Think Like an Engineer

Ever wondered what it’s like to be an engineer?

Well here’s your chance to plan your own road and think like one!

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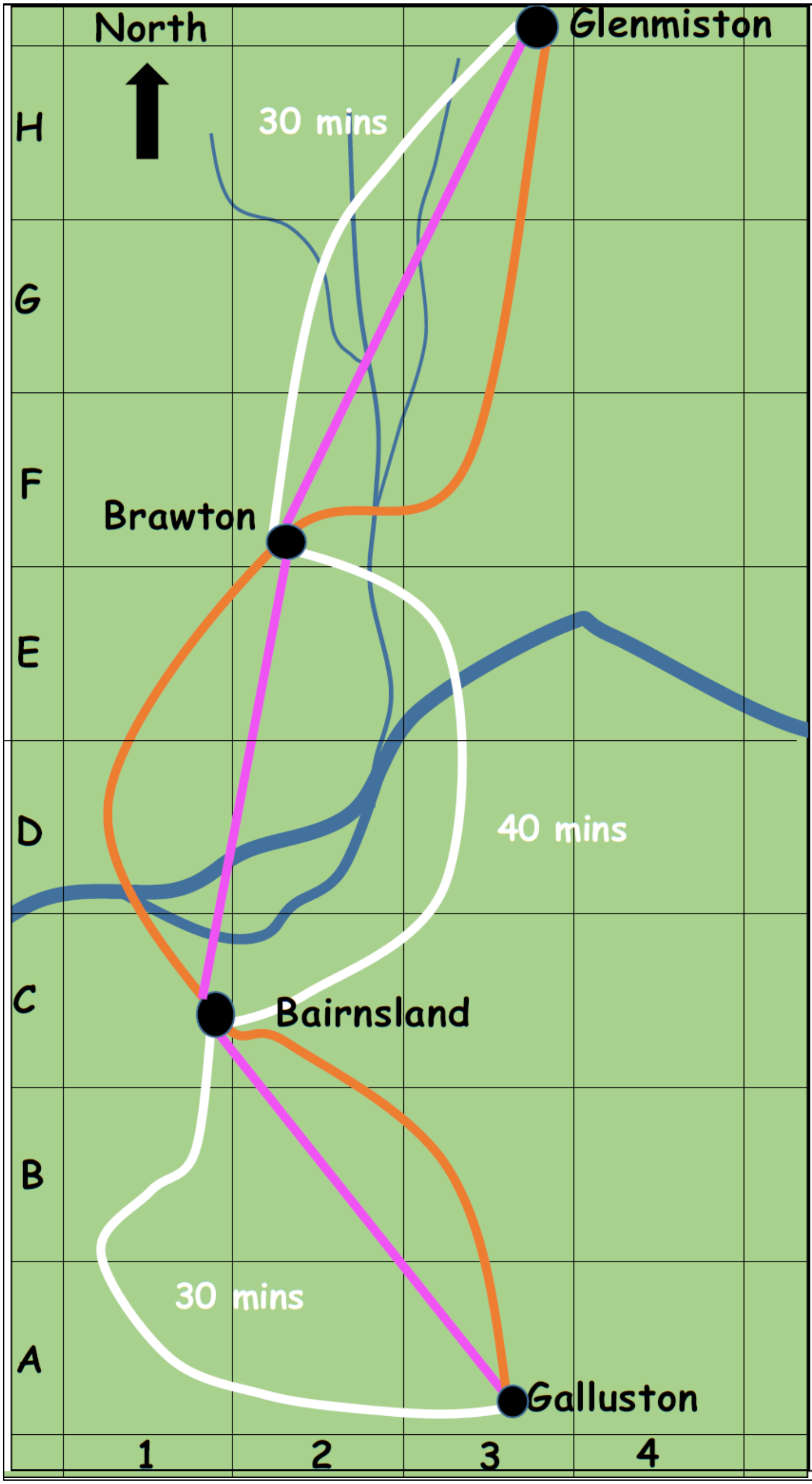
Learning Intentions:

- I am learning about the type of work an engineer does in a road dualling process
- I am learning the importance of tabulating data in order to make informed choices

Success Criteria;

