Measurement and Geometry: Units of Measurement:
Time Problems Reasoning - Fitness Challenge

Australian Curriculum

This lesson plan could be used to support the teaching and learning of the following Content Descriptions from the Australian Curriculum.

Y5: Measurement and Geometry, Using Units of Measurement

Compare 12- and 24-hour time systems and convert between them (ACMMG110)

Child-Friendly Aim:	**Success Criteria:**	**Resources:**
To solve reasoning questions involving time conversion problems.	I can break down complex problems into smaller steps. I can use mathematical language to explain solutions to problems.	Lesson Pack
	Key/New Words: Time, convert, days, hours, minutes, seconds.	**Preparation:** Differentiated Time Problems Reasoning Fitness Challenge Activity Sheets – one per child

Prior Learning: It will be helpful if children know the correlation between units of time, e.g. how many minutes in an hour, how many hours in a day.

Learning Sequence

	**Guided Maths Question 1:** Use the step-by-step slides on the Lesson Presentation to model how to answer a reasoning question based on solving problems involving the conversion of time units (hours and minutes).	
	**Partner Maths Question 1:** The children work in partners to apply the previous teacher modelling to a similar question displayed on the Lesson Presentation, discussing their reasoning. Answer included.	
	**Guided Maths Question 2:** Use the step-by-step slides on the Lesson Presentation to model how to answer a second reasoning question based on solving problems involving the conversion of time units (hours, minutes and seconds).	
	**Partner Maths Question 2:** The children work in partners to apply the previous teacher modelling to a similar question displayed on the Lesson Presentation discussing their reasoning. Answer included.	
	**Guided Maths Question 3:** Use the step-by-step slides on the Lesson Presentation to model how to answer a third reasoning question based on solving problems involving the conversion of time units (days and hours).	
	**Partner Maths Question 3:** The children work in partners to apply the previous teacher modelling to a similar question displayed on the Lesson Presentation, discussing their reasoning. Answer included.	
	**Reasoning Practice:** Children complete the Time Problems Reasoning Fitness Challenge Activity Sheets to show that they can solve reasoning questions involving the conversion of time units. Can children solve reasoning questions involving time conversion problems?	
	**Reasoning Practice Answers:** Use the slides on the to discuss the answers to the independent activity questions and self-assess.	

Mathematics

Measurement and Geometry

Time Problems Reasoning - Fitness Challenge

Aim

- To solve reasoning questions involving time conversion problems.

Success Criteria

- I can break down complex problems into smaller steps.
- I can use mathematical language to explain solutions to problems.

Guided Maths Question 1

Read this reasoning question carefully.

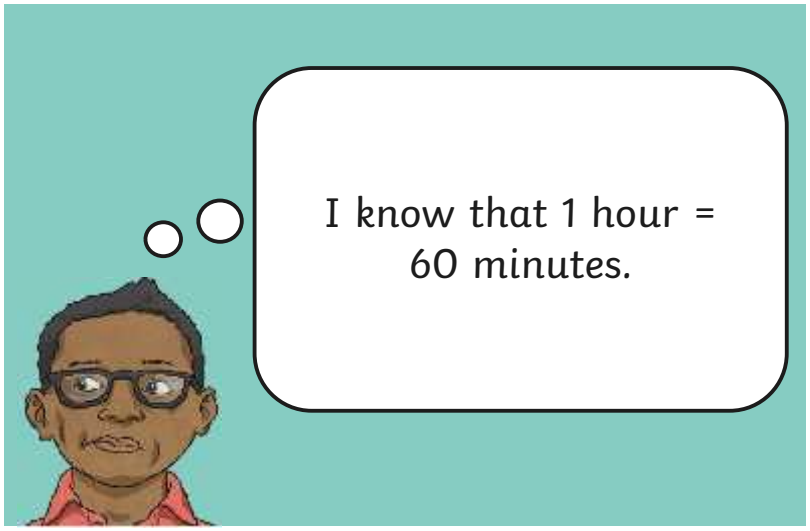
Two friends have been cycle training for a week. Sam has counted the time he trained for in minutes and Harjinder has counted her time in hours and minutes.

