

Contagion

The year is 2040 - the infectious disease POP-63 threatens to spread out of control. You have the power to stop it! Your goal in each of these puzzles is to ensure that, of those people who are susceptible to the disease, more end up protected against the disease (green), than catch the disease (purple).

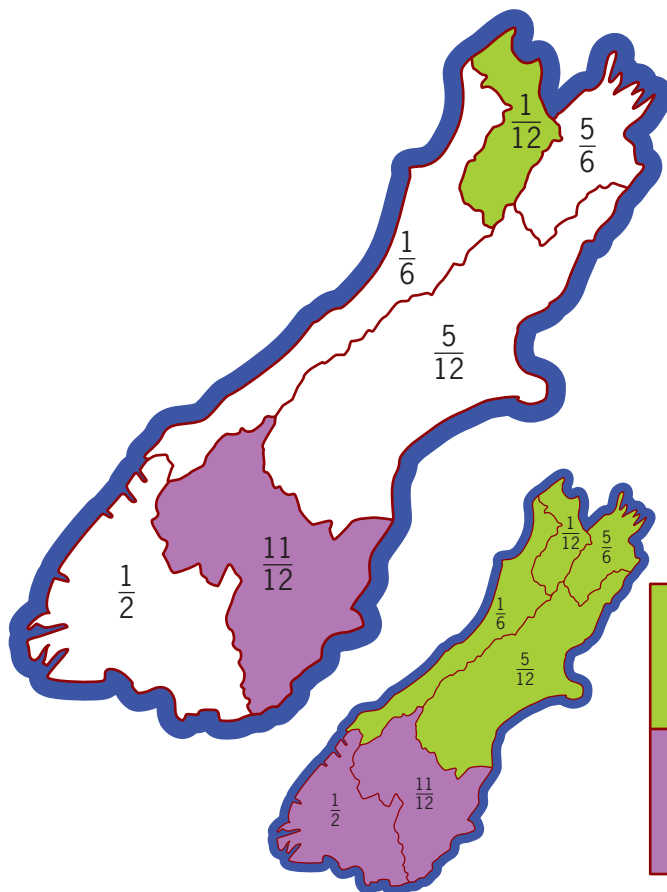
Each map has been broken into regions of equal population. The fraction inside each region represents the fraction of the population in that region that are susceptible to the disease.

Each day, you can choose one region that neighbours a green region and you can protect those people (this turns the region green and safe from infection). Each night the infection spreads to one region that neighbours a purple region and infects that region (this turns it purple and purple regions cannot be reversed). The infection always moves to the neighbouring region with the highest fraction of population susceptible to the disease.

To solve each of these problems you need to protect one region each day until all regions have been either protected or infected. If a region is surrounded by green it becomes safe. If a region is surrounded by purple it becomes infected. If the total of all the fractions in safe regions is greater than the total of all the fractions in the infected regions, you will have saved the country!

EXAMPLE #01

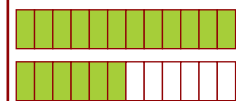
South Island (New Zealand)



SOLUTION

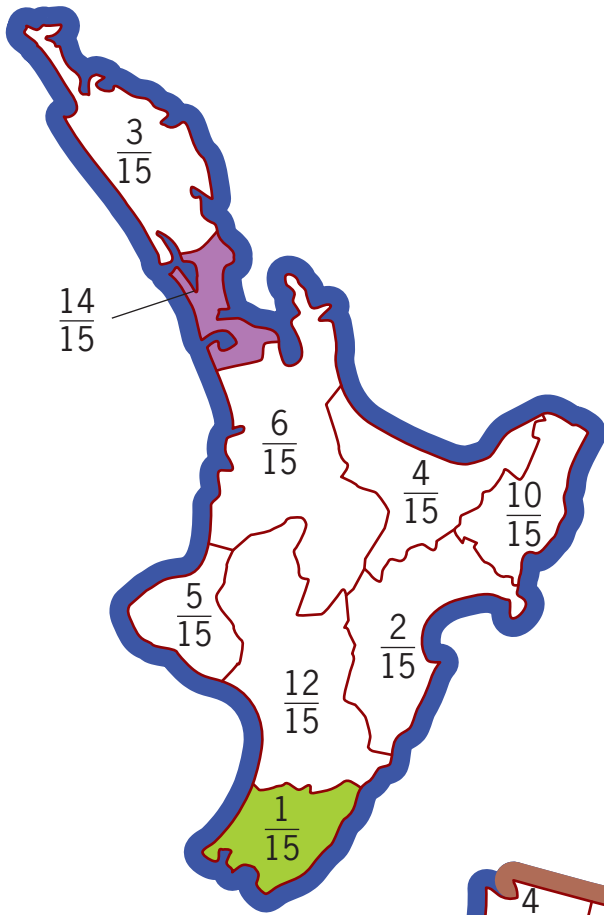
1. You begin with $\frac{1}{12}$
2. The virus begins with $\frac{11}{12}$
3. You protect region $\frac{1}{6}$
4. Virus spreads to the largest adjacent fraction $\frac{1}{2}$
5. You protect region $\frac{5}{12}$
6. The virus is now blocked and can not spread
7. Region $\frac{5}{6}$ is protected
8. Calculate the result:

