Measurement: Train Times

Aim:	**Success Criteria:**	**Resources:**
Solve problems involving converting between units of time. I can solve time problems involving 12-hour and 24-hour times.	I can convert between 12-hour and 24-hour times. I can count on a timeline to calculate how much time has passed. I can solve time problems using timetables written in 12-hour and 24-hour times.	**Lesson Pack** Whiteboards and pens – class set
	Key/New Words: Timetable, 12-hour, 24-hour, convert.	**Preparation:** Differentiated **Activity Sheet Train Time Problems** – one per child **Times of the Day Cards** – one set per pair

Prior Learning: It will be helpful if children can convert from 12-hour times to 24-hour times and vice versa.

Learning Sequence

	**Order, Order!** In pairs, children shuffle the **Times of the Day Cards** and deal out five cards. They order the cards from earliest in the day to latest.	
	**Match it Up:** Use the **Lesson Presentation** to recap on converting between 12-hour and 24-hour times. Children match equivalent pairs, matching 12-hour and 24-hour times.	
	**Converting Train Times:** The **Lesson Presentation** shows train timetables written in 24-hour times. Children convert 24-hour times to 12-hour. Work through the conversions.	
	**Train Time Problems:** Children solve problems using and converting from 12-hour times to 24-hour times, using a time line to calculate the passage of time.	
	**Train Time Problems:** Children complete the differentiated **Train Time Problems Activity Sheet**, solving problems using 12-hour and 24-hour times, converting from one time to another.  Children write 24-hour times in 12-hour times and vice versa. They solve simple problems involving the passage of time. The times involved are in fifteen minute intervals.  Children write 24-hour times in 12-hour times and vice versa. They solve problems involving the passage of time. The times involved are in five minute intervals.  Children write 24-hour times in 12-hour times and vice versa. They solve more complex problems involving the passage of time. The times involved are in minute intervals.	
	**Solve It:** Children use their mastery skills to solve a more complex timetable problem. Ask children to explain their method of solving the problem to another pair.	

Exploreit

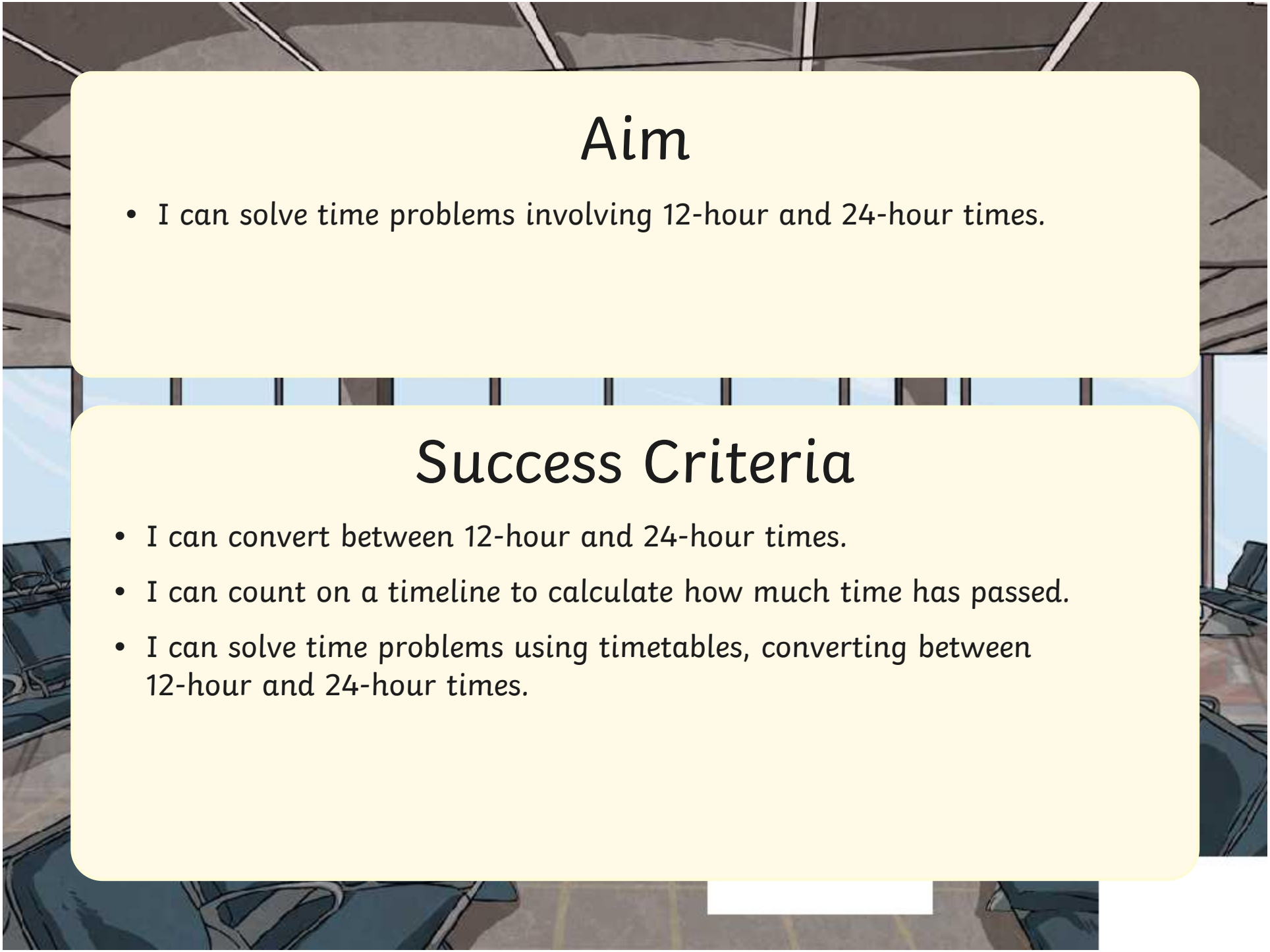
Writeit: Children use one of the timetables used in the lesson to write a timetable problem, including the answer. Children swap problems.

Investigateit: Children find train times of actual train journeys and calculate the time it takes to go from one destination to another.

Maths

Measurement


Train Times



Aim

- I can solve time problems involving 12-hour and 24-hour times.

Success Criteria

- I can convert between 12-hour and 24-hour times.
- I can count on a timeline to calculate how much time has passed.
- I can solve time problems using timetables, converting between 12-hour and 24-hour times.

Order, Order!

Choose 5 cards from the **Times of the Day Cards** set.

Order them from the earliest in the day to the latest.

Match it Up

When telling the time, we can use 12-hour times or 24-hour ti

The 24-hour c
0 to 23 without a.m. and p.m.

Why don't we need a.m. and p.m. with the 24-hour clock?

