Time to the Minute on Digital and Analog Clocks.

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Differentiate and Assess

Not every student will be ready to investigate this concept at this Level and so we will need to differentiate to ensure every student is learning at their leading edge. Select the Differentiate button on this screen.

Integrate

Every mathematical concept is integrally related to other mathematical concepts. Teaching and learning related concepts simultaneously develops deep relational understanding. Select the Integrate button on this screen.

Intervene

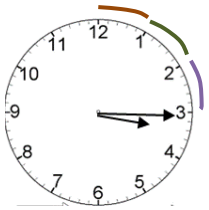
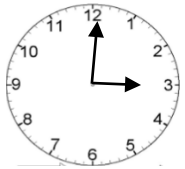
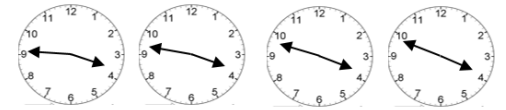
Some students may not yet be ready to investigate this concept at any Level, and so we will need to provide some intervention. Select the Intervention button on this screen.

TIME TO THE MINUTE ON DIGITAL AND ANALOG CLOCKS.

EXPLICIT TEACHING PLAN OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE EXPLICIT TEACHING PLAN, INCLUDING STRATEGIC QUESTIONS, AND DESRIBING THE SEQUENCE WHICH WILL OCCUR OVER MULTIPLE LESSONS.

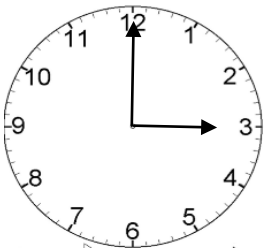
RESOURCES: MECHANICAL ANALOG CLOCKS WITH MINUTES MARKED WHERE THE HANDS MOVE IN SYNC, DIGITAL CLOCKS, PENCIL, PAPER

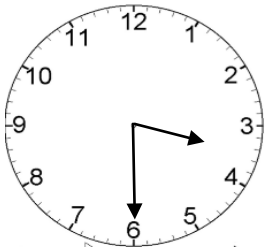
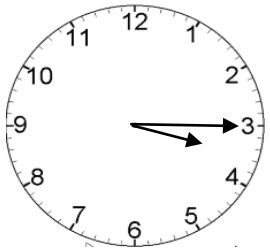
WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
Children: • explain the number of minutes in an hour, quarter of an hour, and in each section between the numbers on an analog clock, for example,  • tell time at 1 minute past the hour, for example,  3:01 • tell time at 2, 3, 4 and 5 minutes past the hour, for example,  3:02 3:03 3:04 • tell time at 14 minutes to the hour / 46 minutes past the hour  3:46 3:47 3:48 3:49 • identify that each time occurs twice a day.	Children • ask one another questions about telling time to the minute, for example: ▸ How many minutes in an hour? ▸ How many minutes in quarter of an hour? ▸ How many minutes between numbers on a clock? ▸ How could we record 1 minute past 3 on an analog clock? ▸ How could we record 1 minute past 3 on a digital clock? ▸ How could we record 2 / 3 / 4 minutes past 3 on an analog clock? ▸ How could we record 2 / 3 / 4 minutes past 3 on a digital clock? ▸ How could we record 14 / 13 / 12 / 11 minutes to 4 on an analog clock? ▸ How could we record 46 / 47 / 48 / 49 minutes past 3 on a digital clock?

TIME TO THE MINUTE ON DIGITAL AND ANALOG CLOCKS.

EXPLICIT TEACHING PLAN

FULL EXPLICIT TEACHING PLAN, EMBEDDING DEEP RELATIONAL UNDERSTANDING, METALANGUAGE, AND QUESTIONS THAT MAY BE USED OVER MULTIPLE LESSONS.