- *I can explain the type of work an engineer carries out*
- *I can read data from different sources and use this to fill in tables correctly*
- *I can use coordinates to place constraints on a map*



Key:

- Route A
- Route B
- Route C
- River
- Town
- Farm
- Protected land
- Pylon
- Railway
- Village
- Bog
- Bridge
- Deer
- Mountains
- Tunnel

Drawn by:	Checked by:	Approved by:
KS	NB	DB

TRANSPORT SCOTLAND

ACADEMY 9 PERTH TO INVERNESS

An Engineer's Choice

Highland Route Selection

Worksheet Tabulating Information

Table 1:

Route	From	To	Time (Mins)	Penalty Points	Top Tip!
A	Galluston	Bairnsland			5 mins = 1 penalty point.
	Bairnsland	Brawton			
	Brawton	Glenmiston			
Totals			Time	Points	

Table 2:

Constraint	Number (Look at your map!)	Penalty Points per Constraint (Look at your data sheet!)	Penalty Points
Herds of Deer			
Bogs			
Protected Area			
Bridges			
Total Constraint Penalty Points			

Table 3:

Total Time Penalty Points	
Total Constraint Penalty Points	
Total Penalty Points for Route A	

Engineer Name:	Checked by:	Approved by:

Worksheet Tabulating Information

Table 1:

Route	From	To	Time (Mins)	Penalty Points	Top Tip!
A	Galluston	Bairnsland	30		5 mins = 1 penalty point.
	Bairnsland	Brawton	40		
	Brawton	Glenmiston	30		
Totals			Time	Points	
			30+40+30= **100**		

Table 2:

Constraint	Number (Look at your map!)	Penalty Points per Constraint (Look at your data sheet!)	Penalty Points
Herds of Deer			
Bogs			
Protected Area			
Bridges			
Total Constraint Penalty Points			

Table 3:

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Engineer Name:	Checked by:	Approved by:

Worksheet Tabulating Information

Table 1:

Route	From	To	Time (Mins)	Penalty Points	Top Tip!
A	Galluston	Bairnsland	30	30/5= 6	5 mins = 1 penalty point.
	Bairnsland	Brawton	40	40/5= 8	
	Brawton	Glenmiston	30	30/5= 6	
Totals			Time	Points	
			30+40+30= **100**	6+8+6 = **20**	

Table 2:

