The Lost RAILWAY

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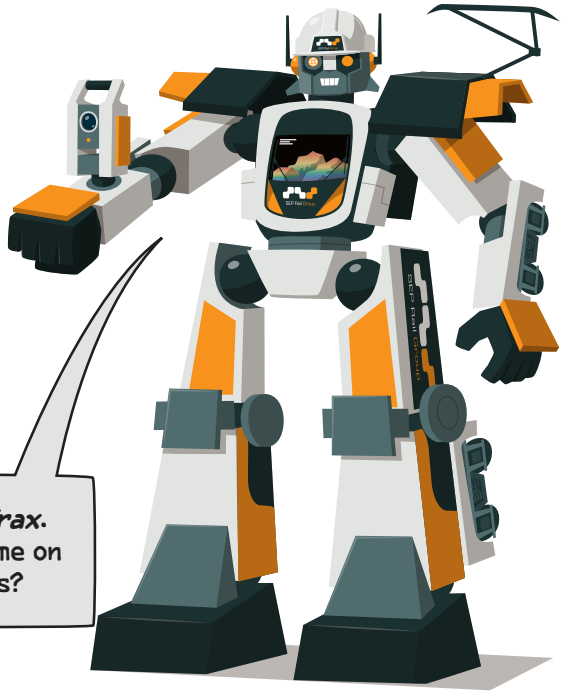


Ever heard of a railway robot? Now, you have! Meet **SEP-Trax**, a railway robot. SEP Trax has an amazing, unique ability to transform and adapt to any terrain or surveying challenge. But, SEP Trax needs your help! Help your new friend by completing the 5 tasks below.

TASK 1: UNSCRAMBLING THE CO-ORDINATES

(MATHS OBJECTIVES - CARTESIAN CO-ORDINATES, GRAPHING, NUMBER PATTERNS)

SEP-Trax is barely hanging by ropes from a high railway viaduct (a type of bridge). SEP-Trax gets to inspecting the high structure with trains rumbling above, and suddenly notices some old markings. He realises that these old markings must have been made by the Victorian stone masons that built the viaduct! The markings are old and covered with hanging vegetation. SEP-Trax tries to remove the vegetation but only finds the stonework and some of the markings to be damaged over time. Some of the markings have been lost! SEP-Trax uses their high-density laser scanner to find the small details of the markings high up on the viaduct walls. SEP-Trax studies this data to try and solve the puzzle of the missing marks. It looks like map co-ordinates. This must be the route of a lost railway and would help many people!

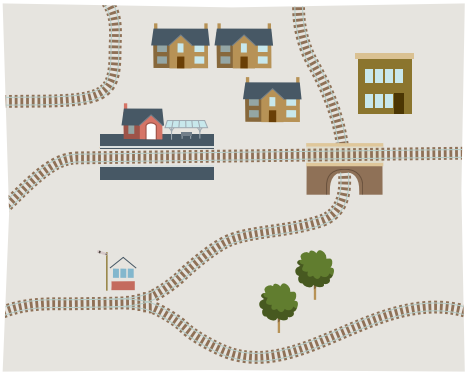
To help SEP-Trax find the lost railway, they will need help with working out the missing co-ordinates. Using the map provided, find and mark the co-ordinates by following the clues given. Each clue will help you discover the missing points of the map. (Hint: Remember, always read co-ordinates from the horizontal axis first, then the vertical axis).

TASK 2: PLOTTING THE ROUTE

(MATHS OBJECTIVES - CARTESIAN CO-ORDINATES, GRAPHING)

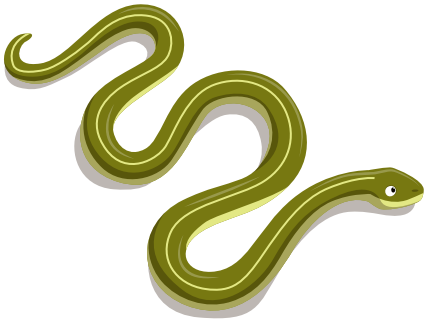
SEP-Trax uses their powerful Computer Aid Design system, to plot the route of the lost railway to a modern map. Glowing points appear on the map showing the features of the lost railway. You will need to use the unscrambled co-ordinates to plot the points on the map to identify the lost railway features. Circle the 10 locations on the map that the co-ordinates lead you to. Then, plan what is the best route to get to each point. Remember that the best trains need electricity to power them. Consider routes where electricity is available and the best route for the environment too.