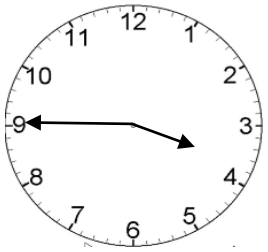
WHAT COULD WE DO?	WHAT LANGUAGE COULD WE USE TO EXPLAIN AND ASK QUESTIONS?
Children think about, talk and listen to a friend about, then have the opportunity to share what they already know.	▸ Today brings an investigation about telling time. ▸ What do you know about telling time? ▸ Talk about telling time with a friend. ▸ Is anyone ready to share what they are thinking about telling?
Children draw an analog clock without seeing one to develop their capacity to visualise it. Children describe the numbers, and the position of the numbers on their clock.	▸ How could you draw an analog clock? ▸ What can you tell me about this clock? ▸ Where are the numbers on an analog clock? ▸ Are the numbers always in the same places?
Distribute analog clocks with hands that move in sync to children. Children show 3 o'clock on their clock, for example, 	▸ We've investigated telling time at o'clock on an analog clock and on a digital clock. ▸ We found that on an analog clock, the hour hand counts the hours. ▸ We found that on an analog clock, the minute hand counts the minutes. ▸ And when the minute hand is on 12, we have zero minutes. ▸ So at 3 o'clock, the hour hand is on the 3 because we have 3 hours, and the minute hand is on the 12 because we have zero minutes.

Children record 3 o'clock on a digital clock, for example, 3:00	▸ We found that on a digital clock, the first number counts the hours. ▸ And the second number counts the minutes. ▸ So 3 o'clock on a digital clock is 3:00 because we have 3 hours and zero minutes.
Children show half past 3 on their clock, for example, 	▸ We've investigated telling time at half past on an analog clock and on a digital clock. ▸ We found that the hour hand moves half way between the numbers. ▸ We found that the minute moves half way around the clock. ▸ So at half past 3, the hour hand is halfway between 3 and 4 because we have 3 and a half hours, and the minute hand is on the 6 because the 6 is half way around the clock.
Children record half past 3 on a digital clock, for example, 3:30	▸ We found that on a digital clock, the first number counts the hours. ▸ And the second number counts the minutes. ▸ Because there are 60 minutes in an hour, there are 30 minutes in half an hour. ▸ So half past 3 on a digital clock is 3:30 because we have 3 hours and 30 minutes.
Children show quarter past 3 on their clock, for example, 	▸ We've investigated telling time at quarter past on an analog clock and on a digital clock. ▸ We found that the hour hand moves a quarter of the way between the numbers. ▸ We found that the minute moves a quarter of the way around the clock. ▸ So at quarter past 3, the hour hand is a quarter of the way between 3 and 4 because we have 3 and a quarter hours, and the minute hand is on the 3 because the 3 is a quarter of the way around the clock.
	▸ We found that on a digital clock, the first number counts the hours. ▸ And the second number counts the minutes.

Children record half past 3 on a digital clock, for example, 3:15

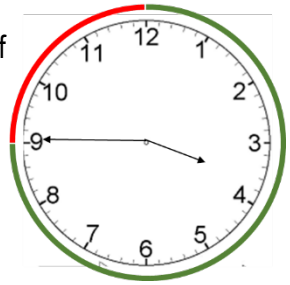
- Because there are 60 minutes in an hour, there are 15 minutes in quarter of an hour.
- So quarter past 3 on a digital clock is 3:15 because we have 3 hours and 15 minutes.

Children show quarter to 4 on their clock, for example,



- We've investigated telling time at quarter to on an analog clock and on a digital clock.
- We found that when the minute hand has moved more than half way around an analog clock, we count the minutes to the next hour.
- We found that when the minute hand has moved three-quarters of the way around the clock, it has one more quarter to move to get to the next hour.
- We found that the minute moves three- quarters of the way around the clock.
- And we found that the minute hand has 1 more quarter to move around the clock.
- So at quarter to 4, it is also three-quarters past 3.
- At quarter to 4, the hour hand is a three-quarters of the way between 3 and 4 because we have 3 and three-quarter hours, and the minute hand is on the 9 because the 3 is a quarter of the way around the clock.
- We found that on a digital clock, the first number counts the hours.
- And the second number counts the minutes.
- A digital clock can only count the minutes past the hour.
- A digital clock cannot count the minutes to an hour.
- Because there are 60 minutes in an hour, and there are 15 minutes in quarter of an hour, there are 45 minutes in three-quarters of an hour.
- So quarter to 4 on a digital clock is 3:45 because we have 3 hours and 45 minutes.