24-hour times have 4 digits. The hours and minutes are usually separated by a colon. For example, 07:15, 11:00, 12:30 and 15:45.

Post meridiem which means after midday in Latin.

Midnight is 00:00. What is midday on the 24-hour clock?

The numbers are different before and after midday.

The
hours of the day into 2 halves: before and after midday. The hours from 0 to 12 in the morning are followed by a.m. (from the Latin **ante meridiem**, meaning before midday). After midday, the hours are followed by p.m.

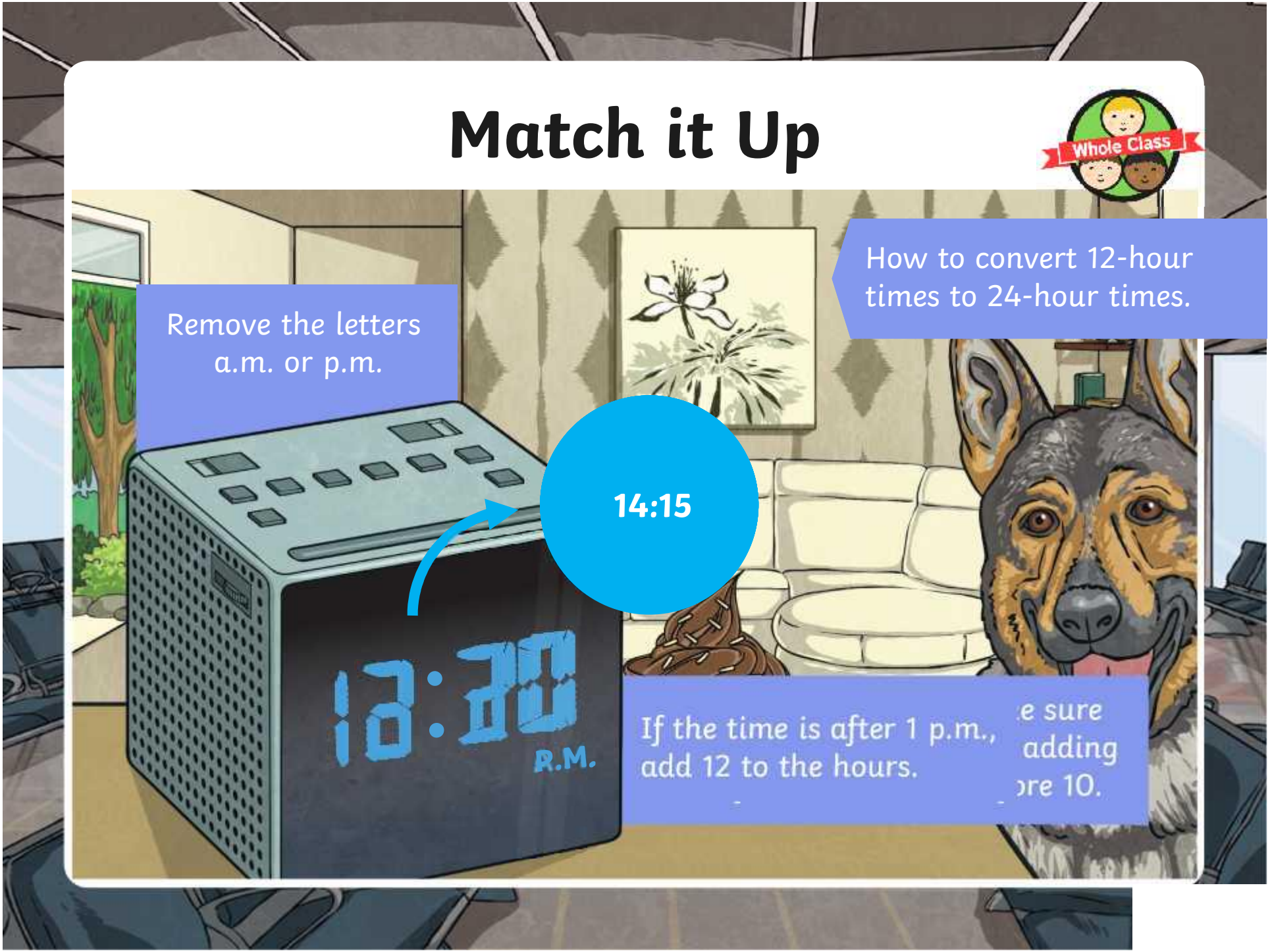
What might p.m. stand for?

Midday is 12:00.

Match it Up


Whole Class
How to convert 24-hour times to 12-hour times
so 13:30 = 1:30 p.m.
13:30
If the hour time is 13 or above, subtract 12 from it.
Times with hours above 12 become p.m. times.