TASK 3: DEVELOPING A NEW RAILWAY



(Maths Objectives - Mapping, Cartesian Co-ordinates)

SEP-Trax can finally adapt and calibrate for survey mode. SEP-Trax needs their survey tools working correctly to make sure they get their data correct. If one doesn't work correctly, it can cause BIG problems! They work out it is much safer to complete the survey at night when there are less trains running and the electricity can be turned off. SEP-Trax knows that the new location points will help connect the lost railway to the modern railway. You will need to use the graph to connect the lost railway to the modern railway network with new points and signals. Think about which directions the train will need to go with this new information.



TASK 4: WINGED WONDERS AND FURRY FRIENDS

(Science Objectives - Living Things, Features of Living Things, Habitats, Environmental Changes)

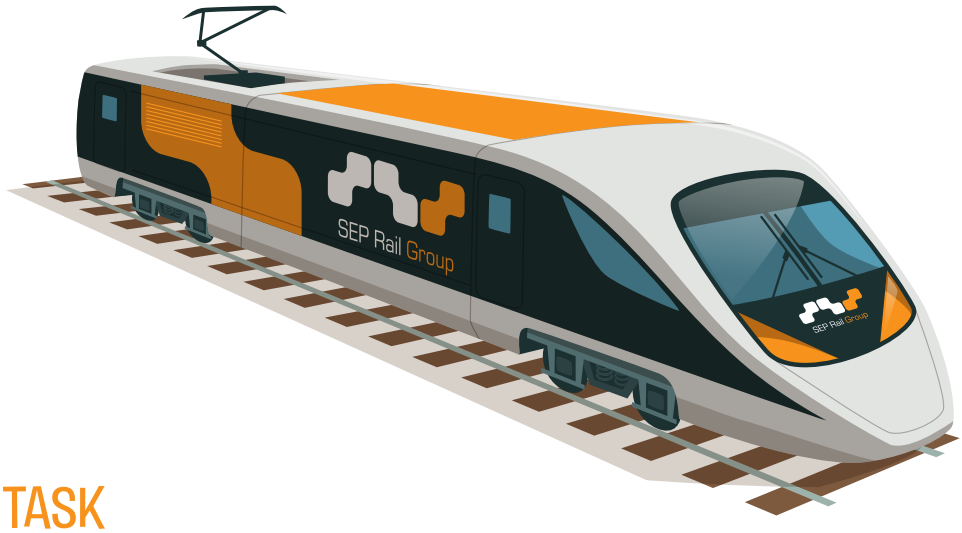
While designing and plotting this new route, SEP-Trax uses GPS receivers and lasers to survey bridges and buildings. However, they find that there is overgrown vegetation and thick woodland in some areas. Although SEP-Trax has the ultimate bush clearing equipment, they know that they can't cut down anything in their path. This could harm wildlife that live there.

You will need to help SEP-Trax investigate the wildlife in the area. Fill out the table and identify what wildlife is commonly found in railway corridors, what they look like and what SEP-Trax can do to help the wildlife thrive alongside the railway network.

TASK 5: TUNNEL TO TERMINUS TOWN

(Maths Objectives - Angles, Measurement and Geometry, Scale)

SEP-Trax continues to survey and take careful readings and notes, all of which to be included in the survey. They find some rusty old rails of the lost railway that guide them to the dark portal of Black Hill Tunnel. SEP-Trax adapts and uses their built-in laser scanner to ensure that the modern trains will be able to fit through old Black Hill tunnel. As SEP-Trax moves through the tunnel, they notice water all over the floor! The old drains have been blocked. Some parts will need to be replaced. You will need to work out the angles and distances from SEP Trax's laser scanner to see if the new trains will fit through the old tunnel. If it doesn't, work out how the tunnel can be changed to help new trains fit!



BONUS TASK

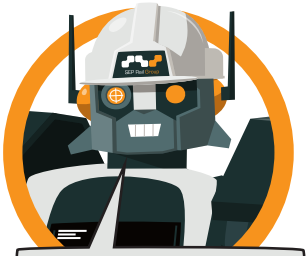
Terminus Town has not had a railway station for many years. A new station will need to be built. SEP-Trax thinks about the amazing benefits that a new railway station will bring to Terminus. SEPTrax needs one more thing from you, and only if you're up for the challenge! Write down a list on a sheet of paper or your workbook of all the benefits for bringing a railway back to Terminus Town.