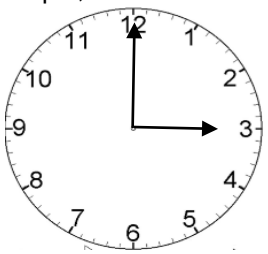
Children point to the hand that has moved three-quarters of the way around the clock, and the one-quarter of the clock that the hand has left to move to get to the next hour, for example,



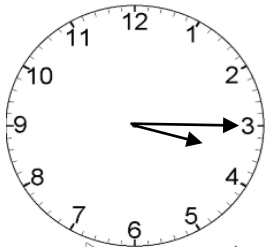
Children record half past 3 on a digital clock, for example, 3:45

Display an analog and a digital clock showing 3 o'clock, for example,

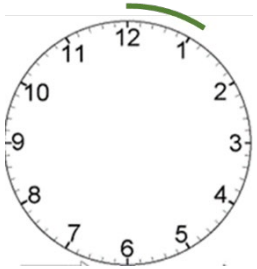
3:00



Move the minute hand on the analog clock to quarter past 3, for example,



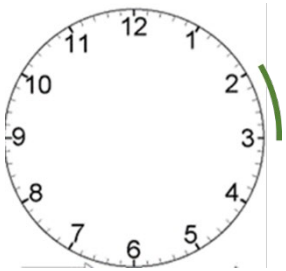
Point to the sections, for example,



- Today we're going to investigate telling time to the minute.
- How many minutes does it take for the minute hand to travel all of the way around the clock?
- Does it take 60 minutes for the minute hand to travel around the clock?
- How many minutes in 1 hour?
- Are there 60 minutes in an hour?

- How far does the hour hand move in 1 hour?
- Does the hour hand from one number to the next?
- Do the numbers count the hours?
- So if the numbers count the hours, how do we count the minutes on an analog clock?
- We know that when the minute hand has moved a quarter of the clock, 15 minutes has passed.
- So how many minutes has passed when the minute hand moves from one number to the next number?
- Are the numbers dividing the clock into sections?
- How many sections has the minute hand passed on its way to quarter past?
- Has the minute hand passed 3 sections?
- Has the minute hand passed 15 minutes?
- If there are 15 minutes in 3 sections, how many minutes in 1 section?
- Is 1 section 5 minutes?
- So if the minute hand moves from the 12 to the 1, how many minutes have passed?
- Have 5 minutes passed?

- If the minute hand moves from the 1 to the 2, how many minutes have passed?
- Have 5 minutes passed?

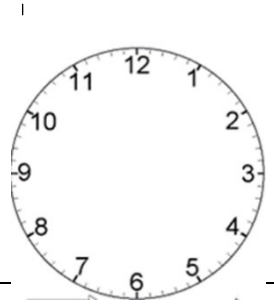


- If the minute hand moves from the 2 to the 3, how many minutes have passed?
- Have 5 minutes passed?

- If the minute hand moves from the 4 to the 5, how many minutes have passed?
- Have 5 minutes passed?

- If the minute hand moves from the 10 to the 11, how many minutes have passed?
- Have 5 minutes passed?

Point to where the space between the numbers is divided into 5 equal parts, for example,



- Does 5 minutes pass as the minute hand moves from every number to the next number?