Sam completed 570 minutes in the week. Harjinder did 9 hours 45 minutes. Who trained for the longest time and for how much longer?

Let's highlight the important information and key vocabulary to show we understand the question.

Guided Maths Question 1

Next, let's think about what we **already know** in order to help us answer the question correctly.

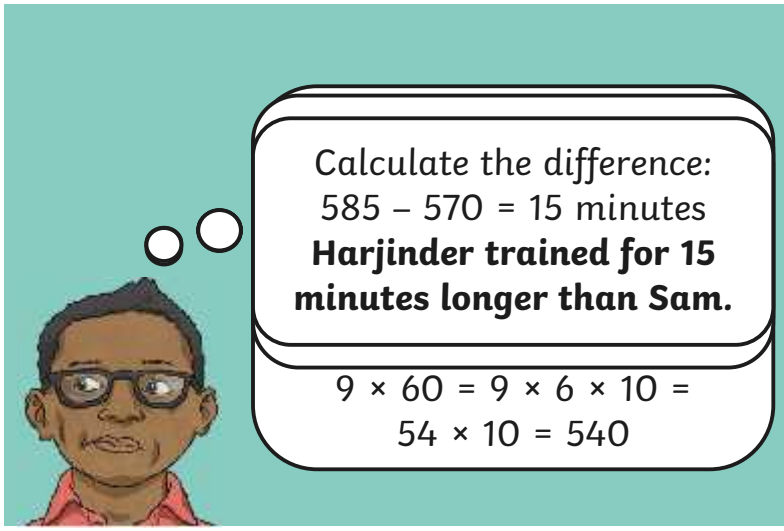


Two friends have been cycle training for a week. Sam has counted the time he trained for in minutes and Harjinder has counted her time in hours and minutes.

Sam completed 570 minutes in the week. Harjinder did 9 hours 45 minutes. Who trained for the longest time and for how much longer?

Guided Maths Question 1

We are now ready to **apply our learning** to solve the question.

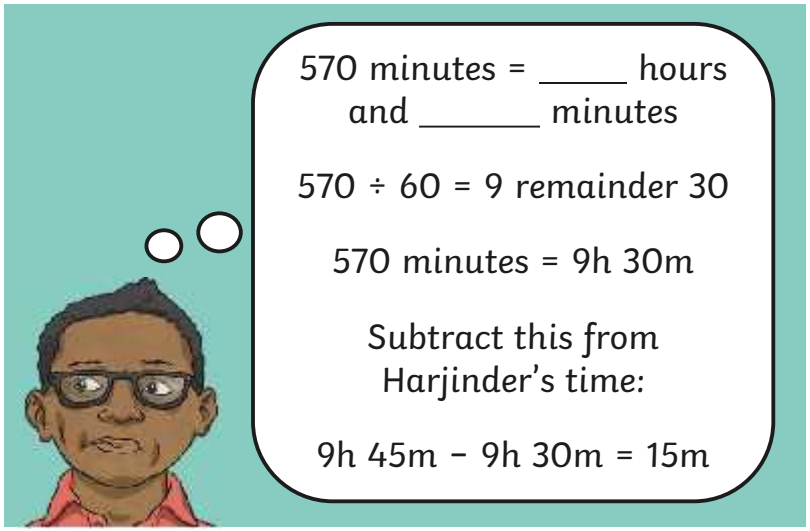


Two friends have been cycle training for a week. Sam has counted the time he trained for in minutes and Harjinder has counted her time in hours and minutes.

Sam completed 570 minutes in the week. Harjinder did 9 hours 45 minutes. Who trained for the longest time and for how much longer?

Guided Maths Question 1

Let's check our answers by changing Sam's time into hours and minutes.



570 minutes = _____ hours and _____ minutes

570 ÷ 60 = 9 remainder 30

570 minutes = 9h 30m

Subtract this from Harjinder's time:

9h 45m – 9h 30m = 15m

Two friends have been cycle training for a week. Sam has counted the time he trained for in minutes and Harjinder has counted her time in hours and minutes.

Sam completed 570 minutes in the week. Harjinder did 9 hours 45 minutes. Who trained for the longest time and for how much longer?

