

Planning a railway

Outline:

This activity is designed to support the Clean, Green Trains resource to aid with engaging pupils in a decision making activity that uses ideas about modern technology. The idea is that pupils will work in teams to plan a rail system for a fictitious island with several communities and facilities that would benefit from better transport links. Each team has a set budget and has to make decisions about priorities. They develop ideas, decide on a good solution and present a case.

By having pupils involved in a discussion and decision based activity, this provides a good opportunity for student interaction and discussion about their ideas and explanations.

Reinforced skills:

- Using maps
- Taking measurements
- Performing calculations
- Teamwork
- Decision making
- Understanding and applying information

Resources required

Each team will need:

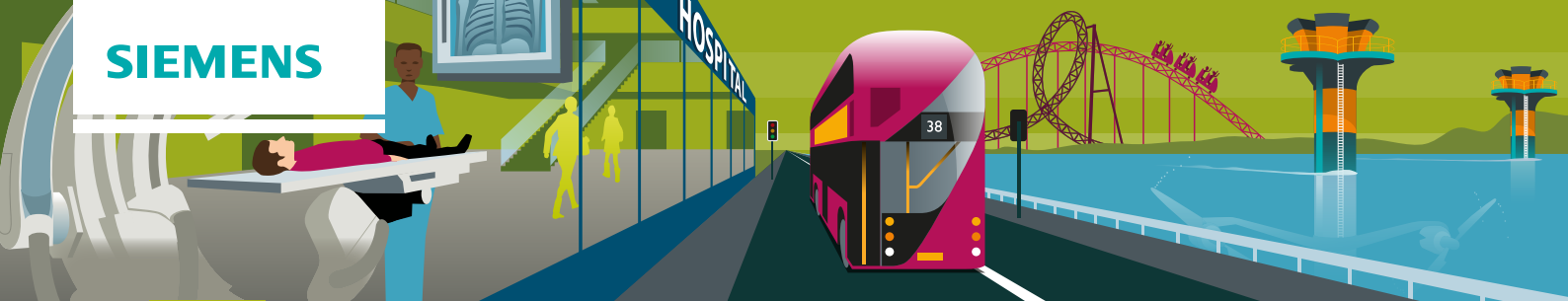
- ☐ A map of the island
- ☐ A list of the prices of the components
- ☐ A budget sheet
- ☐ The facility to make notes of the key features when presenting the case

Learning objectives

- To understand how resources are allocated to projects on the basis of needs
- To balance various demands on resources to develop an overall solution
- To present key features of the solution to support sharing of ideas and evaluation

Outcome

- A plan for an island rail system, justified against the budget and presented as a solution for the transport needs of the islanders.



Outline scenario:

Each team has an island map, with towns, other infrastructure and contours marked. This provides a number of features that need linking. Pupils 'buy' assets using their 'budget', which is sufficient to allow for a range of solutions but limited to the point where decisions have to be made about priorities. They plan their system, making decisions about where to focus resources and present their solution.

The budget has to cover:

- Track – single or double (double is more expensive but allows more trains per hour)
- Stations – major or minor
- Trains – passenger or freight

The island includes:

- Capital city
- Larger towns
- Smaller town
- Industrial area
- Port
- Airport
- Mountainous area (unsuitable for railway construction)
- Area of natural beauty (railway construction likely to be opposed, but case could be made on grounds of attracting visitors)

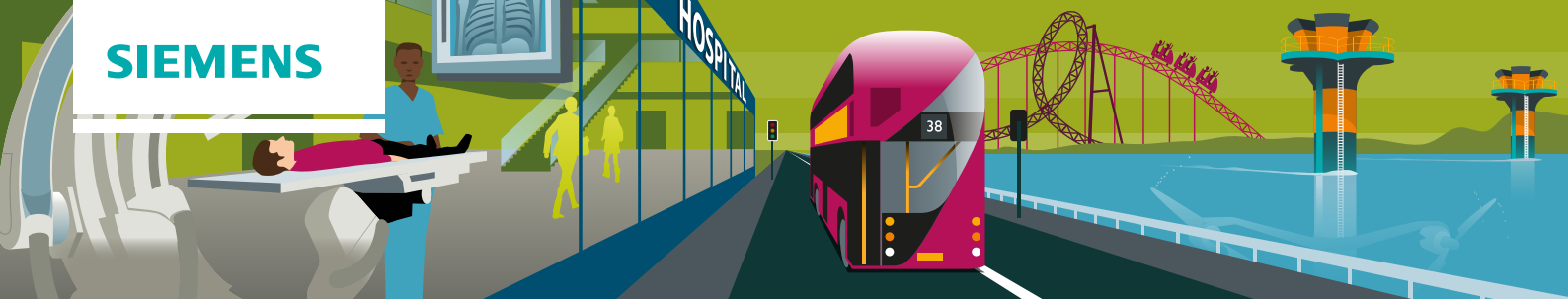
Constraints:

The budget will be sufficient to allow all key points to be connected but insufficient to allow either every point to be directly linked to every other point or for one continuous double track link between all points.

The precise details will be worked out once the size of the map has been agreed, but the outline assumption is that it will be printed on an A3 sheet.

Regulations:

- Single track links allow one train per hour in each direction
- Double track links allow up to one train every fifteen minutes in each direction
- Where a double track line ends, or meets with a single track line, a major station is required
- All other stations can be minor stations
- Stations handle freight as well as passengers
- Each station to station link needs its own passenger train if it is to offer a passenger service and its own freight train if it is to offer a freight service
- Project budget: 200 ducats

**Prices:**

- Double track @ 5 ducats/cm
- Single track @ 3 ducats/cm
- Major stations @ 10 ducats
- Minor stations @ 5 ducats
- Passenger trains @ 5 ducats
- Freight trains @ 5 ducats

Example:

Constructing a double track line from the capital to town A, a single track line from town A to the port and equipping both sections with a passenger train and a freight train would cost:

Item		Capital - town A	Town A - port	Notes
Track	Double	8 @ 5 = 40	-	Assume 8cm on A3 map
	Single	-	12 @ 3 = 36	Assume 12cm on A3 map
Station	Major	2 @ 10 = 20		Major station at either end
	Minor	-	1 @ 5 = 5	Station already at town A. Single track so minor station at port
Train	Passenger	1 @ 5 = 5	1 @ 5 = 5	
	Freight	1 @ 5 = 5	1 @ 5 = 5	
Total		70	51	

This would provide a service of one passenger train and one freight train every 15 minutes each way between the capital and town A and one every hour between town A and the port.

In such a way, teams of pupils would be able to devise an overall plan for the island.