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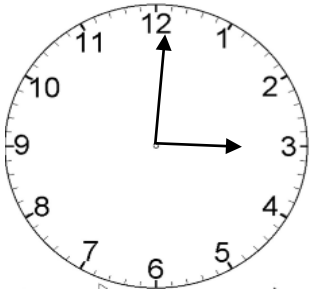
Move the minute hand one-fifth of the way from the 12 to the 1 and observe the hour hand move one-sixtieth of the way from the 3 to the 4, for example,

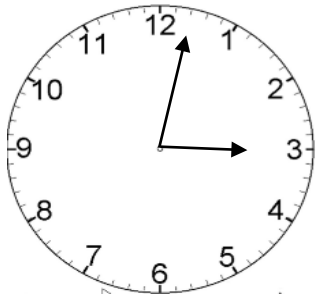


Record a digital clock showing 1 minute past 3, for example,

3:01

- So the minute hand moves 5 minutes when it moves from one number to the next.
- How far does the minute hand travel in one minute?
- Could we divide the space between the numbers into 5 equal parts?
- Sometimes clocks do this for us. Sometimes we have to do it ourselves.
- Where would the minute hand be at 1 minute past 3?
- If the minute hand moves five minutes when it moves from the 12 to the 1, in 1 minute will the minute hand move one-fifth of the way from 12 to 1?
- Where will the hour hand be at 1 minute past 3?
- If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move one-sixtieth of the way between the 3 and the 4 in one minute?
- How would we record 1 minute past 3 on a digital clock?
- How many hours do we have?
- Do we have 3 hours?
- How many minutes do we have?
- Do we have 1 minute?
- Let's record that we have 3 hours and 1 minute.

Move the minute hand two-fifths of the way from the 12 to the 1 and observe the hour hand move two-sixtieths of the way from the 3 to the 4, for example,



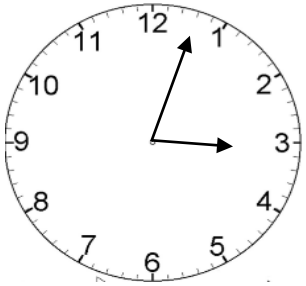
- Where would the minute hand be at 2 minutes past 3?
- If the minute hand moves five minutes when it moves from the 12 to the 1, in 2 minutes will the minute hand move two-fifths of the way from 12 to 1?
- Where will the hour hand be at 2 minute past 3?
- If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move two-sixtieths of the way between the 3 and the 4 in two minutes?

Record a digital clock showing 2 minutes past 3, for example,

3:02

- How would we record 2 minute past 3 on a digital clock?
- How many hours do we have?
- Do we have 3 hours?
- How many minutes do we have?
- Do we have 2 minutes?
- Let's record that we have 3 hours and 2 minutes.

Move the minute hand three-fifths of the way from the 12 to the 1 and observe the hour hand move three-sixtieths of the way from the 3 to the 4, for example,



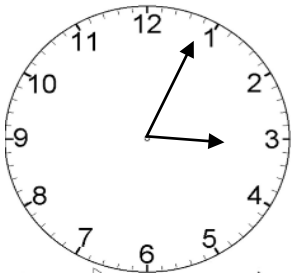
- Where would the minute hand be at 3 minutes past 3?
- If the minute hand moves five minutes when it moves from the 12 to the 1, in 3 minutes will the minute hand move three-fifths of the way from 12 to 1?
- Where will the hour hand be at 3 minute past 3?
- If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move three-sixtieths of the way between the 3 and the 4 in three minutes?
- How would we record 3 minute past 3 on a digital clock?
- How many hours do we have?

Record a digital clock showing 3 minutes past 3, for example,

3:03

- Do we have 3 hours?
- How many minutes do we have?
- Do we have 3 minutes?
- Let's record that we have 3 hours and 3 minutes.

Move the minute hand four-fifths of the way from the 12 to the 1 and observe the hour hand move four-sixtieths of the way from the 3 to the 4, for example,

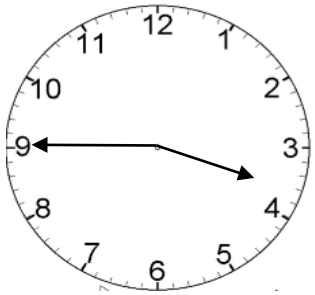


- Where would the minute hand be at 4 minutes past 3?
- If the minute hand moves five minutes when it moves from the 12 to the 1, in 4 minutes will the minute hand move four-fifths of the way from 12 to 1?
- Where will the hour hand be at 4 minute past 3?
- If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move four-sixtieths of the way between the 3 and the 4 in four minutes?
- How would we record 4 minute past 3 on a digital clock?
- How many hours do we have?
- Do we have 3 hours?
- How many minutes do we have?
- Do we have 4 minutes?
- Let's record that we have 3 hours and 4 minutes.