Answer:

Harjinder trained for the longest time, for 15 minutes longer than Sam.

Partner Maths Question 1

Working with a partner, use your reasoning skills to answer this question.

Three friends are trying to improve their fitness. This is how long they walked for on each of the 5 days:

	Day 1	Day 2	Day 3	Day 4	Day 5
Freddy	1h 15m	65m	110m	2h 15m	1h 45m
Lucien	80m	1h 50m	1h 35m	210m	35m
Thalia	1h 25m	40m	1h 45m	220m	175m

Who completed the most training and how much longer than the other two friends did she or he walk for? Write your answer in hours and minutes.

Thalia walked for the longest time. She walked for 2 hours 15 minutes more than Freddy and 1 hour 35 minutes more than Lucien.

Guided Maths Question 2

Working with a partner, use your reasoning skills to answer this question.

Carter is timing how long it takes to run a 20km race.
Here is the time it took him on a stopwatch:

Carter says it took more than 20 000 seconds. Is he right?

Let's highlight the important information and key vocabulary to show we understand the question.

Guided Maths Question 2

Next, let's think about what we **already know** in order to help us answer the question correctly.

On a stopwatch, the first number before the first colon shows the hours (04).

The middle number after the first colon shows the minutes (35).

The last number after the second colon shows the seconds (26).

The small numbers represent hundredths of seconds.

Carter is timing how long it takes to run a 20km race.
Here is the time it took him on a stopwatch:

04:35:26$_{00}$

Carter says it took more than 20 000 seconds. Is he right?

Guided Maths Question 2

We are now ready to **apply our learning** to solve the question.

First, change the hours to minutes:
4 × 60 = 240 minutes

Next, change this to seconds:
240 × 60 = 14 400 seconds

Next, change the minutes to seconds:
35 × 60 = 2100 seconds

Now, add these two amounts and the extra 26 seconds together:
14 400 + 2100 + 26 = 16 526 seconds

16 526 seconds have passed since the stopwatch started.

This is less than 20 000 seconds so Carter is incorrect.

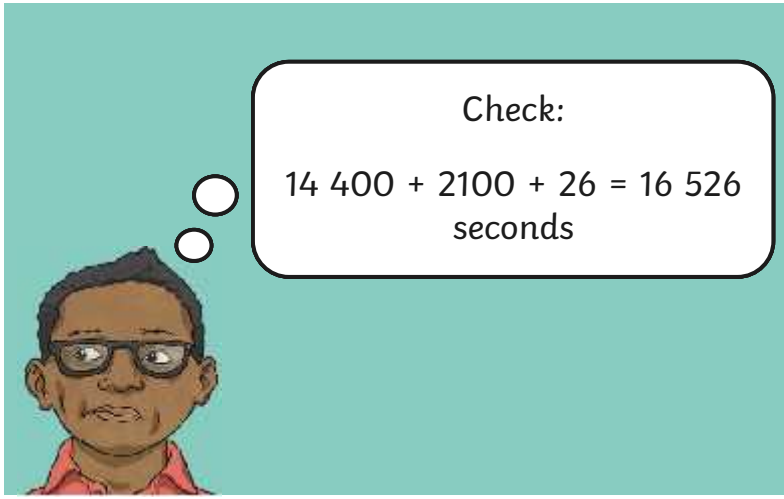
Carter is timing how long it takes to run a 20km race.
Here is the time it took him on a stopwatch:

04:35:26$_{00}$

Carter says it took more than 20 000 seconds. Is he right?

Guided Maths Question 2

Let's check our answers by doing some inverse calculations:



Carter is timing how long it takes to run a 20km race.
Here is the time it took him on a stopwatch:

04:35:2600

Carter says it took more than 20 000 seconds. Is he right?

Answer:
16 526 seconds have passed since the stopwatch started. This is less than 20 000 seconds so Carter is incorrect.

Partner Maths Question 2

Working with a partner, use your reasoning skills to answer this question.

Carter trains over two months and improves his fitness.
Here is the stopwatch reading from the next time he did the 20km race:

His friend Lena says it took him fewer than 15 000 seconds. Is she right?