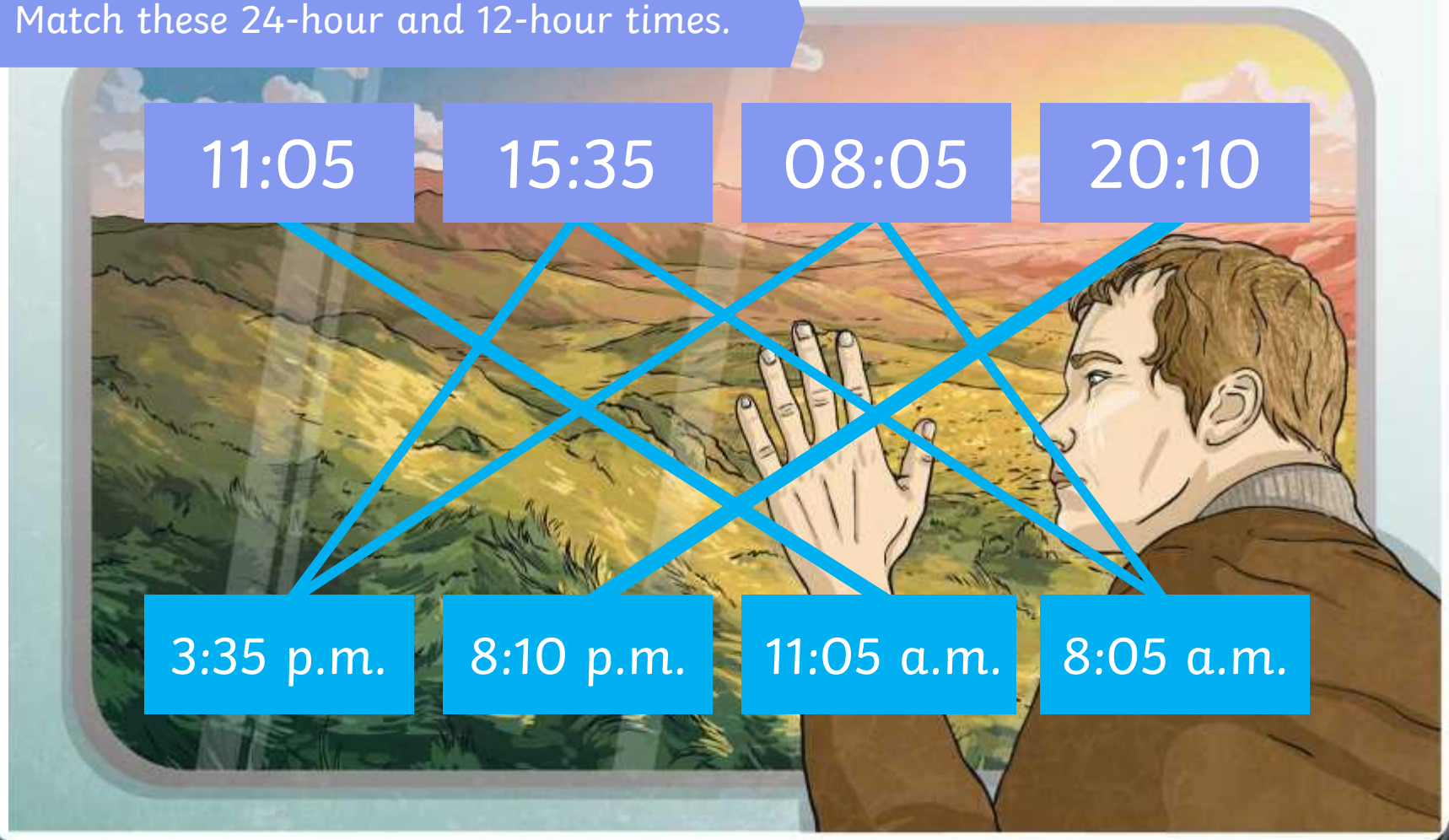
Match it Up


Whole Class
How to convert 12-hour times to 24-hour times.
Remove the letters a.m. or p.m.
14:15
12:30
P.M.
If the time is after 1 p.m., add 12 to the hours.
e sure
adding
ore 10.

Match it Up

Whole Class

Match these 24-hour and 12-hour times.

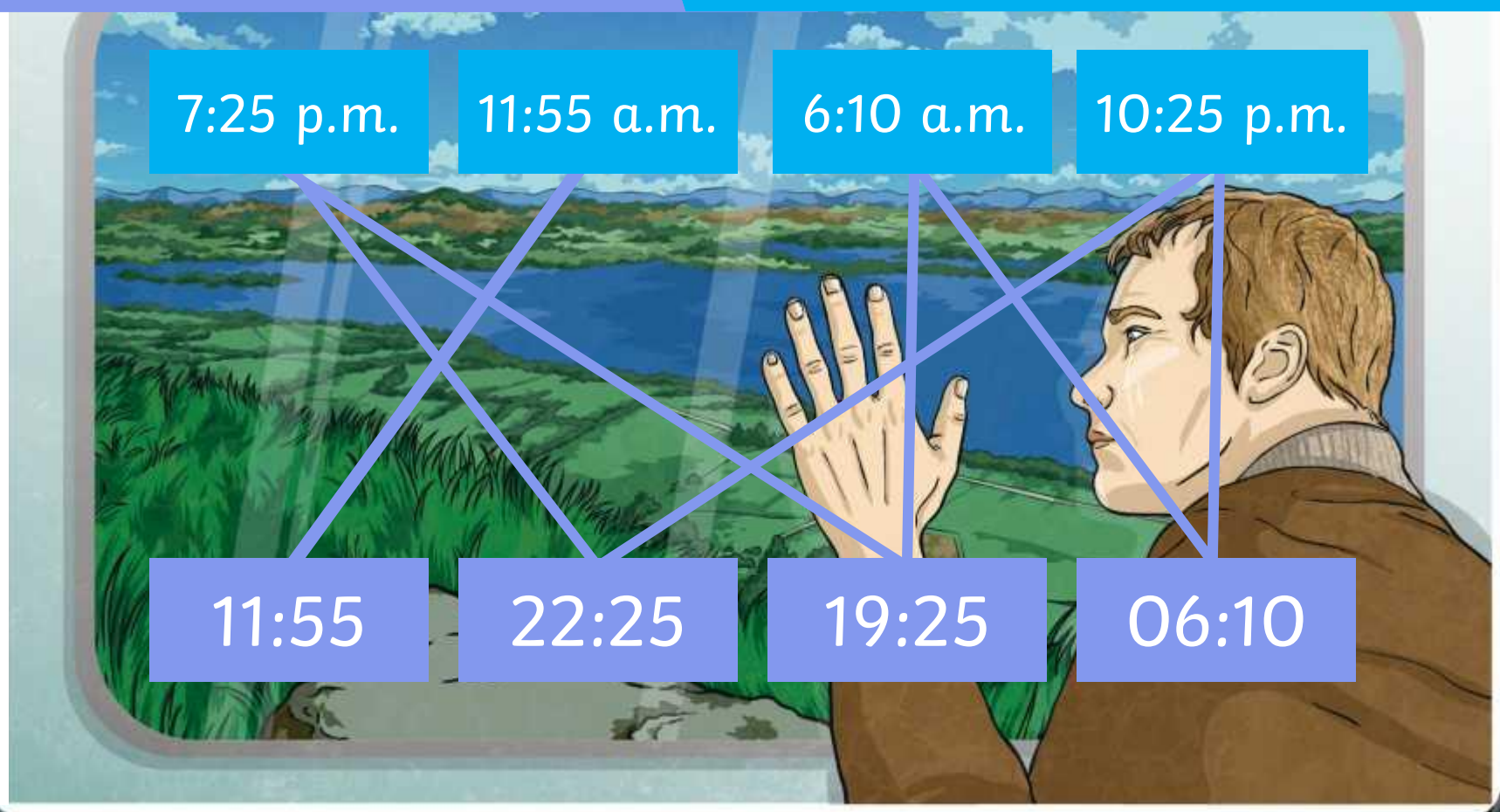


Match it Up

Whole Class

Match these 24-hour and 12-hour ti

Match these 12-hour and 24-hour times.



Converting Train Times

This train timetable is written in 24-hour clock.
Rewrite in 12-hour times using a.m. and p.m.

24-Hour Times	Birmingham	Bristol	Taunton	Tiverton	Exeter
Departs at	**11:15**	**12:30**	**13:25**	**13:35**	**13:45** (arrives)

Reminder
If the hour time is 13 or above, subtract 12.
Add a.m. or p.m.

Converting Train Times

This train timetable is written in 24-hour clock.
Rewrite in 12-hour times using a.m. and p.m.

