceptions

Task 3

After school Jessica watched three television shows.

The first started at 15:12 and went for three quarters of an hour. The next went from 4:03pm and finished at 16:40 and the last one started at 5:07pm and ran for seven minutes short of an hour.

How much television did she watch?

What time did she finish watching television?

Teacher Notes

Facilitate the students to notice the need to count backwards or forwards through 12 but that with minutes in an hour we use a base of sixty but can work in groups of five, and that we use fractions as part of our groupings of time.

Shareback

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

Connect

When you work with numbers what base do we use?
When we talk about time passing what main groupings do we use?

What about when we work an analogue clock? A digital clock? Seconds in a minute? Minutes in an hour? The days of the week? The months in a year?

What do you notice? Which are easier to work with and which are more difficult.

Big Ideas

Time is displayed in different ways depending on the context.

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

Curriculum Links

Measuring duration in both 12- and 24-hour time systems

Finding elapsed time in minutes across an hour.

Mathematical Language

equal, seconds, minutes, duration

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

What is the time difference?

- You get up at 7.16 A.M. and you go to bed at 9.05 P.M?
- You start playing tag at 12:47 and you stop at 13: 25?
- You have dinner at 6.39 P.M., and you do the dishes at 19:21?
- You go to bed at a quarter to 9 and wake up at 7:01A.M?

Anticipations

Solutions, Misconceptions

Task 4

Calculate the equivalent durations and complete the table

Hours	Minutes	Seconds
4		
	75	
		600
24		
	28	

Teacher Notes

Facilitate the students to notice the relationship between, hours minutes and seconds..

Notice students who use accurate calculations between hours, minutes and seconds. Provide times table charts or calculators if needed.

For the independent task, use the task below.

Shareback

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

Connect

What is the ratio between hours, minutes and seconds.

What about days and weeks? If an event is 21 days, how many weeks is that?

Why is it hard to convert days and months accurately? i.e Is 30 days always a month?

Big Ideas

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

Curriculum Links

Converting between units of time (h, min, s)

Mathematical Language

conversion, minutes, hours seconds, ratio

Suggested Learning Outcomes

Convert times between hours, minutes and seconds.

Independent Tasks

Complete the table:

Hours	Minutes	Seconds
2		
	45	
		12,000
5		
	5	

Anticipations

Solutions, Misconceptions

Task 5

Here is a bus timetable.

You live in New Brighton and have an appointment at Burwood Hospital at 9A.M- 10A.M, decide to go to the Palms for lunch and then to Qe2 for a swim at 1:30PM, then home.

Plan out your day. Think about when you would need to leave home, what time to catch each bus. Make sure to include AM and PM to your times. Represent your day on a timeline

From New Brighton to The Palms

Monday – Friday	AM					PM						
New Brighton (Oram Ave)	6.40	7.40	8.45	9.45	10.45	11.45	12.45	1.45	2.45	3.45	4.40	5.40
Taiora QEII	6.52	7.52	8.57	9.57	10.57	11.57	12.57	1.57	2.57	3.57	4.52	5.52
Burwood Hospital	6:57	7:57	9:02	10:02	11:02	12:02	1:02	2:02	3:02	4:02	4:57	5:57
Prestons (Te Korari St)	7.05	8.06	9.09	10.09	11.09	12.09	1.09	2.09	3.10	4.10	5.05	6.04
The Palms	7.25	8.28	9.27	10.27	11.27	12.27	1.27	2.27	3.30	4.30	5.25	6.22

From The Palms to New Brighton

Monday – Friday	AM					PM						
The Palms (Marshland Rd)*	7.50	8.45	9.45	10.45	11.45	12.45	1.45	2.45	3.45	4.45	5.50	6.50
Prestons (Te Korari St)	8.04	8.58	9.58	10.58	11.58	12.58	1.58	3.00	4.00	5.00	6.05	7.03
Burwood Hospital	8.10	9.04	10.04	11.04	12.04	1.04	2.04	3.06	4.06	5.06	6.11	7.09
Taiora QEII	8.29	9.23	10.23	11.23	12.23	1.23	2.23	3.25	4.25	5.25	6.30	7.25
New Brighton	8.38	9.32	10.32	11.32	12.32	1.32	2.32	3.35	4.35	5.35	6.40	7.35

Teacher Notes

During the launch discuss the bus timetables, facilitate the students to notice that one bus goes from New Brighton to the Palms and the other in reverse.