Answer:
13 337 seconds have passed since the stopwatch started. Lena is right.

Guided Maths Question 3

Read this reasoning question carefully.

Today's date is Friday 26th May. The time now is 10:30 a.m.
Surrinder has calculated that Sports Day will be in 243 hours.
What will be the day, date and time of Sports Day?

May

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

June

M	T	W	T	F	S	S
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Let's highlight the important information and key vocabulary to show we understand the question.

Guided Maths Question 3

Next, let's think about what we **already know** in order to help us answer the question correctly.

Today's date is Friday 26th May.
The time now is 10:30 a.m.
Surrinder has calculated that Sports Day will be in 243 hours.
What will be the day, date and time of Sports Day?

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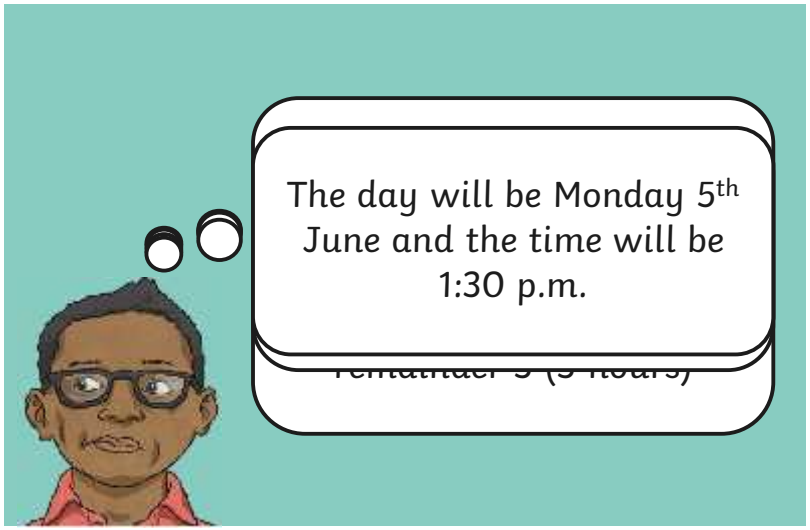
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

June

M	T	W	T	F	S	S
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Guided Maths Question 3

We are now ready to **apply our learning** to solve the question.



Today's date is Friday 26th May.
The time now is 10:30 a.m.
Surrinder has calculated that Sports Day will be in 243 hours.
What will be the day, date and time of Sports Day?

May

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

June

M	T	W	T	F	S	S
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Guided Maths Question 3

Let's check our answers by changing Sam's time into hours and minutes.

243 ÷ 24 = 10 days remainder 3 (3 hours).

Inverse:
24 × 10 = 240, add on the extra hours:

240 + 3 = 243

Count back 10 days and 3 hours from June 10th 1:30 p.m. = Friday 26th May 10:30 a.m.

Today's date is Friday 26th May.
The time now is 10:30 a.m.
Surrinder has calculated that Sports Day will be in 243 hours.
What will be the day, date and time of Sports Day?

May

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

June

M	T	W	T	F	S	S
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Answer:
The day, date and time will be Monday 5th June, 1:30 p.m.

Partner Maths Question 3

Working with a partner, use your reasoning skills to answer this question.

Today's date is Tuesday 21st February. The time now is 6:30 a.m.
Tammy has calculated that the swimming gala will be in 390 hours.
What will be the day, date and time of the swimming gala?

February

M	T	W	T	F	S	S
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	1	2	3	4	5
6	7	8	9	10	11	12