Constraint	Number (Look at your map!)	Penalty Points per Constraint (Look at your data sheet!)	Penalty Points
Herds of Deer			
Bogs			
Protected Area			
Bridges			
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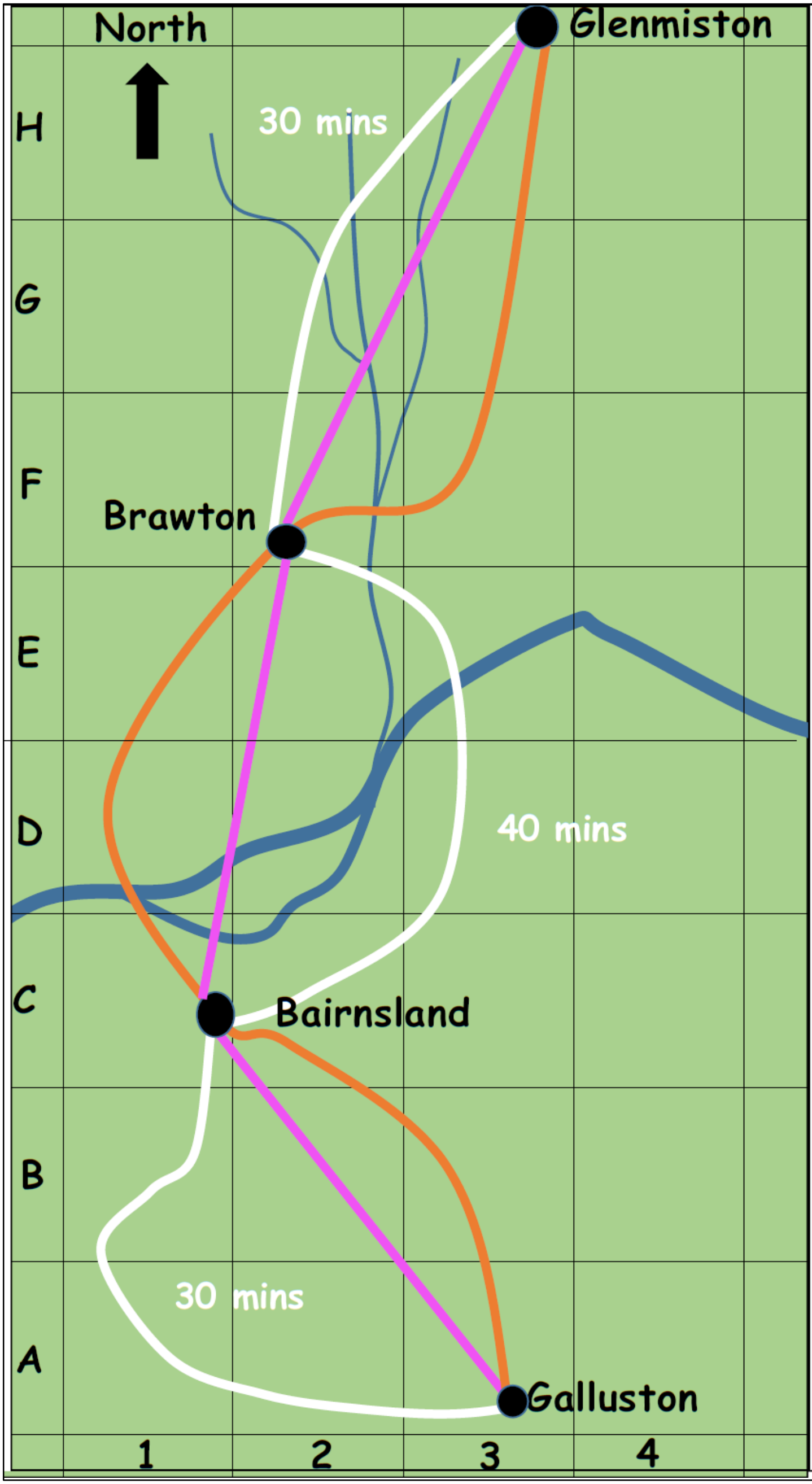

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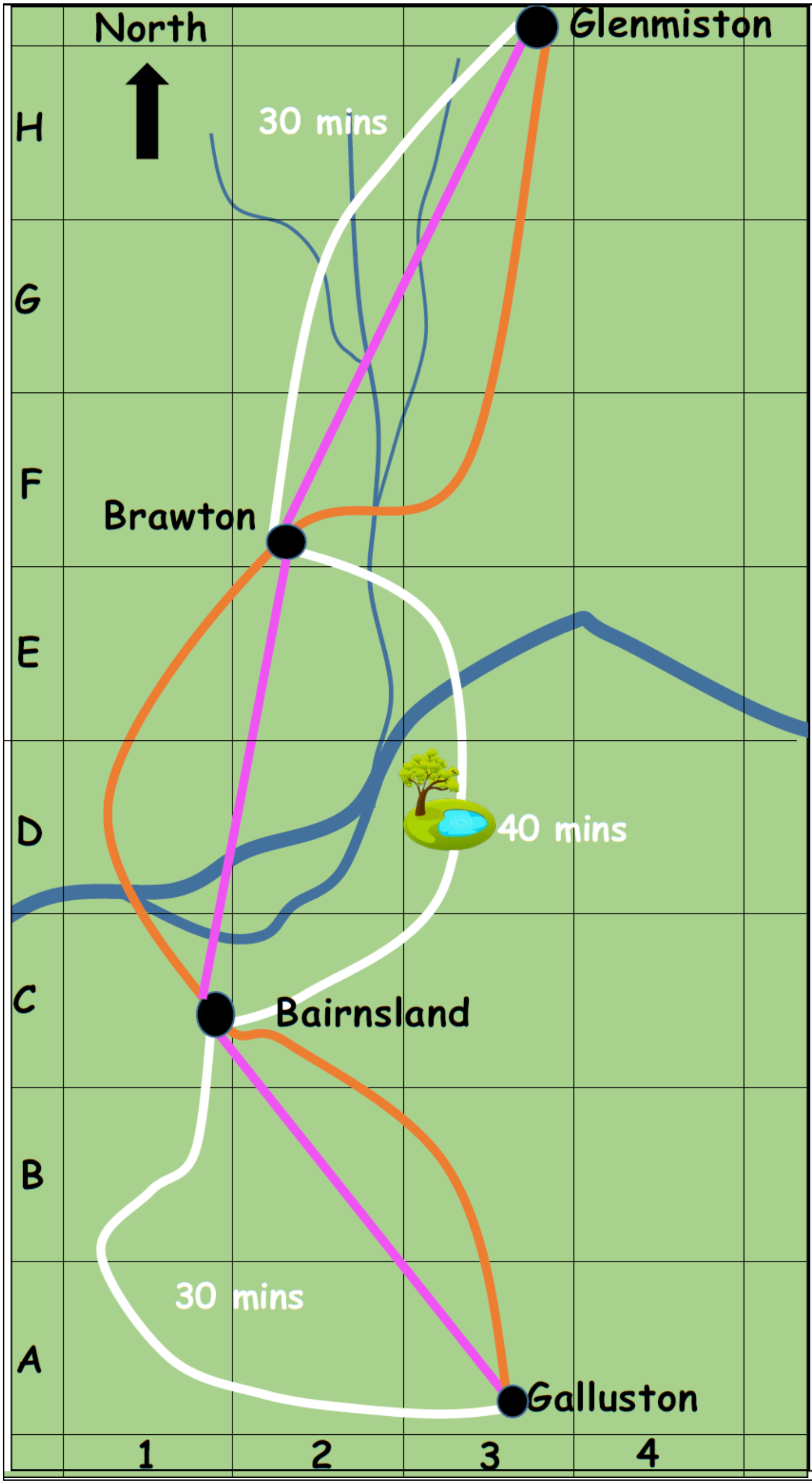
Highland Route Selection