Use the questions below to help you ponder:

- What would a train do for the people in Terminus?
- Will the station be accessible for ALL citizens?
- How do you think the citizens will react to a new station?

TASK 1

The Lost RAILWAY



Remember to read the horizontal axis first, then the vertical axis.

To help SEP-Trax find the lost railway, they will need help with working out the missing co-ordinates. Using the graph paper provided, find and mark the coordinates by following the clues given. Each clue will help you discover the missing points of the map. (Hint: Remember, always read co-ordinates from the horizontal axis first, then the vertical axis).

Clue 1: The first missing coordinate is halfway between Point A (3, 4) and Point B (7, 4).

Clue 2: The second missing coordinate is directly north of Point C (5, 6) by 2 units.

Clue 3: The third missing coordinate is 3 units east of Point D (2, 3).

Clue 4: The fourth missing coordinate is halfway between Point E (6, 2) and Point F (6, 8).

Clue 5: The fifth missing coordinate is directly south of Point G (8, 7) by 3 units.

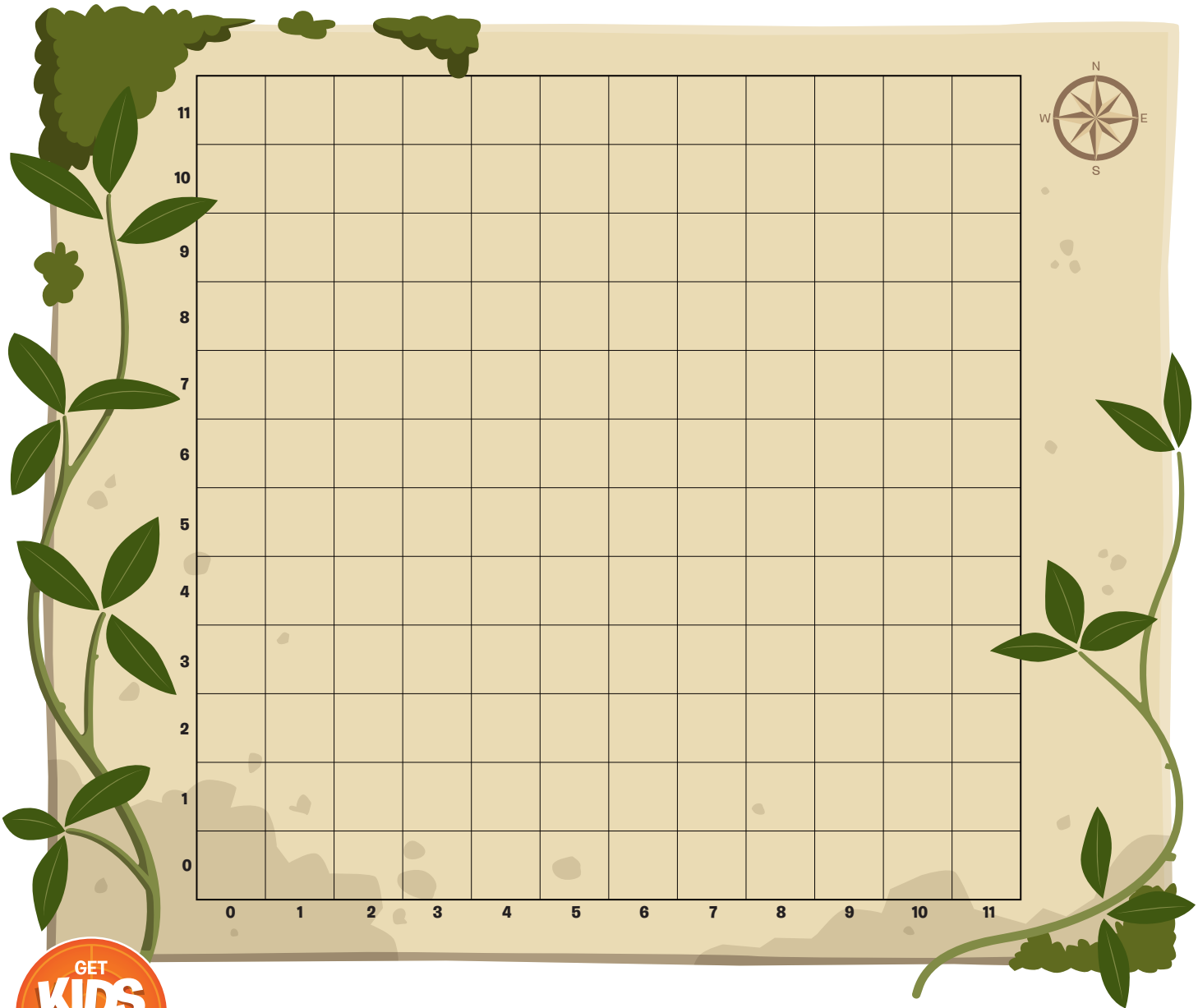
Clue 6: The sixth missing coordinate is halfway between Point H (4, 1) and Point I (4, 9).