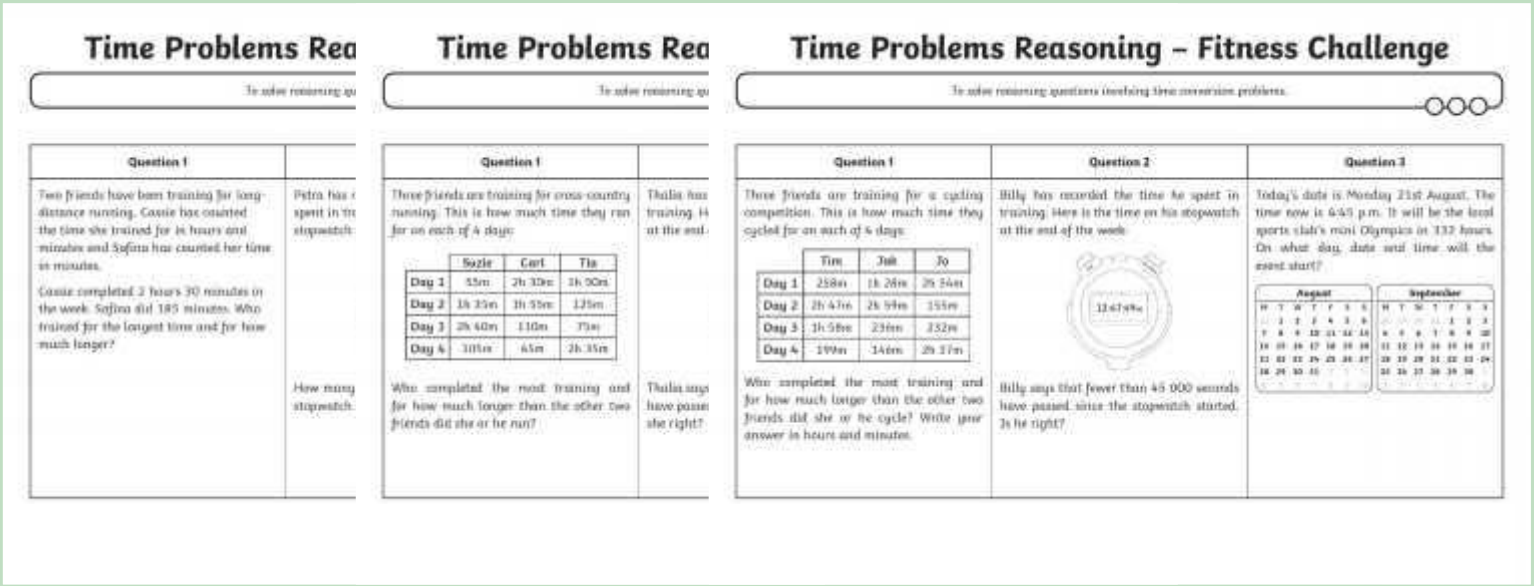
March

M	T	W	T	F	S	S
27	28	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Answer:
Thursday 9th March, 12:30 p.m.

Reasoning Practice

Have a go at **independently** solving the reasoning questions on your activity sheet.



Time Problems Rea

Question 1

Two friends have been training for long-distance running. Cassie has counted the time she trained for in hours and minutes and Safina has counted her time in minutes.

Cassie completed 2 hours 30 minutes in the week. Safina did 185 minutes. Who trained for the longest time and for how much longer?

Time Problems Rea

Question 1

Three friends are training for cross-country running. This is how much time they ran for on each of 4 days:

	Suzie	Carl	Tia
Day 1	55m	2h 30m	1h 50m
Day 2	1h 35m	1h 55m	125m
Day 3	2h 40m	110m	75m
Day 4	105m	45m	2h 35m

Who completed the most training and for how much longer than the other two friends did she or he run?

Time Problems Reasoning – Fitness Challenge

Question 1

Three friends are training for a cycling competition. This is how much time they cycled for on each of 4 days:

	Tim	Jak	Jo
Day 1	258m	1h 26m	2h 54m
Day 2	2h 47m	2h 59m	155m
Day 3	1h 58m	239m	232m
Day 4	199m	146m	2h 27m

Who completed the most training and for how much longer than the other two friends did she or he cycle? Write your answer in hours and minutes.

Question 2

Billy has recorded the time he spent in training. Here is the time on his stopwatch at the end of the week.

Billy says that fewer than 45 000 seconds have passed since the stopwatch started. Is he right?

Question 3

Today's date is Monday 21st August. The time now is 6:45 p.m. It will be the local sports club's mini Olympics in 132 hours. On what day, date and time will the event start?

Reasoning Practice Answers

Did you correctly answer the **first** reasoning question?