Record a digital clock showing 4 minutes past 3, for example,

3:04

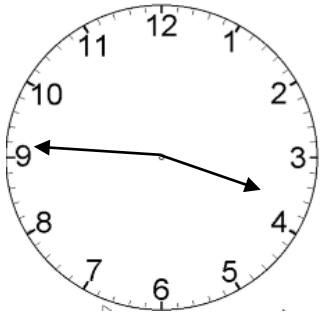
Display an analog clock showing quarter to 4, for example,



Record a digital clock showing quarter to 4, for example,

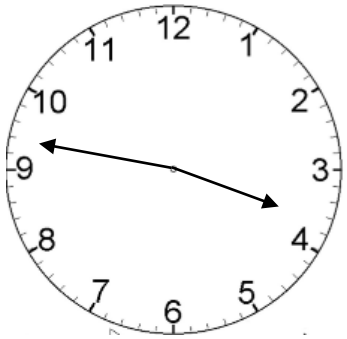
3:45

Move the minute hand one-fifth of the way from the 9 to the 10 and observe the hour hand move one more sixtieth of the way from the 3 to the 4, for example,



- **Let's investigate telling some other times to the minute.**
- What time is the clock showing?
- Is the clock showing quarter to 4?
- Has the minute hand moved three-quarters of the way around the clock?
- Does the minute hand have one-quarter of the clock left to move to get back to the 12?
- Has the hour hand moved three-quarters of the way from the 3 to the 4?
- Does the hour hand have one-quarter of the way left to move to the 4?
- How do we record quarter to 4 on a digital clock?
- How many hours do we have?
- Do we have 3 hours?
- How many minutes do we have?
- Do we have 45 minutes?

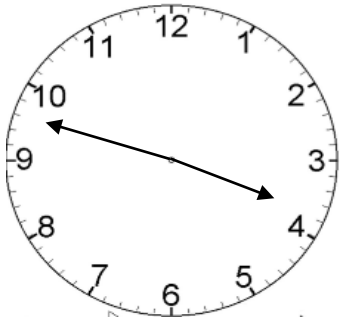
- Where would the minute hand be at 46 minutes past 3?
- If the minute hand moves five minutes when it moves from the 9 to the 10, in 1 minute will the minute hand move one-fifth of the way from 9 to 10?
- Where will the hour hand be at 46 minutes past 3?
- If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move one more sixtieth of the way between the 3 and the 4 in forty-six minutes?
- When the minute hand has moved more than half way around an analog clock, we count the minutes to the next hour.
- When the minute hand has moved 46 minutes around the clock, how many minutes does it have to move to get to the next hour?
- If there are 60 minutes in an hour, and the minute hand has moved 46 minutes,

Record, for example, 60 – 46 = <u>14</u> and 46 + <u>14</u> = 60	how many minutes does It have left to move? ▸ Does the minute hand need to move another 14 minutes? ▸ Are there 14 minutes to the next hour? ▸ Is 46 minutes past 3, 14 minutes to 4? ▸ How do we record 46 minutes past 3 on a digital clock? ▸ How many hours do we have? ▸ Do we have 3 hours? ▸ How many minutes do we have? ▸ Do we have 46 minutes?
Record a digital clock showing 46 minutes past 3, for example, 3:46	
Move the minute hand two-fifths of the way from the 9 to the 10 and observe the hour hand move one more sixtieth of the way from the 3 to the 4, for example, 	▸ Where would the minute hand be at 47 minutes past 3? ▸ If the minute hand moves five minutes when it moves from the 9 to the 10, in 2 minutes will the minute hand move two-fifths of the way from 9 to 10? ▸ Where will the hour hand be at 47 minutes past 3? ▸ If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move one more sixtieth of the way between the 3 and the 4 in forty-seven minutes? ▸ When the minute hand has moved more than half way around an analog clock, we count the minutes to the next hour. ▸ When the minute hand has moved 47 minutes around the clock, how many minutes does it have to move to get to the next hour? ▸ If there are 60 minutes in an hour, and the minute hand has moved 47 minutes, how many minutes does It have left to move?