Note: you can adjust this task to suit the context and bus timetables of your students.

As students plan out their day, notice students that are taking into consideration times to walk to the bus stop etc.

For the independent activity have local bus timetables for the students to use.

Shareback

Select students to share who have developed an accurate timetable of the day who are able to explain and justify their thinking.

Connect

Why are everyone's timelines slightly different?

Discuss the differences in elapsed time and how that impacts their timelines.

What would happen if we stayed ten minutes longer at the pool than intended?

Big Ideas

Time is displayed in different ways depending on the context.

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

Curriculum Links

Measuring duration in both 12- and 24-hour time systems

Finding elapsed time in minutes across an hour

Using and interpreting timetables to calculate the duration of events (e.g. bus and train schedules)

Mathematical Language

timetable, time, hour, minute, duration, return, timeline,

Suggested Learning Outcomes

Read and interpret a timetable

Represent elapsed times on a timeline.

Independent Tasks

Using your local bus timetable, plan out a days adventure. You must have three stops along the way. You will leave home at 9A.M and return around 3:30P.M

Represent your thinking on a timeline, remember to record the times you get on and off the bus, how long you will spend doing an activity.

Anticipations

Solutions, Misconceptions

Task 6

This is a recent timetable for the ferry crossings between Wellington and Picton.

Date	Departs	Scheduled Departure	Departure	Arrival
Fri Oct 09	Wellington Kaitaki	8:30pm	Est: 8:30pm Actual: 8:05pm	Est: 12:00am Actual: 11:50pm
Fri Oct 09	Picton Kaiahi	9:30pm	Est: 9:30pm Actual: 8:59pm	Est: 1:00am Actual: 12:41am
Sat Oct 10	Picton Kaitaki	2:30am	Est: 2:30am Actual: 2:05am	Est: 6:00am Actual: 5:49am
Sat Oct 10	Wellington Kaiahi	3:30am	Est: 3:30am Actual: 3:27am	Est: 6:57am Actual: 6:44am
Sat Oct 10	Wellington Kaitaki	8:30am	Est: 8:30am Actual: 8:18am	Est: 11:48am Actual: 11:55am
Sat Oct 10	Picton Kaiahi	9:30am	Est: 9:30am Actual: 9:04am	Est: 12:34pm Actual: 12:41pm

Frankie believes the Ferry Departing Wellington on the 10th October and 8:30AM was the quickest crossing. Do you agree? Explain and justify your reasoning.

Teacher Notes

Facilitate the students to notice the difference in the estimated times and actual departure times.

For the independent task, complete the assessment task.

Shareback

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

Connect

What estimations could we make about these ferry crossings?
I.e. the total duration of the crossing.

If the departure is at 8:30 what time would you need to arrive at the ferry terminal?

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.

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.

Curriculum Links

Measuring duration in both 12- and 24-hour time systems

Finding elapsed time in minutes across an hour

Using and interpreting timetables to calculate the duration of events (e.g. bus and train schedules)

Mathematical Language

timetable, elapsed time,

Suggested Learning Outcomes

Read and interpret a timetable.

Calculate elapsed time.

Compare time durations.



Anticipations

Solutions, Misconceptions

Assessment Task 1 - Measurement - Time - Year 5 / 6

The Class Field Trip

The bus leaves school at 9:37 am and arrives at the wildlife reserve at 11:12 am.

The students explore for 2 hours and 48 minutes, then have lunch for 35 minutes before getting back on the bus.

- a) How long was the bus trip?
 - b) What time did lunch finish?
 - c) How long were they at the wildlife reserve in total (from arrival to leaving after lunch)?
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Tournament Day

The first basketball game starts at 10:25 am and lasts 38 minutes.

The next game begins 22 minutes after the first one ends and goes for 41 minutes.

The final game begins at 1:15 pm and runs for 57 minutes.

- a) What time did the second game start and finish?
 - b) What time did the final game end?
 - c) Write all three finish times in 24-hour time.
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Family Evening Out

The family leaves home for a concert at 5:47 pm.

The drive takes 1 hour and 18 minutes, and the concert runs for 2 hours and 25 minutes.

Afterward, they spend 40 minutes at the café before driving 52 minutes home.

- a) What time did they arrive at the concert?
- b) What time did they leave the café?
- c) What time did they get home?