★

Cassie completed 2 hours 30 minutes in the week. Safina did 185 minutes. Who trained for the longest time and for how much longer?

Safina trained for the longest – 35 minutes longer than Cassie.

★★

Who completed the most training and for how much longer than the other two friends did she or he run?

	Suzie	Carl	Tia
Day 1	55m	2h 30m	1h 50m
Day 2	1h 35m	1h 55m	125m
Day 3	2h 40m	110m	75m
Day 4	105m	45m	2h 35m

Tia completed the most training. She trained for 50 minutes longer than Suzie and 45 minutes longer than Carl.

★★★

Who completed the most training and for how much longer than the other two friends did she or he cycle? Write your answer in hours and minutes.

	Tim	Jak	Jo
Day 1	258m	1h 28m	2h 54m
Day 2	2h 47m	2h 59m	155m
Day 3	1h 58m	236m	232m
Day 4	199m	146m	2h 37m

Tim completed the most training. He cycled for 1 hour 33 minutes more than Jak and 24 minutes more than Jo.

Reasoning Practice Answers

Did you correctly answer the **second** reasoning question?

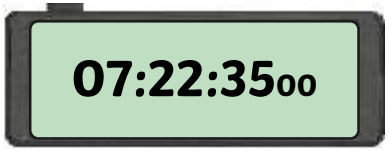
★

How many seconds have passed since the stopwatch started?

4225 seconds have passed.

★★

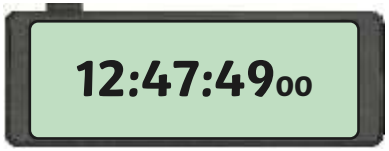
Thalia says that more than 25 000 seconds have passed since the stopwatch started. Is she right?



26 555 seconds have passed since the stopwatch started. She is right.

★★★

Billy says that fewer than 45 000 seconds have passed since the stopwatch started. Is he right?



46 069 seconds have passed since the stopwatch started. He is incorrect.

Reasoning Practice Answers

Did you correctly answer the **third** reasoning question?

★

Today's date is Saturday 7th January. The time now is 6:00 a.m. It will be the leisure centre's swimming club gala in 132 hours. On what day, date and time will the event start?

January

M	T	W	T	F	S	S
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Thursday 12th January
6:00 p.m.

★★

Today's date is Saturday 29th July. The time now is 7:45 a.m. It will be the local sports club's mini Olympics in 198 hours. On what day, date and time will the event start?

July

M	T	W	T	F	S	S
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

August

M	T	W	T	F	S	S
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Sunday 6th August
1:45 p.m.

★★★

Today's date is Monday 21st August. The time now is 4:45 p.m. It will be the local sports club's mini Olympics in 332 hours. On what day, date and time will the event start?

August

M	T	W	T	F	S	S
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

September

M	T	W	T	F	S	S
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1
2	3	4	5	6	7	8

Monday 4th September
12:45 p.m.

Reasoning Practice

How confident do you feel about the types of questions that we have worked on today?