Clue 7: The seventh missing coordinate is 4 units west of Point J (9, 5).

Clue 8: The eighth missing coordinate is directly east of Point K (1, 6) by 2 units.

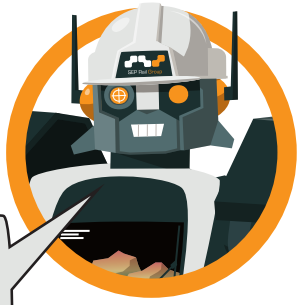
Clue 9: The ninth missing coordinate is halfway between Point L (0, 8) and Point M (10, 8).

Clue 10: The tenth missing coordinate is 5 units north of Point N (6, 0).



TASK 2

PLOTTING THE ROUTE

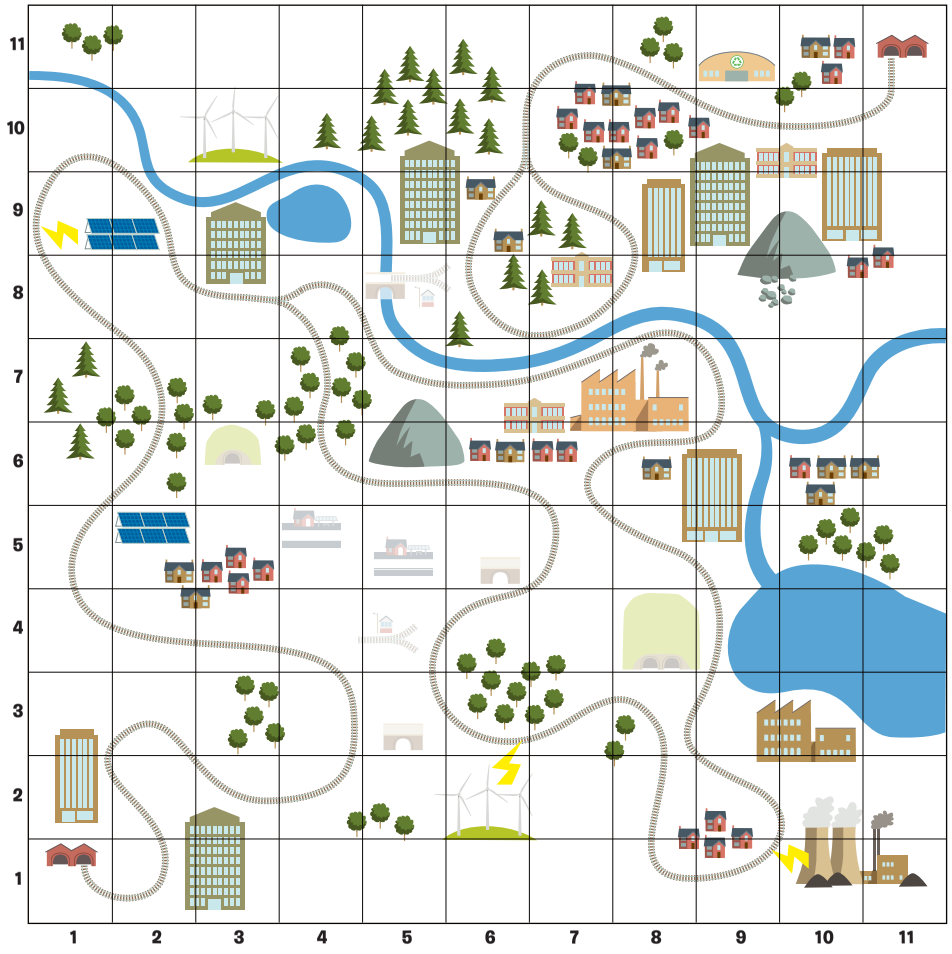


Use the unscrambled co-ordinates to plot the points on the map to identify the lost railway features. Circle the 10 locations on the map that the co-ordinates lead you to. Then, plan the best route to get to each point. Remember that the best trains need electricity to power them. Consider routes where electricity is available and the best route for the environment too..

