



Stringways

Scenario

A large new area in Central Australia is being developed for settlement. Your team has been employed to develop a high-speed railway network to connect the new cities and towns. An alternative airborne network must also be developed to cater for emergencies.

Aim

The aim of this half-day activity is to develop networks to join a series of towns in the most efficient way possible. The higher the efficiency of linkage (i.e. minimum travel distance) the more points your team earns.

What to do

Each team will be given a Stringways board, Quick-start / Scenario Booklet and two lengths of coloured string.

In the initial scenarios, your team will select the routes for rail lines to connect towns. Due to various topographical features (hills, rivers, etc.), only the pre-existing black pathways printed on the board can be used. Your score will be determined by measuring the length of your proposed railway line (string).

In the later scenarios, a cure has been developed for a disease that has spread quickly across the new settlements. Your team must plan a route for the helicopter to distribute the cure from town to town.

Rules

Do not remove the strings from the board unless directed to do so by the Event Staff. Unless otherwise stated, you must follow the pre-existing black pathways printed on the board.

Any team that does not make a serious attempt - i.e. does not include more than 30 towns per string - will receive zero points for the scenario.

Any team that cuts, tangles, knots, loses or otherwise damages their strings will receive zero points for the entire activity.

Teams work at their own pace but must complete the scenarios in order, i.e. 1, 2, 3, etc. If a scenario is missed, any later scenarios will not be scored.

The string only needs to touch the towns, and not necessarily looped right around them.

Scoring

In the initial scenarios the aim is to visit as many towns (bolts) as possible but to have as much string left over as possible. Teams score one point per centimetre of string remaining at the completion of each scenario. Points are deducted each time a town (bolt) or pathway (the pre-existing black pathways printed on the Stringways board) is missed.

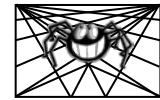
The later scenarios are more challenging with additional penalties and rewards.

Tips

Be careful to follow the pre-existing black pathways printed on the Stringways board when required to do so; the penalties are severe otherwise.

Scenarios 7-12 are much more challenging. It is very important that every member of each team contributes to the solution.

Don't spend too long on each scenario (about 10 minutes should do); the more scenarios you complete the more opportunities there are to earn points.



Overview of all scenarios

Scenario	Parameters						Penalties			Income	
	String	Start Location	Finish Location	Follow pathways?	Special Conditions	Miss a town (-20)	Miss a pathway (-20)	Not meeting special conditions (-50)	Left over string	Points shown on board	
1	Lime	Anywhere	Anywhere	Yes	-	Yes	Yes	-	1 pt/cm	-	
2	Lime	Anywhere	Anywhere	Yes	Do not include RED towns	Yes	Yes	Yes	1 pt/cm	-	
3	Lime	Anywhere	Anywhere	Yes	Must alternate between BLUE and RED towns	Yes	Yes	Yes	1 pt/cm	-	
4	Lime & Pink	Anywhere	Anywhere	Yes	Strings must not cross over	Yes	Yes	Yes (2)	1 pt/cm	-	
5	Lime & Pink	Capitol City	Capitol City	No	Do not include BLUE or RED towns	Yes	-	Yes (2)	1 pt/cm	-	
6	Lime & Pink	Anywhere	Anywhere	No	Lime must connect all BLUE towns Pink must connect all RED towns	Yes	-	Yes (2)	1 pt/cm	-	
7	Lime	Capitol City	Capitol City	Yes	Must start at, and return to Capitol City	-	Yes	Yes	1 pt/cm	Yes	
8	Lime & Pink	Anywhere	Anywhere	No	Lime must connect towns valued '1-5' Pink must connect towns valued '6-10'	-	-	Yes	1 pt/cm	Yes	
9	Lime	Capitol City	Capitol City	No	Connect all the BLUE towns	-	-	Yes (2)	1 pt/cm	Yes	
10	Lime	Allocated (A)	Allocated (B)	Yes	Must start at Town A, and finish at Town B Must include every '7' town	-	Yes	Yes (3)	1 pt/cm	Yes	
11	Lime	Capitol City	Capitol City	No	Must include BLUE and RED towns	-	-	Yes (2)	1 pt/cm	Yes	
12	Lime & Pink	Allocated (A) Allocated (B)	Allocated (B) Allocated (A)	Yes	Lime String - Town A > Town B Pink String - Town B > Town A Must include at least one town of each point value	-	Yes	Yes	1 pt/cm	Yes	



STUDENT ACTIVITY NOTES

Stringways

The problem

Plans to settle a large new area in Central Australia are being developed and your team must design various railway networks to connect the new cities and towns.

Later, alternate networks have to be designed for emergency situations. In these emergencies a sickness has spread to all the towns, and your team must plan the most efficient route for the helicopter to take the vaccine to the towns.

Duration

This activity runs for a half day (approximately 2 hours).

Terms

There are some terms used in this activity that you may not be familiar with:

Node	A node is simply a connection or joining point. For example, a road intersection, where roads cross or join, could be called a traffic node. In Stringways, each of the towns (bolts) is a node.
Network	A network results from joining a series of nodes. For example, a computer network uses fibre-optic cable or wire to join individual computers (nodes) into a communications network.
Route	A word meaning road, track or pathway.

Materials

Each team gets a Stringways board (a section is reproduced in figure 1 below) and two lengths of different coloured string (both are the same length).