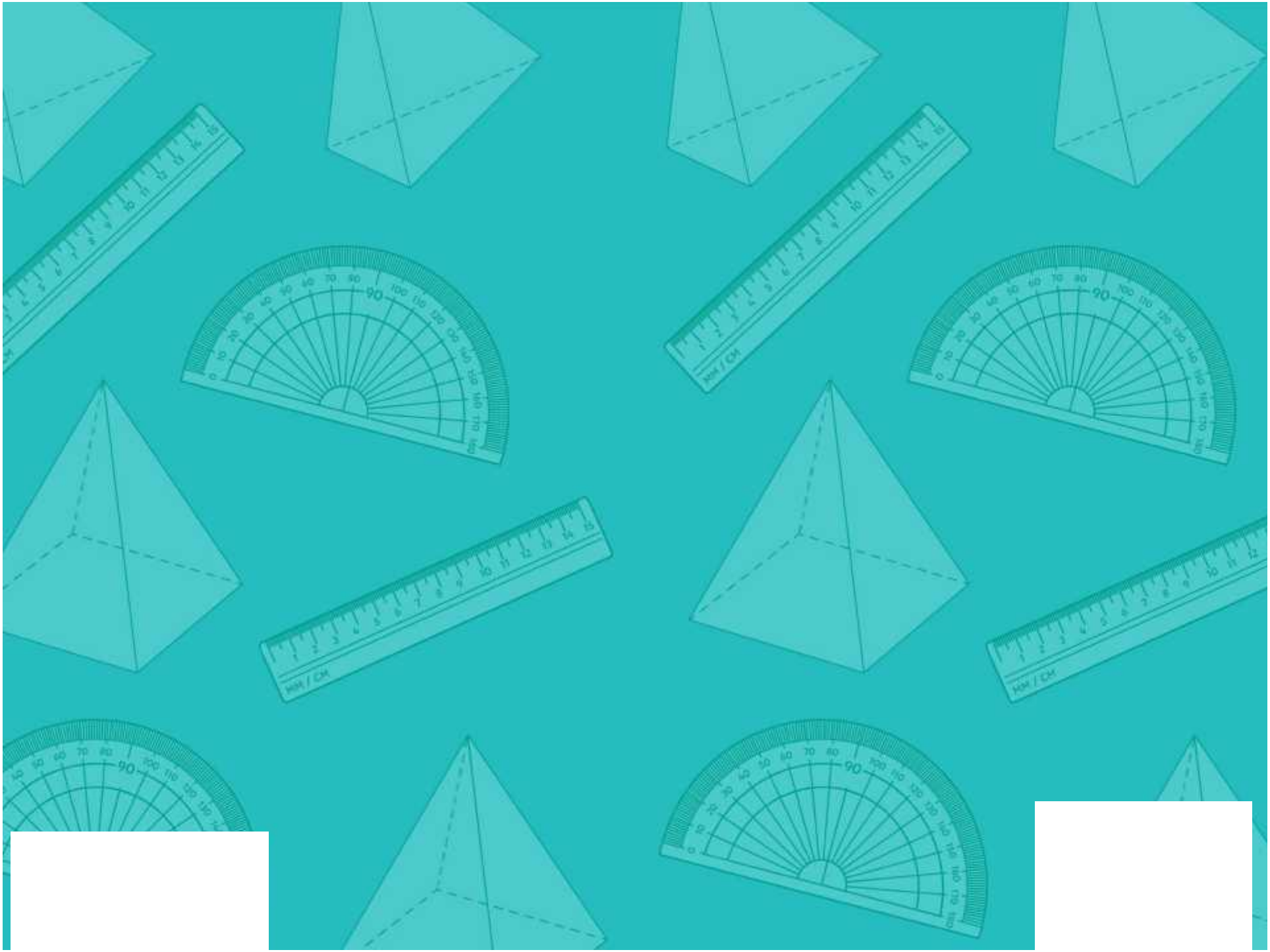
Show me using a silent signal:

Aim

- To solve reasoning questions involving time conversion problems.

Success Criteria

- I can break down complex problems into smaller steps.
- I can use mathematical language to explain solutions to problems.



Aim: To solve reasoning questions involving time conversion problems.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can break down complex problems into smaller steps.				**Notes/Evidence**					
I can use mathematical language to explain solutions to problems.									

Next Steps

- _____
- _____

T	Teacher	**I**	Independent
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

Aim: To solve reasoning questions involving time conversion problems.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can break down complex problems into smaller steps.				**Notes/Evidence**					
I can use mathematical language to explain solutions to problems.									

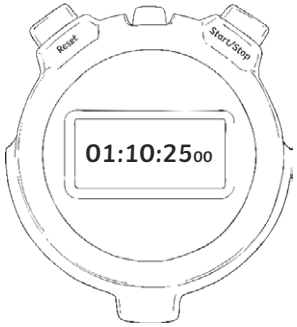
Next Steps

- _____
- _____

T	Teacher	**I**	Independent
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

Time Problems Reasoning – Fitness Challenge

To solve reasoning questions involving time conversion problems.