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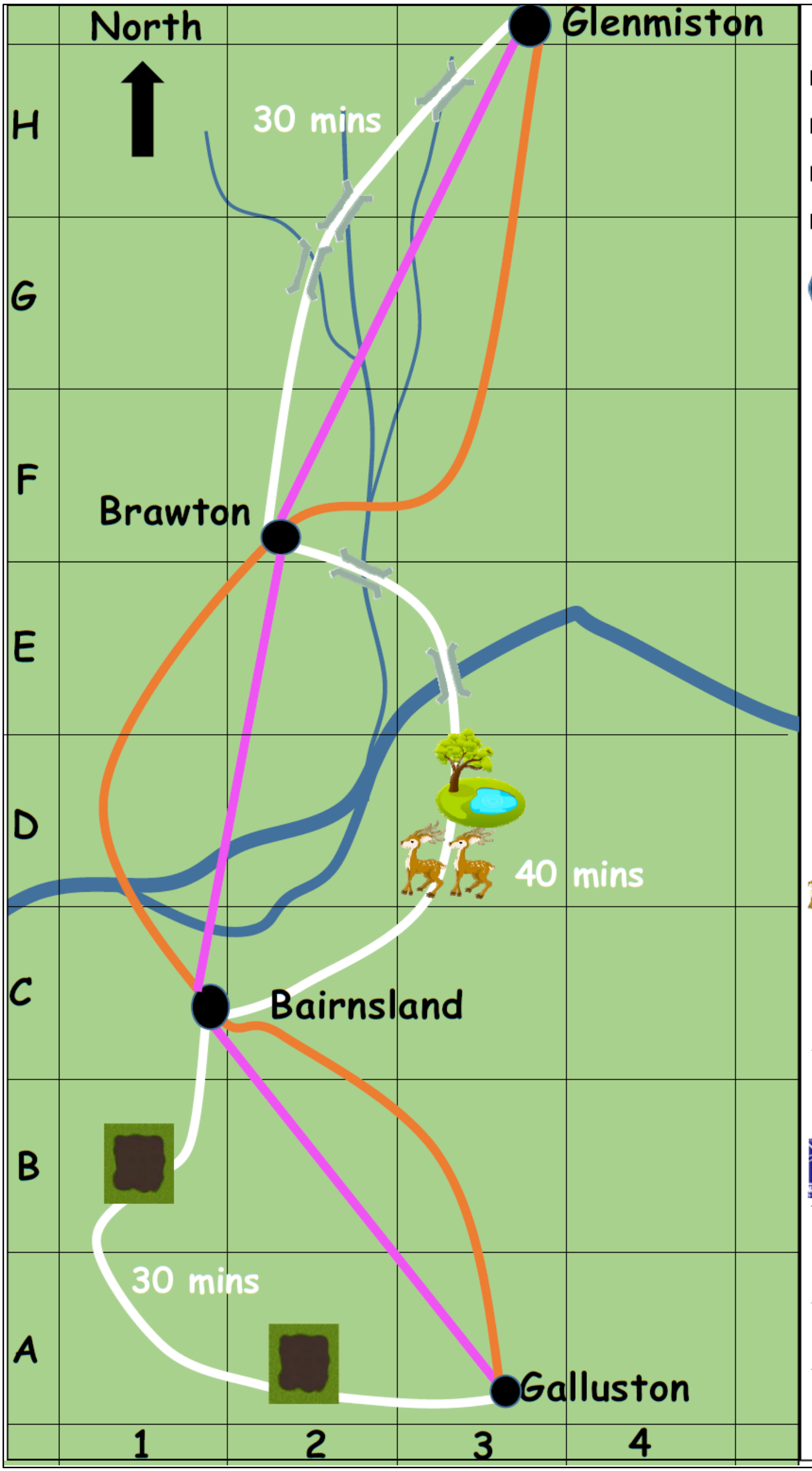
Highland Route Selection



