MEASUREMENT TIME

**YEAR 5-6
ODD YEARS**

Teacher Booklet

Task 1

What can you do in a minute? Ten seconds? Thirty seconds? Five minutes?

Work with a buddy and make a table. Record five things you think you can do for the duration of each of the times.

After you have recorded a set use a stopwatch to test out how accurate you were with your prediction. Re-record and repeat each activity until you are almost accurate with your prediction.

Teacher Notes

During the launch, have the students brainstorm everything they know about time. Begin a graffiti Time board which students add to in their independent time.

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.

Have stop watches of similar tools available. Develop a board where students record what they can do in specified lengths of time.

Facilitate the students to notice that accuracy of duration of different times can be measured using informal tools.

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 to share who have systematically developed tables which accurately illustrate informal measures of the duration of different lengths of time. Discuss predictions and how accurate they were. What were the big differences?

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.

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.

Connect

Why is it important to be able to measure accurately different durations of time without using a time measuring tool like a stopwatch?

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

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.

Curriculum Links

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

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

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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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Time is displayed in different ways depending on the context.

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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

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.

Curriculum Links

During Year 5
Describe the differences in duration between units of time (e.g., days and weeks, months, and years), and solve duration-of-time problems involving 'am' and 'pm' notation

During Year 6
Convert between units of time and solve duration-of-time problems, in both 12- and 24-hour time systems

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 3

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?

Teacher Notes

Facilitate the students to notice that using a 24-hour clock or analogue clock can both be used to measure the duration of time and both are appropriate to the context used.

Notice students who are able to work across groupings of numbers to work out minutes.

Expect students to represent using a range of different time measurement tools.

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.

Connect

What do you notice about measuring the duration of time using an analogue clock and a 24-hour clock? What is the same? What is different?

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

Record 6 things you all do over a weekend.

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.

Mathematical Language

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Anticipations

Solutions, Misconceptions

Task 4

After school Jessica watched three television shows.

The first started at 3:12 and went for three quarters of an hour. The next went from 4:03 and finished at 4:40 and the last one started at 5:07 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.

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

Record everything that you notice about measuring the duration of time using an analogue clock and a 24-hour clock? What is the same? What is different?

List 8 things you do over a week. What time does each event start and finish. How long do they last? Record your reasoning using a digital and an analogue clock.

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Anticipations

Solutions, Misconceptions

Task 5

Louise has a watch that loses two minutes every hour. Pania has a watch that gains one minute every hour.

They both set their watches by the radio at 6 A.M. Then they both set off on a family holiday. They arrive at the family holiday at the same time, and they notice that their watches are 10 minutes apart.

At what time (real time) did they arrive at the family holiday?

Teacher Notes

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

Notice students who use accurate intervals for measuring duration 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 using comparative representations.

Connect

What did you notice about how representations supported you to explain and justify your reasoning?
When we measure time we usually represent it using timelines?
Is this true for all measures of time including years and hundreds of years?

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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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Suggested Learning Outcomes

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Independent Tasks

After school Manu played three different PlayStation games.

He started playing the first one at 3:12 and played for three quarters of an hour. He started the second game at 4:03 and finished at 4:40. He started playing the final game at 5:07 and ran for 6 minutes short of an hour.
How much time did he spend playing games?
What time did he finish playing games?

Anticipations

Solutions, Misconceptions

Task 6

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.

Teacher Notes

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

Facilitate the students to notice the use of Timelines to measure over time historical facts and the use of the terms decades and centuries to measure years and combinations of years.

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

Shareback

Select students to share who have developed an evenly spaced out representation of a timeline and are able to use it to explain and justify their reasoning.

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Connect

When measuring time in years we often talk about decades and centuries. What decade are we in now? What century are we in? Use your timeline to identify the decade and century an event occurred.

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

Aunty wears a watch that loses two minutes every hour. Rena has a watch that gains one minute every hour.