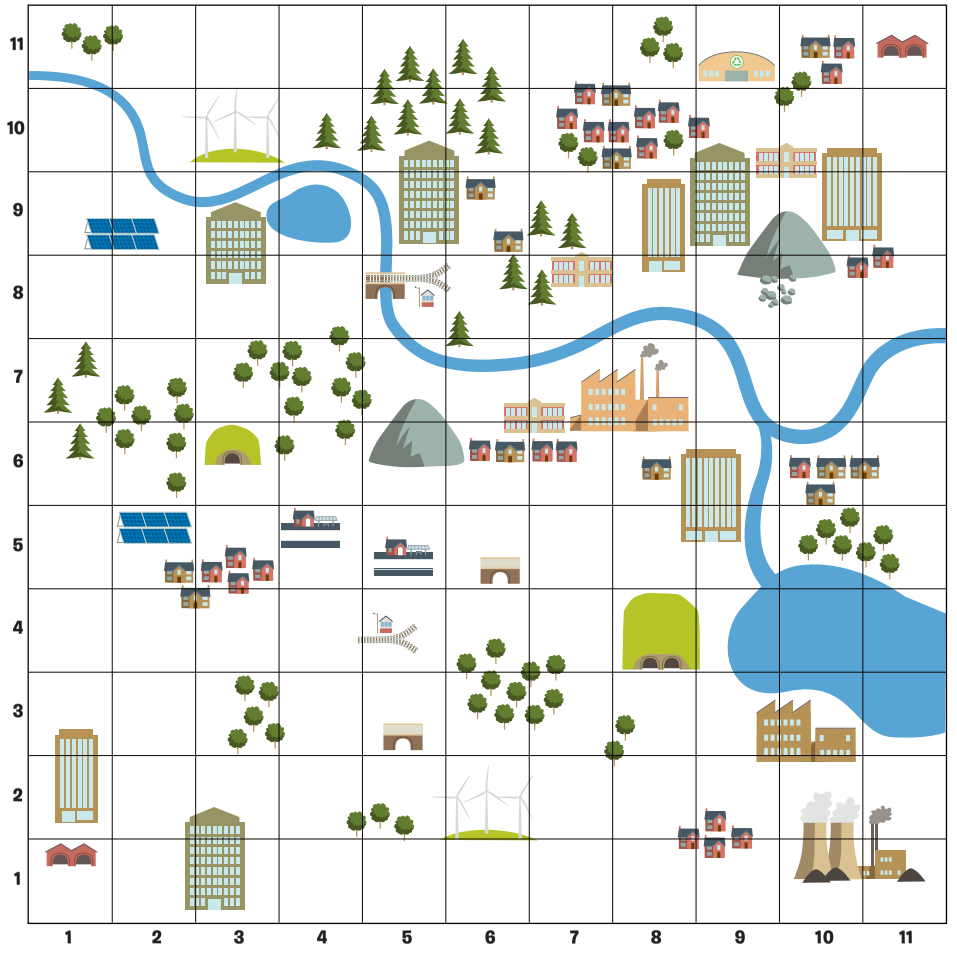
TASK 3

DEVELOPING A NEW RAILWAY

You will need to use the graph to connect the lost railway to the modern railway network with the location points you found on the old stonemason map. Think about which directions the train will need to go with this new information. Draw the new railway route on the map on the right.



Here's an example track that isn't very efficient.



Draw your own railway track that will be more efficient.

TASK 4

WINGED WONDERS AND FURRY FRIENDS

Fill out the table to find what wildlife live near railway tracks. You will need to research this information using valid and reliable sources. Record what animals are commonly found in railway corridors, what the animals look like and what SEPTrax can do to help these animals. Make sure to write down the source you used to find this information. Use at least 3 different sources.

Name of Animal	What does it look like?	How cam SEP-Trax help this animal?	Source Which website did you use?

CLUE 1

I am a small, scaly creature that loves to bask in the sun.

CLUE 2

I slither through fields and am often mistaken for a stick.

CLUE 3

I graze in the early morning and have antlers.