Question 1	Question 2	Question 3
Two friends have been training for long-distance running. Cassie has counted the time she trained for in hours and minutes and Safina has counted her time in minutes. Cassie completed 2 hours 30 minutes in the week. Safina did 185 minutes. Who trained for the longest time and for how much longer?	Petra has recorded the time she has spent in training. Here is the time on her stopwatch at the end of the week:  How many seconds have passed since the stopwatch started?	Today's date is Saturday 7th January. The time now is 6:00 a.m. It will be the leisure centre's swimming club gala in 132 hours. On what day, date and time will the event start? **January** M T W T F S S 26 27 28 29 30 31 **1** **2 3 4 5 6 7 8** **9 10 11 12 13 14 15** **16 17 18 19 20 21 22** **23 24 25 26 27 28 29** **30 31** 1 2 3 4 5

Time Problems Reasoning – Fitness Challenge

To solve reasoning questions involving time conversion problems.

Question 1

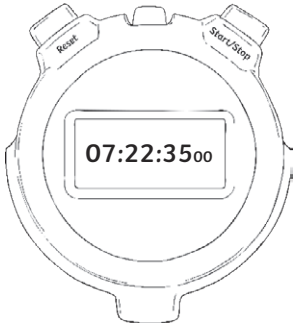
Three friends are training for cross-country running. This is how much time they ran for on each of 4 days:

	Suzie	Carl	Tia
Day 1	55m	2h 30m	1h 50m
Day 2	1h 35m	1h 55m	125m
Day 3	2h 40m	110m	75m
Day 4	105m	45m	2h 35m

Who completed the most training and for how much longer than the other two friends did she or he run?

Question 2

Thalia has recorded the time she spent in training. Here is the time on her stopwatch at the end of the week:



Thalia says that more than 25 000 seconds have passed since the stopwatch started. Is she right?

Question 3

Today's date is Saturday 29th July. The time now is 7:45 a.m. It will be the local sports club's mini Olympics in 198 hours. On what day, date and time will the event start?

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M	T	W	T	F	S	S
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17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

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31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
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28	29	30	31	1	2	3
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Time Problems Reasoning – Fitness Challenge

To solve reasoning questions involving time conversion problems.

Question 1

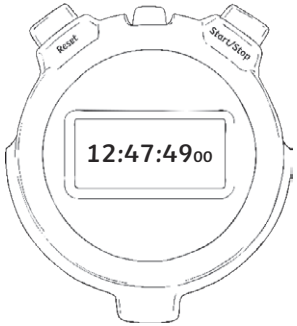
Three friends are training for a cycling competition. This is how much time they cycled for on each of 4 days:

	Tim	Jak	Jo
Day 1	258m	1h 28m	2h 54m
Day 2	2h 47m	2h 59m	155m
Day 3	1h 58m	236m	232m
Day 4	199m	146m	2h 37m

Who completed the most training and for how much longer than the other two friends did she or he cycle? Write your answer in hours and minutes.

Question 2

Billy has recorded the time he spent in training. Here is the time on his stopwatch at the end of the week:



Billy says that fewer than 45 000 seconds have passed since the stopwatch started. Is he right?

Question 3

Today's date is Monday 21st August. The time now is 4:45 p.m. It will be the local sports club's mini Olympics in 332 hours. On what day, date and time will the event start?

August

M	T	W	T	F	S	S
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

September

M	T	W	T	F	S	S
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1
2	3	4	5	6	7	8

Time Problems Reasoning – Fitness Challenge **Answers**

★		★★		★★★	
1.	Safina trained for the longest – 35 minutes longer than Cassie.	1.	Tia completed the most training. She trained for 50 minutes longer than Suzie and 45 minutes longer than Carl.	1.	Tim completed the most training. He cycled for 1 hour 33 minutes more than Jak and 24 minutes more than Jo.
2.	4225 seconds have passed.	2.	26 555 seconds have passed since the stopwatch started. She is right.	2.	46 069 seconds have passed since the stop-watch started. He is incorrect.
3.	Thursday 12th January 6:00 p.m.	3.	Sunday 6th August, 1:45 p.m.	3.	Monday 4th September, 12:45 p.m.

Measurement and Geometry | Time Problems Reasoning

To solve reasoning questions involving time conversion problems.		
I can break down complex problems into smaller steps.		
I can use mathematical language to explain solutions to problems.		

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