24-Hour Times	Inverness	Edinburgh	Durham	Sheffield	Nottingham
Departs at	**10:45**	**15:08**	**16:54**	**19:06**	**20:00** (arrives)

Train Time Problems

Jo arrives at Taunton station at 1:15 p.m.
How long must she wait until the train departs?

24-Hour Times	Birmingham	Bristol	Taunton	Tiverton	Exeter
Departs at	**11:15**	**12:30**	**13:25**	**13:35**	**13:45** (arrives)

How will we solve this problem?

First, convert Jo's arrival time to 24-hour clock, so it's the same as the train timetable!

The train departs at 13:25. Count on minutes from 13:15 to 13:25.

How many minutes did you count on?

From 13:15 to 13:25 is 10 minutes.

Jo will wait 10 minutes before the train departs.

1:15 p.m. = **13:15**

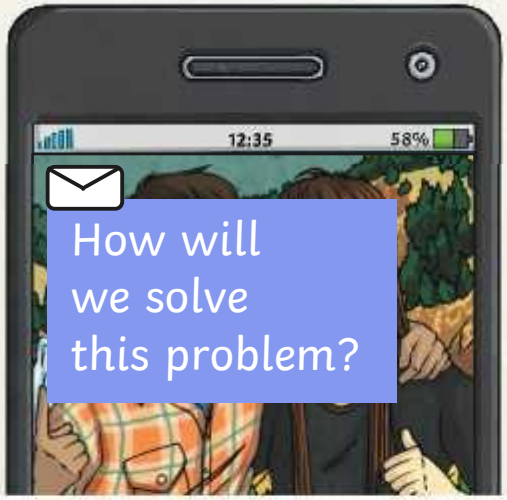
+10 minutes

13:15 — 13:25

Train Time Problems

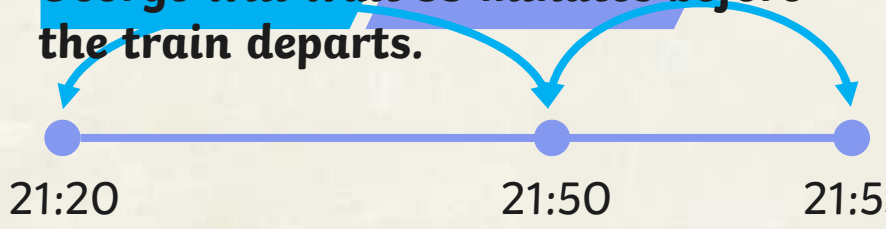
George arrives at Kilmarnock station at 9:20 p.m.
How long must he wait until the train departs?

24-Hour Times	Glasgow	Dunlop	Kilmarnock	Carlisle	Manchester
Departs at	**21:13**	**21:38**	**21:53**	**23:45**	**01:59** (arrives)



Answer:

From 21:20 to 21:53 is 33 minutes.
9:20 + 30 minutes = 21:20 + 3 minutes
George will wait 33 minutes before the train departs.



Train Time Problems

How long is it from when the train leaves Edinburgh until it reaches York? Write your answer in minutes.

24-Hour Times	Edinburgh	Berwick	Newcastle	Darlington	York
Departs at	**13:30**	**14:15**	**15:00**	**15:30**	**15:55** (arrives)

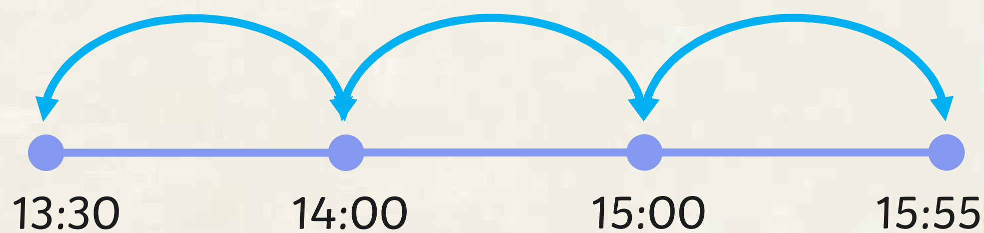
Your time line may look different to this one. You may have jumped along the time line in different steps.

First, count the minutes to the next whole hour.

Next, count the whole hours (remember 1 hour = 60 minutes).

+ 30 minutes + 60 minutes + 55 minutes

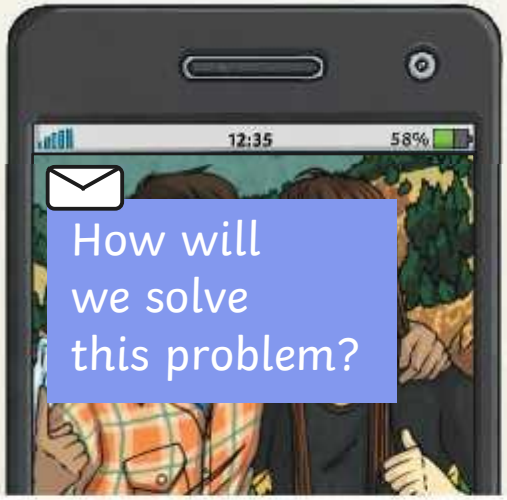
= 145 minutes



Train Time Problems

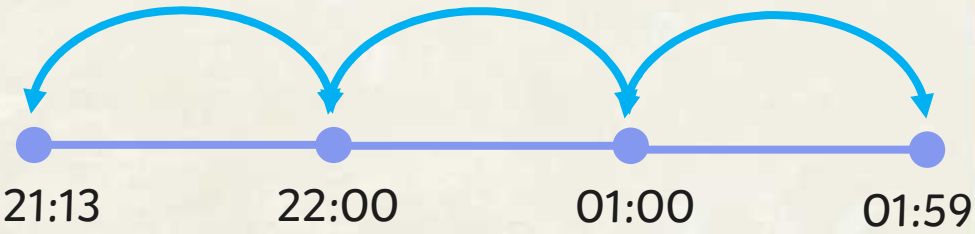
How long is it from when the train leaves Glasgow until it reaches Manchester? Use a time line to answer this problem. Write your answer in minutes.

24-Hour Times	Glasgow	Dunlop	Kilmarnock	Carlisle	Manchester
Departs at	**21:13**	**21:38**	**21:53**	**23:45**	**01:59** (arrives)



47 + 180 = 59 = **286 minutes**

+ 47 minutes + 3 hours = 180 minutes + 59 minutes



Train Time Problems

How long is the train journey from Birmingham to Exeter?

It takes 286 minutes to travel from Glasgow to Manchester.
Write your answer in two ways: hours and minutes (e.g. 1 hour 30 minutes) and in minutes (e.g. 90 minutes).
What is this in hours and minutes?