They both set their watches by the radio at 6 A.M. Then they both set off on a family holiday. They arrive at the family holiday at the same time, and they notice that their watches are 10 minutes apart.

At what time (real time) did they arrive at the family holiday?

During Year 5
Describe the differences in duration between units of time (e.g., days and weeks, months, and years), and solve duration-of-time problems involving 'am' and 'pm' notation

During Year 6
Convert between units of time and solve duration-of-time problems, in both 12- and 24-hour time systems

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Anticipations

Solutions, Misconceptions

Task 7

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.

Big Ideas

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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?

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

When measuring time in years we talk about decades and centuries. What decade are we in now? What century are we in? Use your timeline to identify the decade and century an event occurred.

Mathematical Language

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Anticipations

Solutions, Misconceptions

Task 8

What is the time difference?
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 1957 and my great grandmother was born in 1925?
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?

Teacher Notes

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

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

Shareback

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

Connect

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

Big Ideas

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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?
1. You get up at 6.13 A.M. and you go to bed at 8.05 P.M?
2. You start playing football at 11:38 and you stop at 12: 25?
3. You have dinner at 6.12 P.M., and you do the dishes at 19:21?
4. You go to bed at 8:25 pm and wake up at 7:01am?
5. This month is November 2025. Covid began in February 2020?
6. I was born in 2014 my nana was born in 1955 and my great grandmother was born in 1927?

Mathematical Language

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Anticipations

Solutions, Misconceptions

Task 9

Is Strickland, right?

He says that if the time has a 4 in it, it must be 4 o'clock in the afternoon.

Don agrees with him, and he says he has a way of proving it. What might he say?

Generosa disagrees with him, and she says she can give lots of times it might also be. What times might she use to justify her disagreement?

Teacher Notes

Facilitate the students to notice the pattern of numbers used to describe seconds, minutes and hours.

Monitor for students using vocabulary which supports their explanations and justification including the use of because.

For the independent task, you need the task below.

Shareback

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

Connect

What are all the possible numbers we might see on an analogue 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

Maria has dance class at 4.15pm every Wednesday. She takes 17 minutes to walk to class from home. What time must she leave home to get to dance class?

George runs around the block 3 times every evening. The first lap takes him 9 minutes. The second lap takes him 11 minutes. The final lap takes him 15 minutes. How much time does it take for George to complete his 3 laps?

Anticipations

Solutions, Misconceptions

Task 10

Villiami and Tevita live in different villages.

 Both villages are 9 kilometres away from the nearest market.

Villiami rides his bike at 6 kilometres per hour and Tevita rides his at 4 kilometres an hour.
They both want to arrive at the market at exactly noon.
What time should each of them start riding?

Teacher Notes

Facilitate the students to notice how time distance and speed are connected. Ratios can be represented on a double number line such as the one below and this can be modelled during the connect to support conceptual understanding. Begin by marking the whole hours and corresponding km. Then find half hours and for Tevita's travel time find
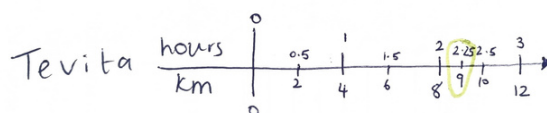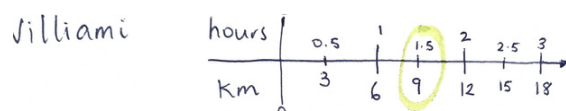
Notice students who need support to convert 1.5 hours in 1 hour 30 minutes rather than 1 hour 50 minutes and 2.25 hours into 2 hours 15 minutes rather than 2 hours 25 minutes, and who is able to subtract this from 12.00 to find each persons starting time.

Shareback

Select students to share who have developed explanations and are able to justify their mathematical reasoning using a representation.

Connect

Change the speeds and / or distances to practice calculating time taken to travel.

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

Complete the following assessment task (attached at the end of the document) as the independent activity:

Assessment Task 1: Time problems

Mathematical Language

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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)?

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.

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?