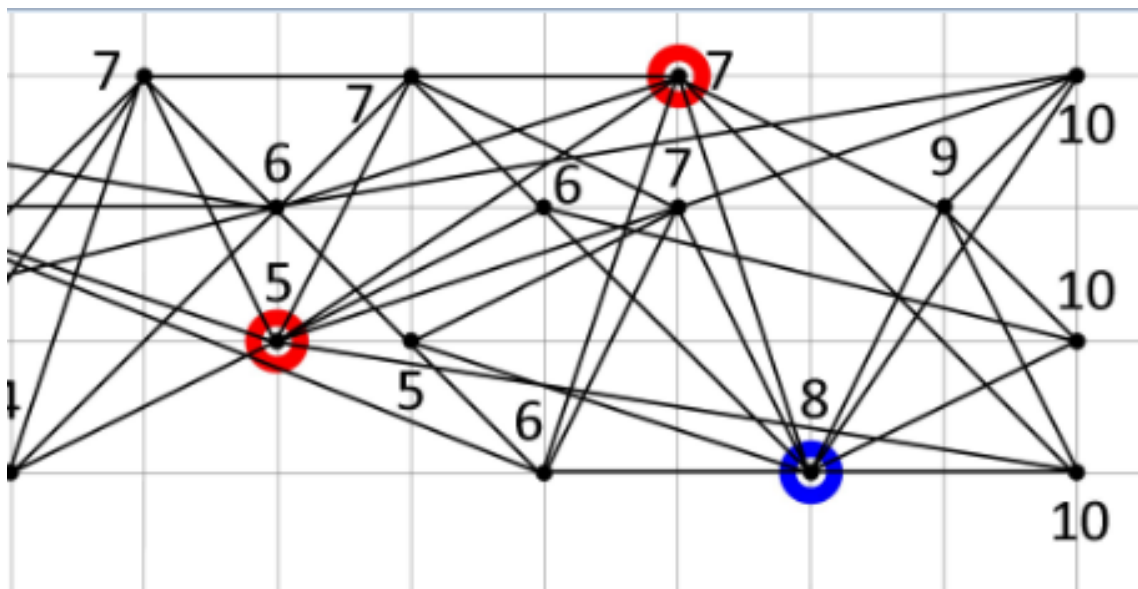


Figure 1: The top-right corner of the Stringways board showing the pre-existing pathways (black lines), the numbered town bolts (small black dots) and coloured town bolts (large coloured circles).



Rules

1. Do not remove the strings from the board unless directed to do so by the Event Staff.
2. Unless otherwise stated, you must follow the pre-existing black pathways printed on the board.
3. Any team that does not make a serious attempt - i.e. does not include more than 30 towns per string - will receive zero points for the scenario.
4. Any team that deliberately cuts, tangles, knots, loses or otherwise damages their strings will receive zero points for the entire activity.
5. Teams work at their own pace but must complete the scenarios in order, i.e. 1, 2, 3, etc. If a scenario is missed, any later scenarios will not be scored.
6. The string only needs to touch the towns, and not necessarily looped right around them.

Scoring

Allow approximately 10 minutes to do each scenario. Ensure each scenario is marked by the Event Staff before moving on to the next scenario.

At the end of each scenario, once your board has been scored, carefully remove all the string and wind it back onto the spool provided.

Tips

- In the initial scenarios the aim is to visit as many towns as possible and have as much string left over as you can, i.e. the shortest interconnecting path.
- Unless otherwise stated, be careful to only use the pre-existing black pathways printed on the Stringways board; otherwise the penalties are severe.
- Scenarios 7-12 are much more challenging. It is very important that every member of each team contributes to the solution.
- Don't spend too much time on each scenario. The more scenarios you complete, the more opportunities there are to score points.
- Notify the activity Event Staff as soon as your team has finished each scenario. One of them will mark it and then you will be able to move onto the next scenario. If you work quickly you can get through more scenarios and – hopefully – score more points!



SCORE SHEET

Stringways

School name: _____

AM / PM
circle one

Scenario number v	Income	Penalties					Total for each scenario (can be negative) (A)-(B+C)
	String left over in cm	20 point penalties (missed town or pathways)			50 point penalties (special conditions: see notes)		
	(A)	Missed	Tally	x 20 (B)	Tally	x 50 (C)	
1		Town					
		Pathway					
2		Town					
		Pathway					
3		Town					
		Pathway					
4		Town					
		Pathway					
5		Town					
		Pathway					
6		Town					
		Pathway					
Score subtotal						(D)	

Score subtotal (D) + Score subtotal (L) = FINAL SCORE _____



Scenario number	Income										Penalties			Total for each scenario (F+G) - (J+K)											
	Value of towns (bolts) NOT included in route										Total value of bolts not in route (E)	Bolt points for each scenario = 522 - E (F)	String left over in cm (G)		20 point penalties (not following pathways on board) Tally	Tallyx20 (J)	50 point penalties (special conditions: see notes) Tally	Tallyx50 (K)							
	1	2	3	4	5	6	7	8	9	10															
7	Tally																								
	Tally x town value																								
8	Tally																								
	Tally x town value																								
9	Tally																								
	Tally x town value																								
10	Tally																								
	Tally x town value																								
11	Tally																								
	Tally x town value																								
12	Tally																								
	Tally x town value																								
Score subtotal																									
(L)																									