24-Hour Times	Glasgow	Dunlop	Kilmarnock	Carlisle	Manchester
Departs at	**21:13**	**21:38**	**21:53**	**23:45**	**01:59** (arrives)

2 hours 26 minutes or 146 minutes

How many minutes in 4 hours?

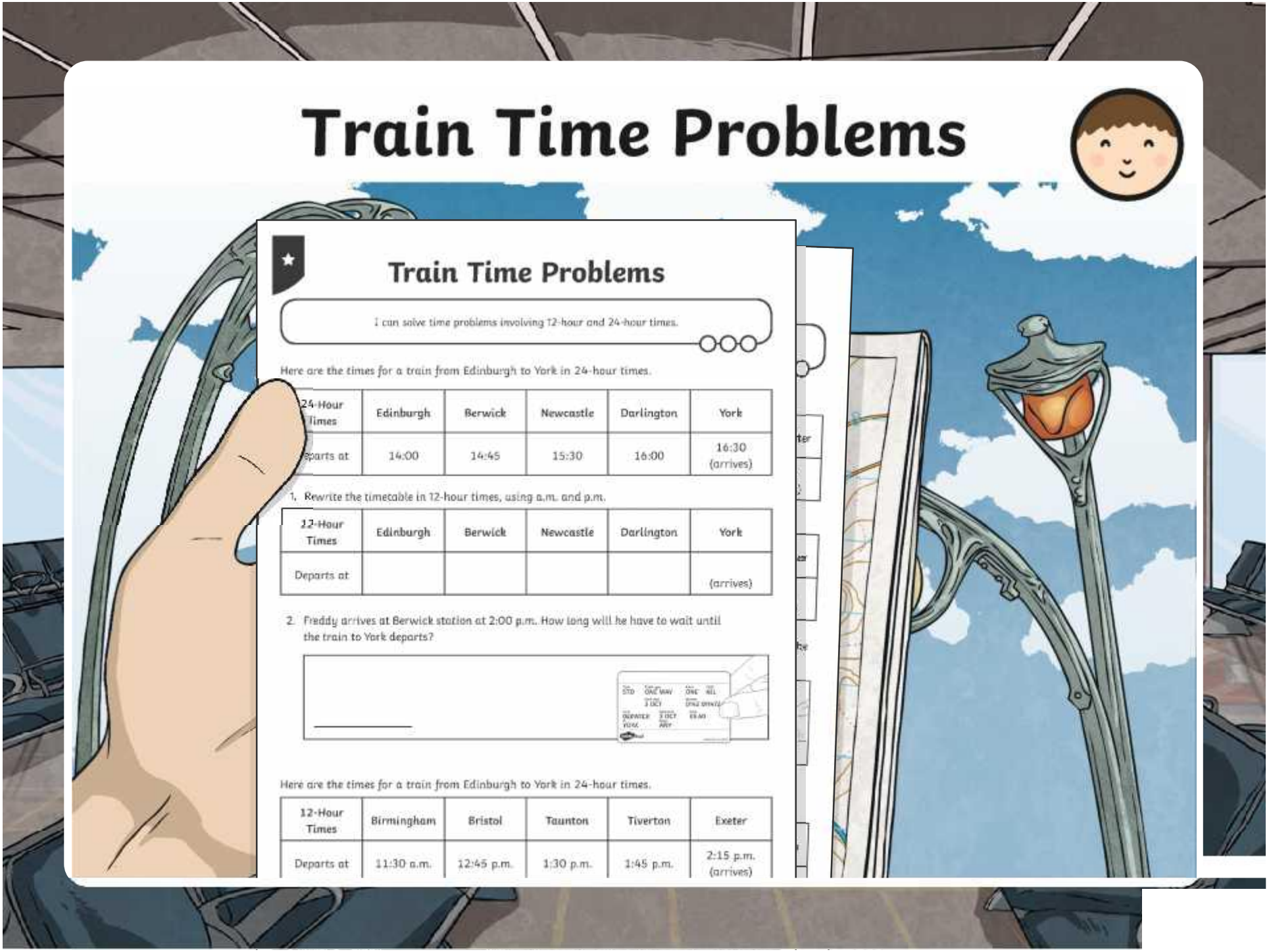
+ 1 hour = 60 minutes

+ 43 minutes

11:17 → 12:00 → 13:00 → 13:43

4 hours = 240 minutes
Subtract this from 286 minutes.
+ 43 minutes
286 − 240 = 46 minutes

1 hour 46 minutes


Train Time Problems
Train Time Problems
I can solve time problems involving 12-hour and 24-hour times.
Here are the times for a train from Edinburgh to York in 24-hour times.
24-Hour Times | Edinburgh | Berwick | Newcastle | Darlington | York
Departs at | 14:00 | 14:45 | 15:30 | 16:00 | 16:30 (arrives)
1. Rewrite the timetable in 12-hour times, using a.m. and p.m.
12-Hour Times | Edinburgh | Berwick | Newcastle | Darlington | York
Departs at | | | | | (arrives)
2. Freddy arrives at Berwick station at 2:00 p.m. How long will he have to wait until the train to York departs?
Here are the times for a train from Edinburgh to York in 24-hour times.
12-Hour Times | Birmingham | Bristol | Taunton | Tiverton | Exeter
Departs at | 11:30 a.m. | 12:45 p.m. | 1:30 p.m. | 1:45 p.m. | 2:15 p.m. (arrives)