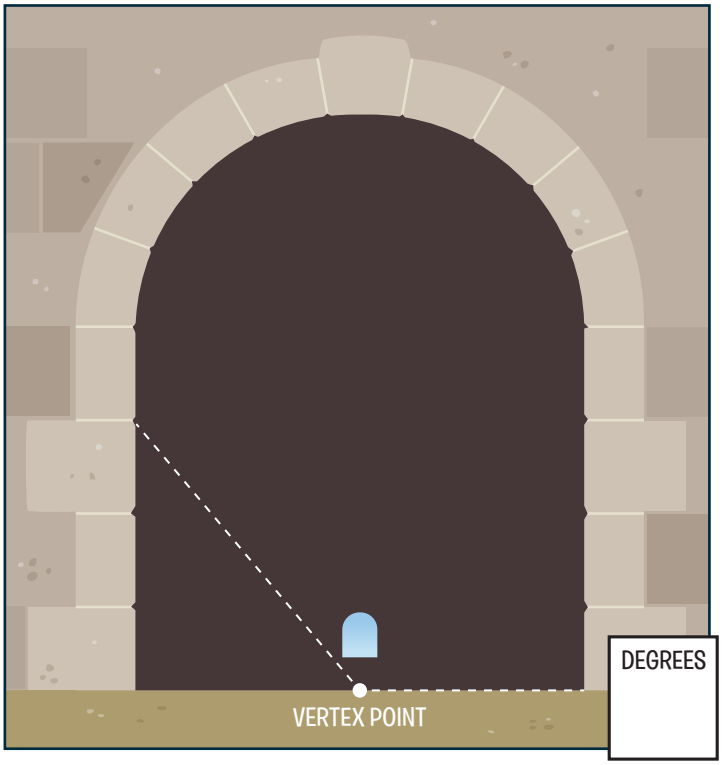
CLUE 4

I am small and furry and live near streams and rivers.

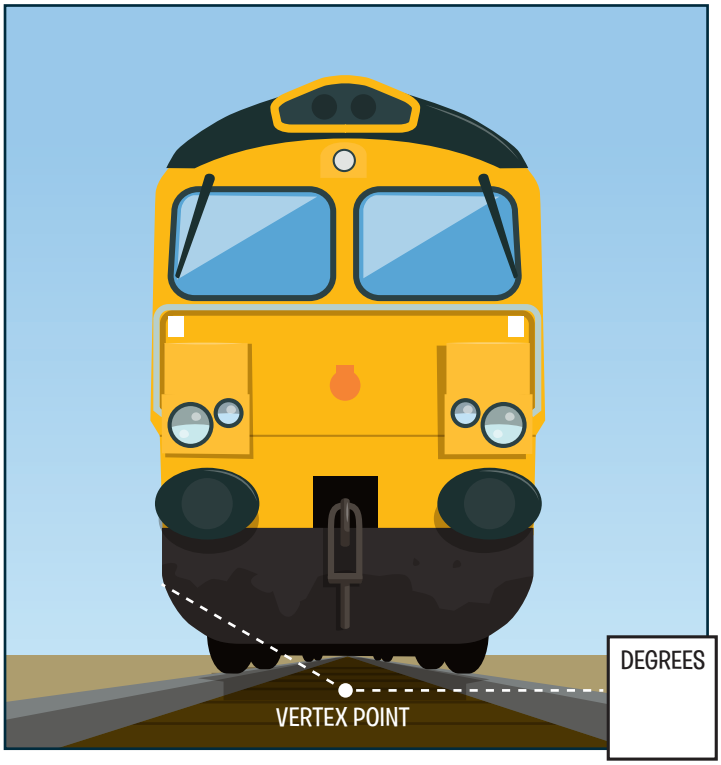
TASK 5

TUNNEL TO TERMINUS TOWN

Work out the angles and distances using a protractor and ruler to see if the new trains will fit through the old tunnel. Using the angles you find, sketch the tunnel and train to see if they fit. Then, explain why or why not the tunnel needs to be changed.



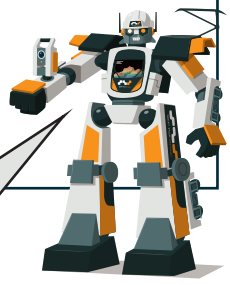
DEGREES



DEGREES

Your tunnel profile

Does the train fit in the tunnel? If it doesn't, explain how the tunnel can be changed to help new trains fit.



When using a protractor, use the centre marker for the point you are measuring. Then, read the outer circle of numbers to find the degrees.