Exercise 1: Modelling measles using differential equations

Measles is a highly contagious disease that commonly occurs in young children. Initial signs and symptoms typically include [fever](https://en.wikipedia.org/wiki/Fever), often greater than 40 °C (104.0 °F), cough, [runny nose](https://en.wikipedia.org/wiki/Rhinitis), and [inflamed eyes](https://en.wikipedia.org/wiki/Conjunctivitis). You are tasked with modelling a measles epidemic in a small town. Getting measles confers permanent immunity.

Characteristics of a population of interest:

* At the start of the outbreak, there is 1 infectious person in the population of 1000
* The number of contacts per day between a susceptible and infectious individual is 0.8.
* The average duration of infectiousness is 10 days.

1. Use the deSolve package in R to model the measles epidemic over 100 days.
2. Manually assess the impact of changing the number of contacts per day and the average duration of infectiousness.
3. Using a “for” loop, create a graph/video to show the impact of changing the number of contacts per day on the epidemic

Measles is often characterized by an SEIR model as it has a latent period of 12 days before an individual becomes infectious.

Adjust your model above to reflect the current scenario.

What differences do you notice?