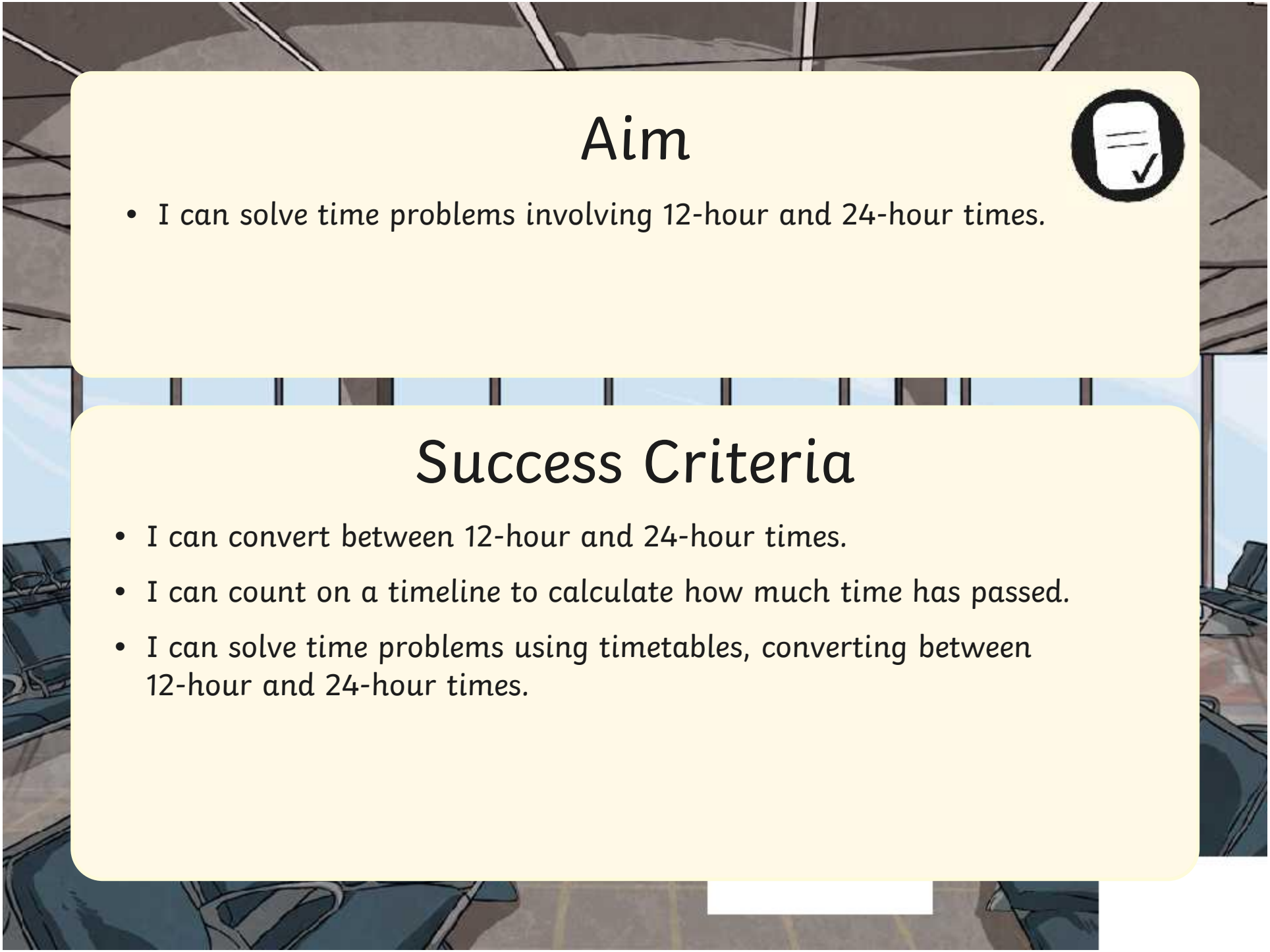
Solve It

24-Hour Times	Inverness	Edinburgh	Durham	Sheffield	Nottingham
Departs at	**10:45**	**15:08**	**16:54**	**19:06**	**20:00** (arrives)

Billy is going to the train station to catch the 16:54 train from Durham to Sheffield. He leaves his house at 4:15 p.m. He has a 5 minute walk to the bus stop. He waits at the bus stop for 5 minutes, then catches the bus to the station which, is a 17 minute journey. He then has an 8 minute walk to the station. How long will he have to wait at the station before the train leaves?

Answer:
4 minutes

Use this timetable to write your own story problem for your partner to solve.

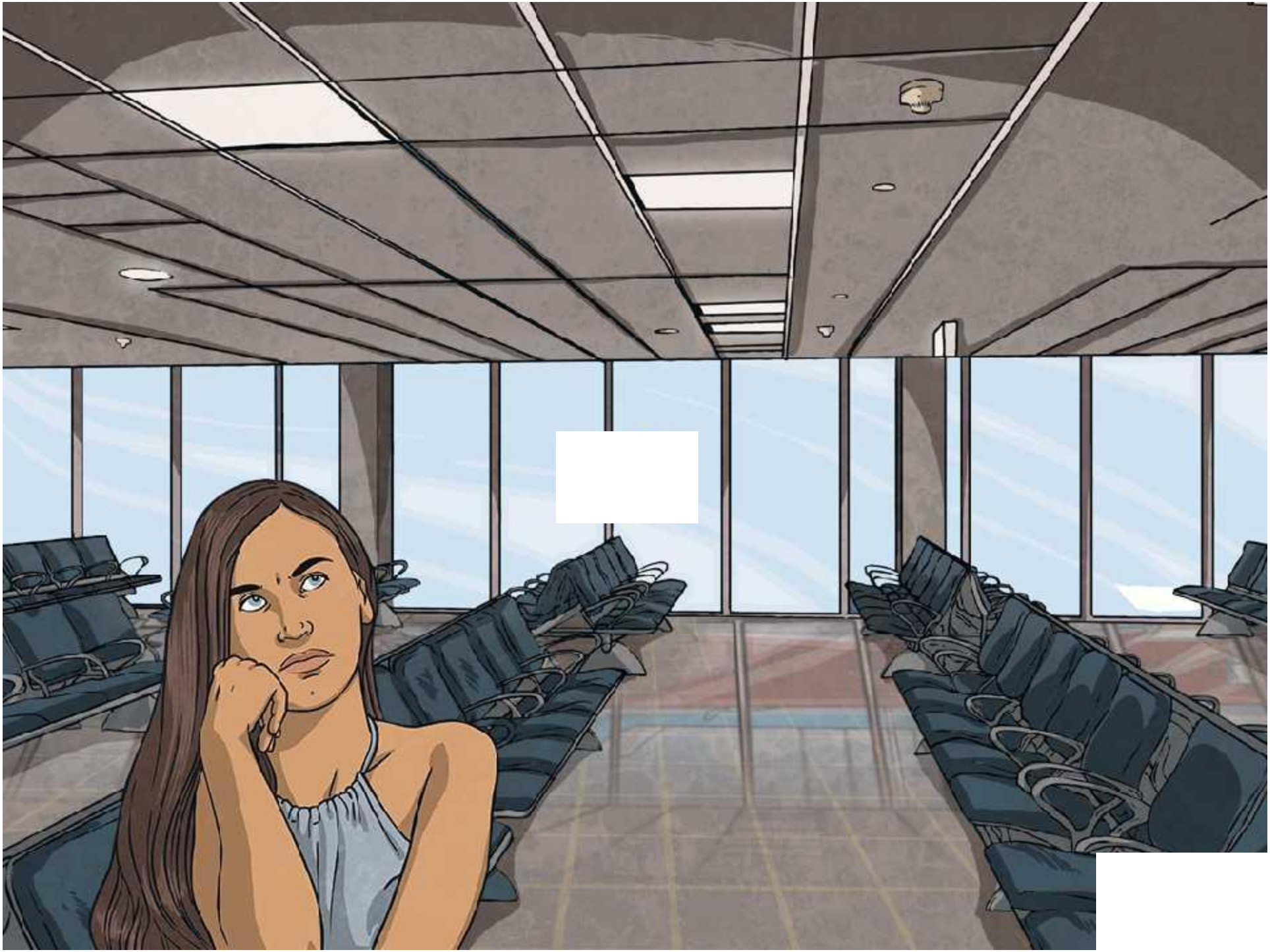


Aim

- I can solve time problems involving 12-hour and 24-hour times.