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Totals			Time	Points	
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Table 2:

Constraint	Number (Look at your map!)	Penalty Points per Constraint (Look at your data sheet!)	Penalty Points
Herds of Deer			
Bogs			
Protected Area			
Bridges			
Total Constraint Penalty Points			

Table 3:

Total Time Penalty Points	
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Total Penalty Points for Route A	

Engineer Name:	Checked by:	Approved by:

Worksheet Tabulating Information

Table 1:

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	Brawton	Glenmiston	30	30/5= 6	
Totals			Time	Points	
			30+40+30= **100**	6+8+6 = **20**	

Table 2:

Constraint	Number (Look at your map!)	Penalty Points per Constraint (Look at your data sheet!)	Penalty Points
Herds of Deer	1		
Bogs	2		
Protected Area	1		
Bridges	5		
Total Constraint Penalty Points			

Table 3:

Total Time Penalty Points	
Total Constraint Penalty Points	
Total Penalty Points for Route A	

Engineer Name:	Checked by:	Approved by:

Worksheet Tabulating Information

Table 1:

Route	From	To	Time (Mins)	Penalty Points	Top Tip!
A	Galluston	Bairnsland	30	30/5= 6	5 mins = 1 penalty point.
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	Brawton	Glenmiston	30	30/5= 6	
Totals			Time	Points	
			30+40+30= **100**	6+8+6 = **20**	

Table 2:

Constraint	Number (Look at your map!)	Penalty Points per Constraint (Look at your data sheet!)	Penalty Points
Herds of Deer	1	15	
Bogs	2	10	
Protected Area	1	20	
Bridges	5	5	
Total Constraint Penalty Points			

Table 3:

Total Time Penalty Points	
Total Constraint Penalty Points	
Total Penalty Points for Route A	

Engineer Name:	Checked by:	Approved by:

Worksheet Tabulating Information

Table 1:

Route	From	To	Time (Mins)	Penalty Points	Top Tip!
A	Galluston	Bairnsland	30	30/5= 6	5 mins = 1 penalty point.
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	Brawton	Glenmiston	30	30/5= 6	
Totals			Time	Points	
			30+40+30= **100**	6+8+6 = **20**	

Table 2:

Constraint	Number (Look at your map!)	Penalty Points per Constraint (Look at your data sheet!)	Penalty Points
Herds of Deer	1	15	15 x 1 = **15**
Bogs	2	10	10 x 2 = **20**
Protected Area	1	20	20 x 1 = **20**
Bridges	5	5	5 x 5 = **25**
Total Constraint Penalty Points			15 + 20 + 20 + 25 = **80**

Table 3:

Total Time Penalty Points	
Total Constraint Penalty Points	
Total Penalty Points for Route A	