$\frac{1}{12} + \frac{1}{6} + \frac{5}{12} + \frac{5}{6}$	
$= \frac{1}{12} + \frac{2}{12} + \frac{5}{12} + \frac{10}{12}$	$= \frac{18}{12}$
$\frac{11}{12} + \frac{1}{2}$	
$= \frac{11}{12} + \frac{6}{12}$	$= \frac{17}{12}$



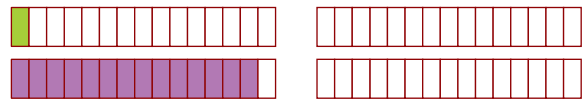
You win, since $\frac{18}{12}$ is greater than $\frac{17}{12}$

Colour in the bars to check your solution.



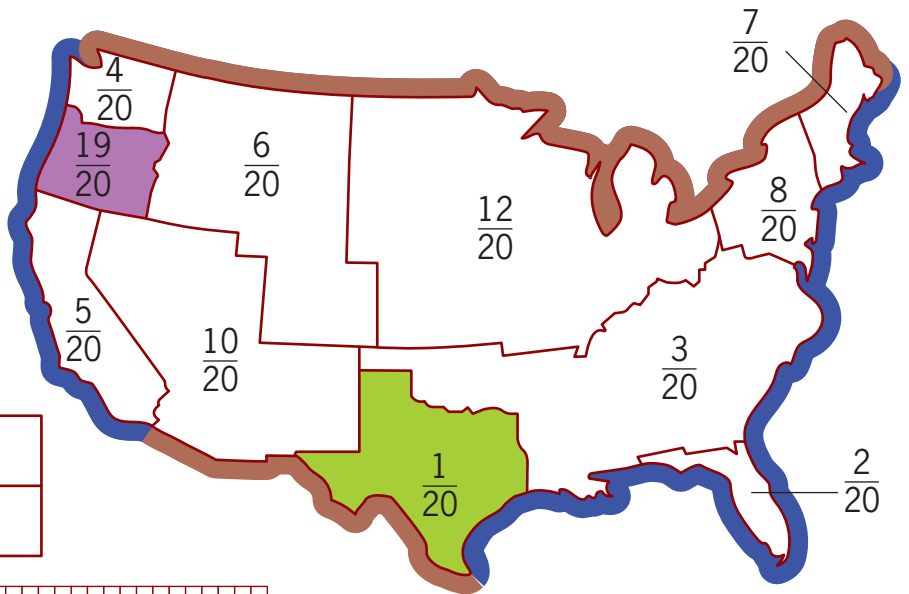
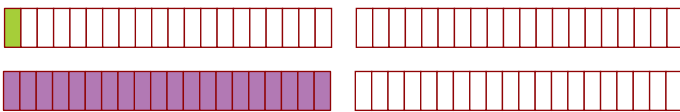
EASY #02
North Island (New Zealand)

$\frac{1}{15} +$	=
$\frac{14}{15} +$	=



MODERATE #01
USA

$\frac{1}{20} +$	=
$\frac{19}{20} +$	=



Did you enjoy this activity?

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