Success Criteria

- I can convert between 12-hour and 24-hour times.
- I can count on a timeline to calculate how much time has passed.
- I can solve time problems using timetables, converting between 12-hour and 24-hour times.



Aim: I can solve time problems involving 12-hour and 24-hour times.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can convert between 12-hour and 24-hour times.				**Notes/Evidence**					
I can count on a timeline to calculate how much time has passed.									
I can solve time problems using timetables written in 12-hour and 24-hour times.									

Next Steps

- _____
- _____

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

Aim: I can solve time problems involving 12-hour and 24-hour times.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can convert between 12-hour and 24-hour times.				**Notes/Evidence**					
I can count on a timeline to calculate how much time has passed.									
I can solve time problems using timetables written in 12-hour and 24-hour times.									

Next Steps

- _____
- _____

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

midday

midnight

10:35 a.m.

half past 3 in the afternoon

quarter to 10 in the evening

3:45 p.m.

quarter past 8 in the morning

1:05 p.m.

5 to 8 in the evening

10:10 a.m.

quarter to 9 in the morning

20 past 4 in the morning

20 to 5 in the afternoon

6:45 a.m.

8:55 p.m.

20 to 4 in the morning

11:50 p.m.

half past 1 in the morning

10:15 p.m.

7:10 a.m.

Train Time Problems

I can solve time problems involving 12-hour and 24-hour times.

Here are the times for a train from Edinburgh to York in 24-hour times.

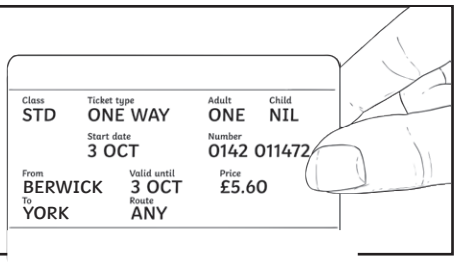
24-Hour Times	Edinburgh	Berwick	Newcastle	Darlington	York
Departs at	14:00	14:45	15:30	16:00	16:30 (arrives)

1. Rewrite the timetable in 12-hour times, using a.m. and p.m.

12-Hour Times	Edinburgh	Berwick	Newcastle	Darlington	York
Departs at					(arrives)

2. Freddy arrives at Berwick station at 2:00 p.m. How long will he have to wait until the train to York departs?

_____



Here are the times for a train from Birmingham to Exeter in 12-hour times.

12-Hour Times	Birmingham	Bristol	Taunton	Tiverton	Exeter
Departs at	11:30 a.m.	12:45 p.m.	1:30 p.m.	1:45 p.m.	2:15 p.m. (arrives)

3. Rewrite the timetable using 24-hour times.

24-Hour Times	Birmingham	Bristol	Taunton	Tiverton	Exeter
Departs at					(arrives)

4. How long is the journey from Edinburgh to York? Write your answer in two ways: hours and minutes (e.g. 1 hour 20 minutes) and in minutes (e.g. 80 minutes).

24-Hour Times	Edinburgh	Berwick	Newcastle	Darlington	York
Departs at	14:00	14:45	15:30	16:00	16:30 (arrives)

_____

5. Sascha has a 20-minute walk to get to Tiverton station. She says that if she leaves her house at 13:05 she will have enough time to walk to the station before the train departs. Is she right? Show how you know.

12-Hour Times	Birmingham	Bristol	Taunton	Tiverton	Exeter
Departs at	11:30 a.m.	12:45 p.m.	1:30 p.m.	1:45 p.m.	2:15 p.m. (arrives)

_____

Train Time Problems **Answers**

1. Rewrite the timetable in 12-hour times, using a.m. and p.m.

12-Hour Times	Edinburgh	Berwick	Newcastle	Darlington	York
Departs at	2:00 p.m.	2:45 p.m.	3:30 p.m.	4:00 p.m.	4:30 p.m. (arrives)

2. Freddy arrives at Berwick station at 2:00 p.m. How long will he have to wait until the train to York departs?
   45 minutes

3. Rewrite the timetable using 24-hour times.

24-Hour Times	Birmingham	Bristol	Taunton	Tiverton	Exeter
Departs at	11:30	12:45	13:30	13:45	14:15 p.m. (arrives)

4. How long is the journey from Edinburgh to York? Write your answer in two ways: hours and minutes (e.g. 1 hour 20 minutes) and in minutes (e.g. 80 minutes).
   2 hours 30 minutes or 150 minutes

5. Sascha has a 20-minute walk to get to Tiverton station. She says that if she leaves her house at 13:05 she will have enough time to walk to the station before the train departs. Is she right? Show how you know.
   She is right. She will arrive at the station at 13:25 (1:25 p.m.). The train leaves at 1:45 p.m.

Train Time Problems

I can solve time problems involving 12-hour and 24-hour times.

Here are the times for a train from Glasgow to Manchester in 24-hour times.

24-Hour Times	Glasgow	Dunlop	Kilmarnock	Carlisle	Manchester
Departs at	22:30	22:55	23:05	23:50	02:10 (arrives)

1. Rewrite the timetable in 12-hour times, using a.m. and p.m.

12-Hour Times	Glasgow	Dunlop	Kilmarnock	Carlisle	Manchester
Departs at					(arrives)

2. Patrick arrives at Kilmarnock station at 10:40 p.m. How long will he have to wait until the train to Manchester departs?

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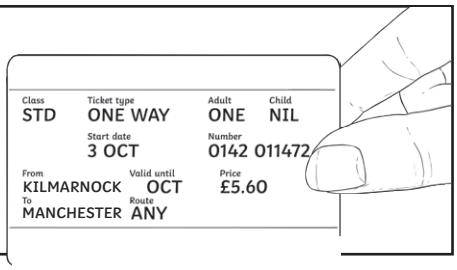


Here are the times for a train from Inverness to Nottingham in 12-hour times.

12-Hour Times	Inverness	Edinburgh	Durham	Sheffield	Nottingham
Departs at	10:50 a.m.	3:10 p.m.	4:55 p.m.	7:10 p.m.	8:05 p.m. (arrives)

3. Rewrite the timetable using 24-hour times.

24-Hour Times	Inverness	Edinburgh	Durham	Sheffield	Nottingham
Departs at					(arrives)

4. Heidi arrives at Sheffield station at 18:35. How long will she have to wait until the train to Nottingham departs? It took her 15 minutes to walk from home to the station. What time did she leave home? Write your answer using a.m. or p.m.