Engineer Name:	Checked by:	Approved by:

Worksheet Tabulating Information

Table 1:

Route	From	To	Time (Mins)	Penalty Points	Top Tip!
A	Galluston	Bairnsland	30	30/5= 6	5 mins = 1 penalty point.
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Protected Area	1	20	20 x 1 = **20**
Bridges	5	5	5 x 5 = **25**
Total Constraint Penalty Points			15 + 20 + 20 + 25 = **80**

Table 3:

Total Time Penalty Points	20
Total Constraint Penalty Points	80
Total Penalty Points for Route A	100

Engineer Name:	Checked by:	Approved by:

Review – Have we achieved our SCs?

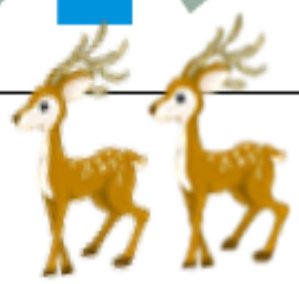
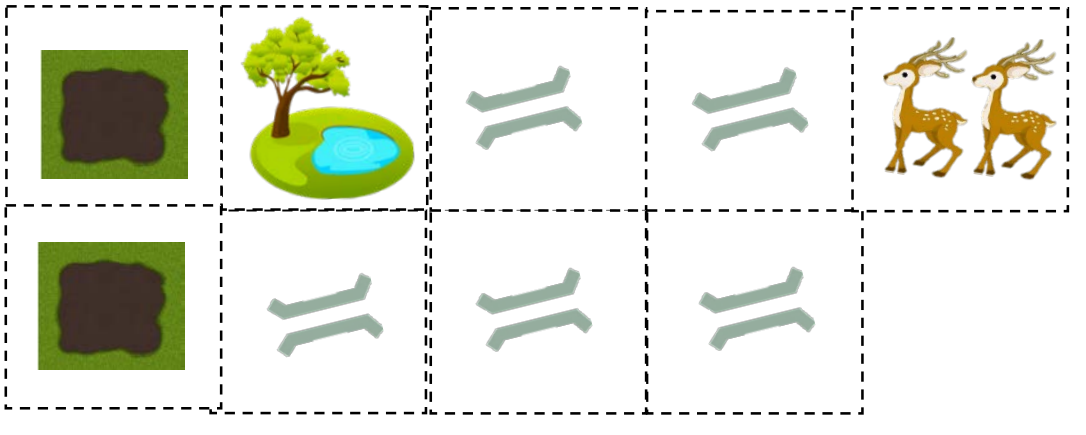
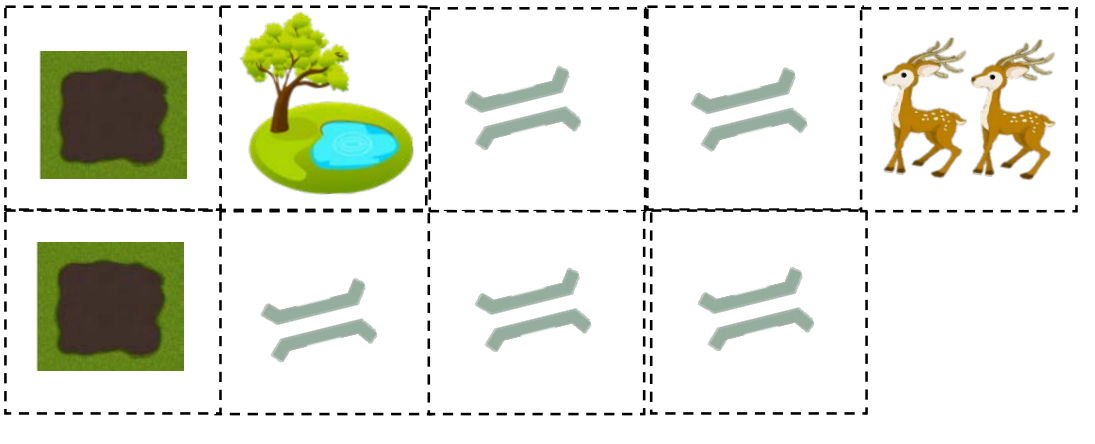
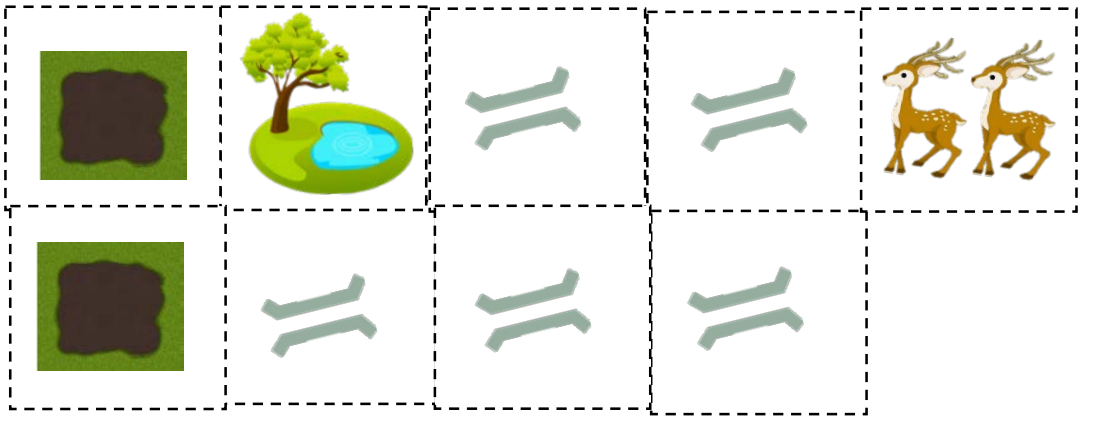
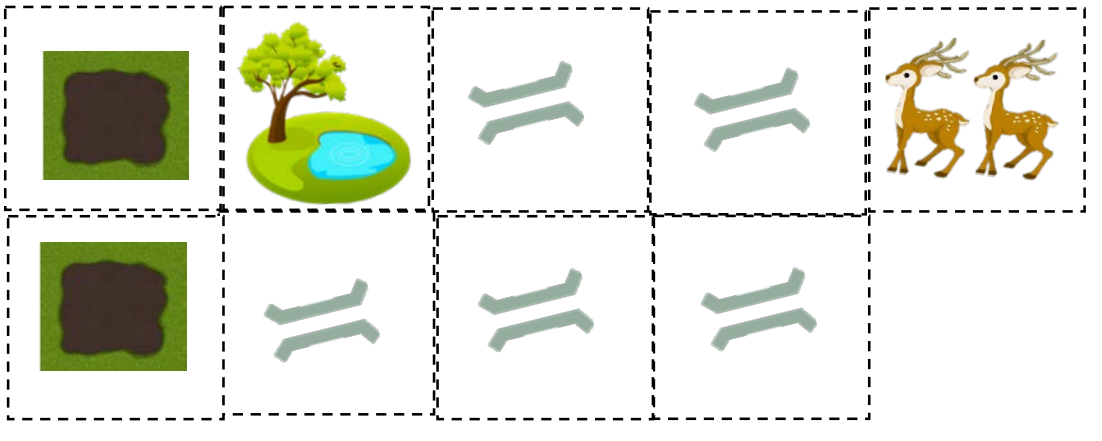
Learning Intentions:

- I am learning about the type of work an engineer does in a road dualling process
- I am learning the importance of tabulating data in order to make informed choices

Success Criteria;

- *I can explain the type of work an engineer carries out*
- *I can read data from different sources and use this to fill in tables correctly*
- *I can use coordinates to place constraints on a graph*

Data Sheet

Constraint Symbol	Constraint	Co-ordinates	Penalty Points
	Farm Crossing	2, E	10 points
	Protected Area	3, D	20 points
	Electricity Pylon	1, E	15 points
	Railway Crossing	2, C and 1, C	15 points
	Village	3, G	30 points
	Bog	1, B and 2, A	10 points
	River Bridge	You tell us! What obstacle does this help get people past?	5 points
	Herd of Deer	3, D	15 points
	Mountains	3, G	None - they are just where they are! It's up to Engineers to overcome these challenges!
	Tunnel	You tell us! What obstacle does this help get people past?	50 Points

These are the correct size for the cut-outs (1 set of cut-outs per child)