Record, for example, 60 – 47 = 13 and 47 + 13 = 60

Record a digital clock showing 47 minutes past 3, for example, 3:47

Move the minute hand three-fifths of the way from the 9 to the 10 and observe the hour hand move one more sixtieth of the way from the 3 to the 4, for example,



- Does the minute hand need to move another 13 minutes?
- Are there 13 minutes to the next hour?
- Is 47 minutes past 3, 13 minutes to 4?
- How do we record 47 minutes past 3 on a digital clock?
- How many hours do we have?
- Do we have 3 hours?
- How many minutes do we have?
- Do we have 47 minutes?

- Where would the minute hand be at 48 minutes past 3?
- If the minute hand moves five minutes when it moves from the 9 to the 10, in 3 minutes will the minute hand move three-fifths of the way from 9 to 10?
- Where will the hour hand be at 48 minutes past 3?
- If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move one more sixtieth of the way between the 3 and the 4 in forty-eight minutes?
- When the minute hand has moved more than half way around an analog clock, we count the minutes to the next hour.
- When the minute hand has moved 48 minutes around the clock, how many minutes does it have to move to get to the next hour?
- If there are 60 minutes in an hour, and the minute hand has moved 48 minutes, how many minutes does It have left to move?
- Does the minute hand need to move another 12 minutes?

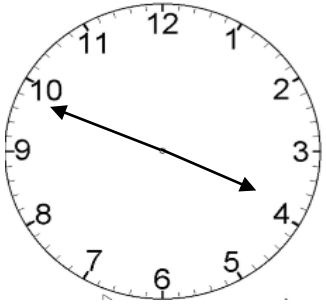
Record, for example, 60 – 48 = 12 and 48 + 12 = 60

- Are there 12 minutes to the next hour?
- Is 48 minutes past 3, 12 minutes to 4?
- How do we record 48 minutes past 3 on a digital clock?
- How many hours do we have?
- Do we have 3 hours?
- How many minutes do we have?
- Do we have 48 minutes?

Record a digital clock showing 48 minutes past 3, for example, 3:48

- Where would the minute hand be at 49 minutes past 3?
- If the minute hand moves five minutes when it moves from the 9 to the 10, in 4 minutes will the minute hand move four-fifths of the way from 9 to 10?

Move the minute hand four-fifths of the way from the 9 to the 10 and observe the hour hand move one more sixtieth of the way from the 3 to the 4, for example,



- Where will the hour hand be at 49 minutes past 3?
- If the hour hand moves sixty minutes when it moves from the 3 to the 4, will the hour hand move one more sixtieth of the way between the 3 and the 4 in forty-nine minutes?
- When the minute hand has moved more than half way around an analog clock, we count the minutes to the next hour.
- When the minute hand has moved 49 minutes around the clock, how many minutes does it have to move to get to the next hour?
- If there are 60 minutes in an hour, and the minute hand has moved 49 minutes, how many minutes does It have left to move?
- Does the minute hand need to move another 11 minutes?
- Are there 11 minutes to the next hour?
- Is 49 minutes past 3, 11 minutes to 4?

Record, for example, 60 – 49 = 11 and 49 + 11 = 60	▸ How do we record 49 minutes past 3 on a digital clock? ▸ How many hours do we have? ▸ Do we have 3 hours? ▸ How many minutes do we have? ▸ Do we have 49 minutes?
Record a digital clock showing 49 minutes past 3, for example, 	▸ Have you ever noticed that each time happens twice each day? ▸ There is a 4 minutes past 3 in the morning. ▸ And a 4 minutes past 3 in the afternoon. ▸ What would you be doing at 4 minutes past 3 in the morning? ▸ Would you be sleeping? ▸ What would you be doing at 4 minutes past 3 in the afternoon? ▸ Would you be going home from school?