_____

5. How long is the journey from Glasgow to Manchester? Write your answer in two ways: hours and minutes (e.g. 1 hour 20 minutes) and in minutes (e.g. 80 minutes).

24-Hour Times	Glasgow	Dunlop	Kilmarnock	Carlisle	Manchester
Departs at	22:30	22:55	23:05	23:50	02:10 (arrives)

_____

6. A journey from one station to the next station takes more than 100 minutes, but less than 120 minutes. What could the two stops be? Are there any other possible answers? Explain why you think this.

12-Hour Times	Inverness	Edinburgh	Durham	Sheffield	Nottingham
Departs at	10:50 a.m.	3:10 p.m.	4:55 p.m.	7:10 p.m.	8:05 p.m. (arrives)

Train Time Problems **Answers**

1. Rewrite the timetable in 12-hour times, using a.m. and p.m.

12-Hour Times	Glasgow	Dunlop	Kilmarnock	Carlisle	Manchester
Departs at	10:30 p.m.	10:55 p.m.	11:05 p.m.	11:50 p.m.	2:10 a.m. (arrives)

2. Patrick arrives at Kilmarnock station at 10:40 p.m. How long will he have to wait until the train to Manchester departs?
   25 minutes

3. Rewrite the timetable using 24-hour times.

24-Hour Times	Inverness	Edinburgh	Durham	Sheffield	Nottingham
Departs at	10:50	15:10	16:55	19:10	20:05 (arrives)

4. Heidi arrives at Sheffield station at 18:35. How long will she have to wait until the train to Nottingham departs? It took her 15 minutes to walk from home to the station. What time did she leave home? Write your answer using a.m. or p.m.
   She will have to wait 35 minutes. She left home at 6:20 p.m.

5. How long is the journey from Glasgow to Manchester? Write your answer in two ways: hours and minutes (e.g. 1 hour 20 minutes) and in minutes (e.g. 80 minutes).
   3 hours 40 minutes or 220 minutes

6. A journey from one station to the next station takes more than 100 minutes, but less than 120 minutes. What could the two stops be? Are there any other possible answers? Explain why you think this.
   Edinburgh to Durham. Explanation shows that these are the only stops.

Train Time Problems

I can solve time problems involving 12-hour and 24-hour times.

Here are the times for a train from Carlisle to Coventry in 24-hour times.

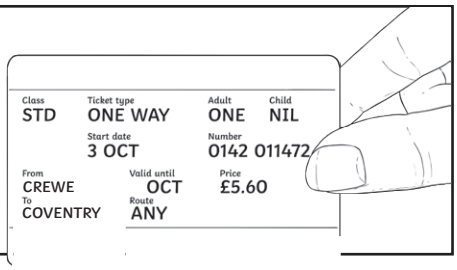
24-Hour Times	Carlisle	Preston	Crewe	Birmingham	Coventry
Departs at	11:06	12:15	13:04	14:19	14:30 (arrives)

1. Rewrite the timetable in 12-hour times, using a.m. and p.m.

12-Hour Times	Carlisle	Preston	Crewe	Birmingham	Coventry
Departs at					(arrives)

2. Toby arrives at Crewe station at 12:38 p.m. How long will he have to wait until the train to Coventry departs?

_____



Here are the times for a train from Inverness to London in 12-hour times.

12-Hour Times	Inverness	Edinburgh	Wigan	Wolverhampton	London
Departs at	11:09 a.m.	2:52 p.m.	5:28 p.m.	6:46 p.m.	8:32 p.m. (arrives)

3. Rewrite the timetable using 24-hour times.

24-Hour Times	Inverness	Edinburgh	Wigan	Wolverhampton	London
Departs at					(arrives)

4. Lydia arrives at Wigan station at 17:09. How long will she have to wait until the train to London departs? It took her 13 minutes to walk from home to the station. What time did she leave home? Write your answer using a.m. or p.m.

12-Hour Times	Inverness	Edinburgh	Wigan	Wolverhampton	London
Departs at	11:09 a.m.	2:52 p.m.	5:28 p.m.	6:46 p.m.	8:32 p.m. (arrives)

_____

5. How long is the journey from Inverness to London? Write your answer in two ways: hours and minutes (e.g. 1 hour 20 minutes) and in minutes (e.g. 80 minutes).

_____

6. A journey from one stop to the next stop takes more than 1 hour, but less than 90 minutes. What could the two stops be? Are there any other possible answers? Explain why you think this.

_____

7. A new route has been introduced. The train is a high speed train and it reduces the journey time from Inverness to London by 1 hour 15 minutes. If the train leaves Inverness at 10:30 a.m., what time should it arrive in London? Write your answer in 24-hour time.

_____

Train Time Problems **Answers**

1. Rewrite the timetable in 12-hour times, using a.m. and p.m.

12-Hour Times	Carlisle	Preston	Crewe	Birmingham	Coventry
Departs at	11:06 a.m.	12:15 p.m.	1:04 p.m.	2:19 p.m.	2:30 p.m. (arrives)

2. Toby arrives at Crewe station at 12:38 p.m. How long will he have to wait until the train to Coventry departs?
   26 minutes

3. Rewrite the timetable using 24-hour times.

24-Hour Times	Inverness	Edinburgh	Wigan	Wolverhampton	London
Departs at	11:09	14:52	17:28	18:46	20:32 (arrives)

4. Lydia arrives at Wigan station at 17:09. How long will she have to wait until the train to London departs? It took her 13 minutes to walk from home to the station. What time did she leave home? Write your answer using a.m. or p.m.
   She will have to wait 19 minutes. She left home at 4:56 p.m.

5. How long is the journey from Inverness to London? Write your answer in two ways: hours and minutes (e.g. 1 hour 20 minutes) and in minutes (e.g. 80 minutes).
   9 hours 23 minutes or 563 minutes

6. A journey from one stop to the next stop takes more than 1 hour, but less than 90 minutes. What could the two stops be? Are there any other possible answers? Explain why you think this.
   Wigan and Wolverhampton. Explanation shows that these are the only stops.

7. A new route has been introduced. The train is a high speed train and it reduces the journey time from Inverness to London by 1 hour 15 minutes. If the train leaves Inverness at 10:30 a.m., what time should it arrive in London? Write your answer in 24-hour time.
   18:38

Measurement | Train Times

I can solve time problems involving 12-hour and 24-hour times.		
I can convert between 12-hour and 24-hour times.		
I can count on a timeline to calculate how much time has passed.		
I can solve time problems using timetables written in 12-hour and 24-hour times.		

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