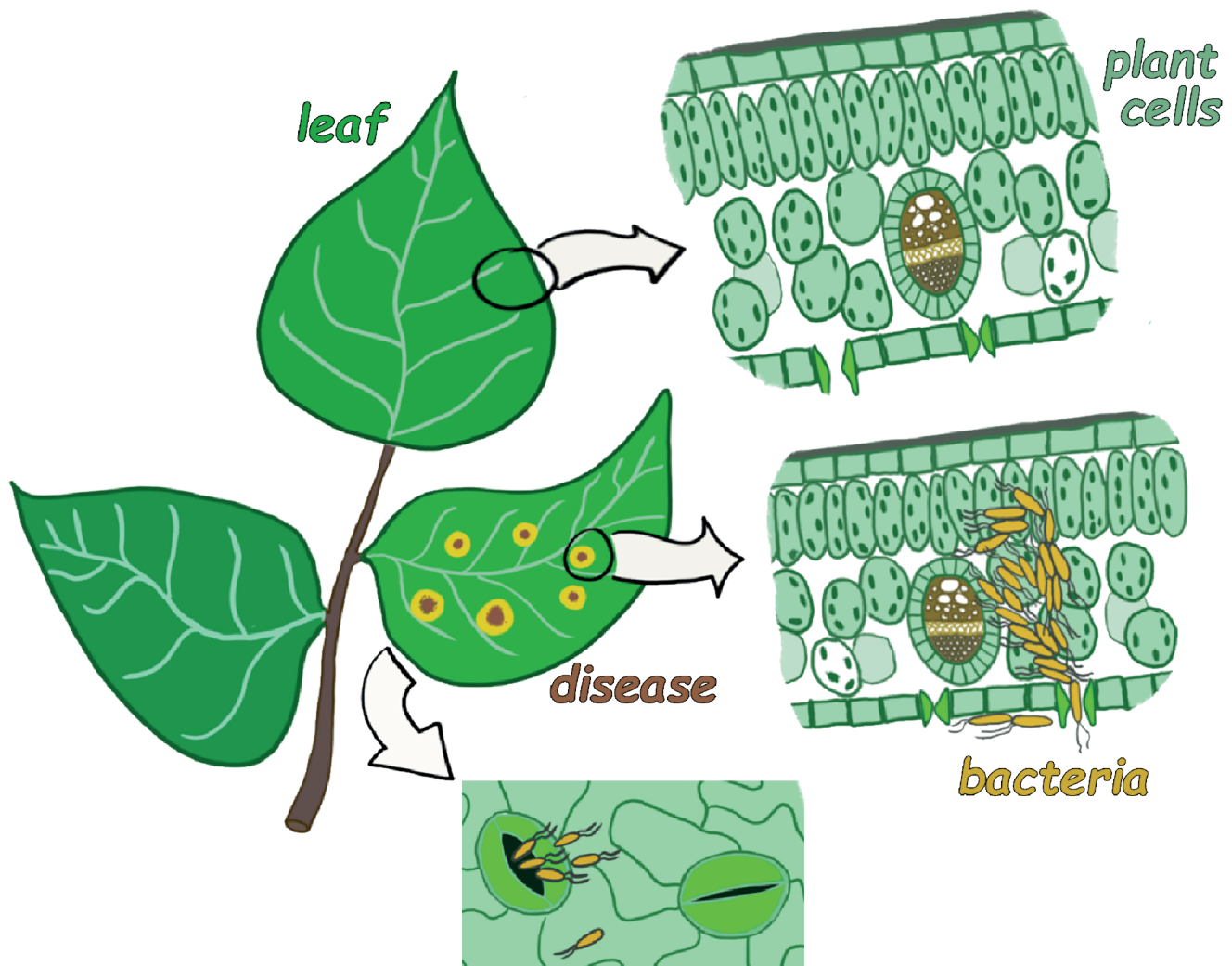


StomaToy

Activity Book

Be a plant scientist! Research plant disease!



Stomata - Guardians of The Plants!



THE ROYAL
SOCIETY

Plant Science Group
IMCSB



Karnik Lab



University
of Glasgow

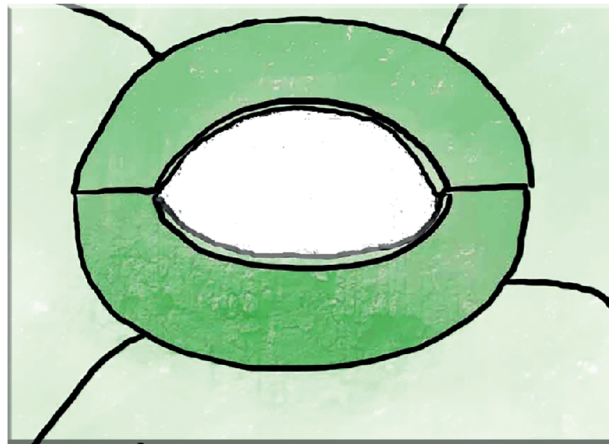
CC-BY

@morehorse 2019

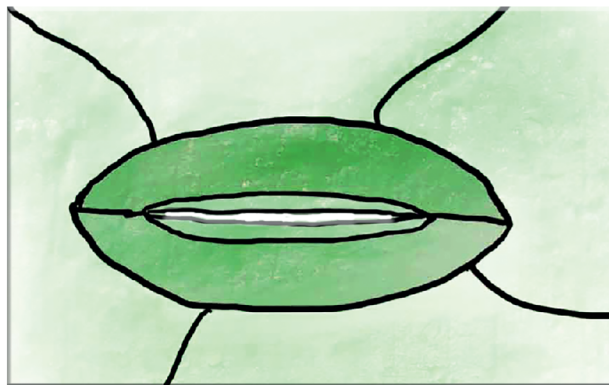
Inspiration: Melotto M, et al (2008) Annu. Rev. Phytopathol.

Each Stoma consists of two Guard cells that surround a pore

Guard cells are like balloons!!!
when guard cells expand, stomata 'open'



when guard cells lose water, stomata 'close'



Upload photos of your StomaToy activities
@Stomatal_2019

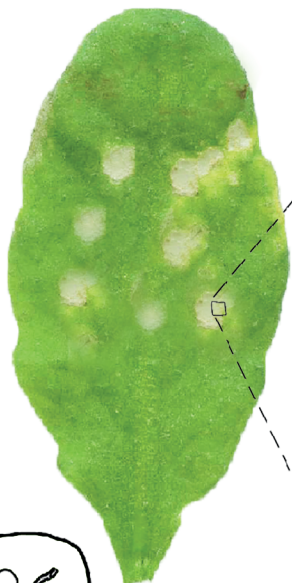
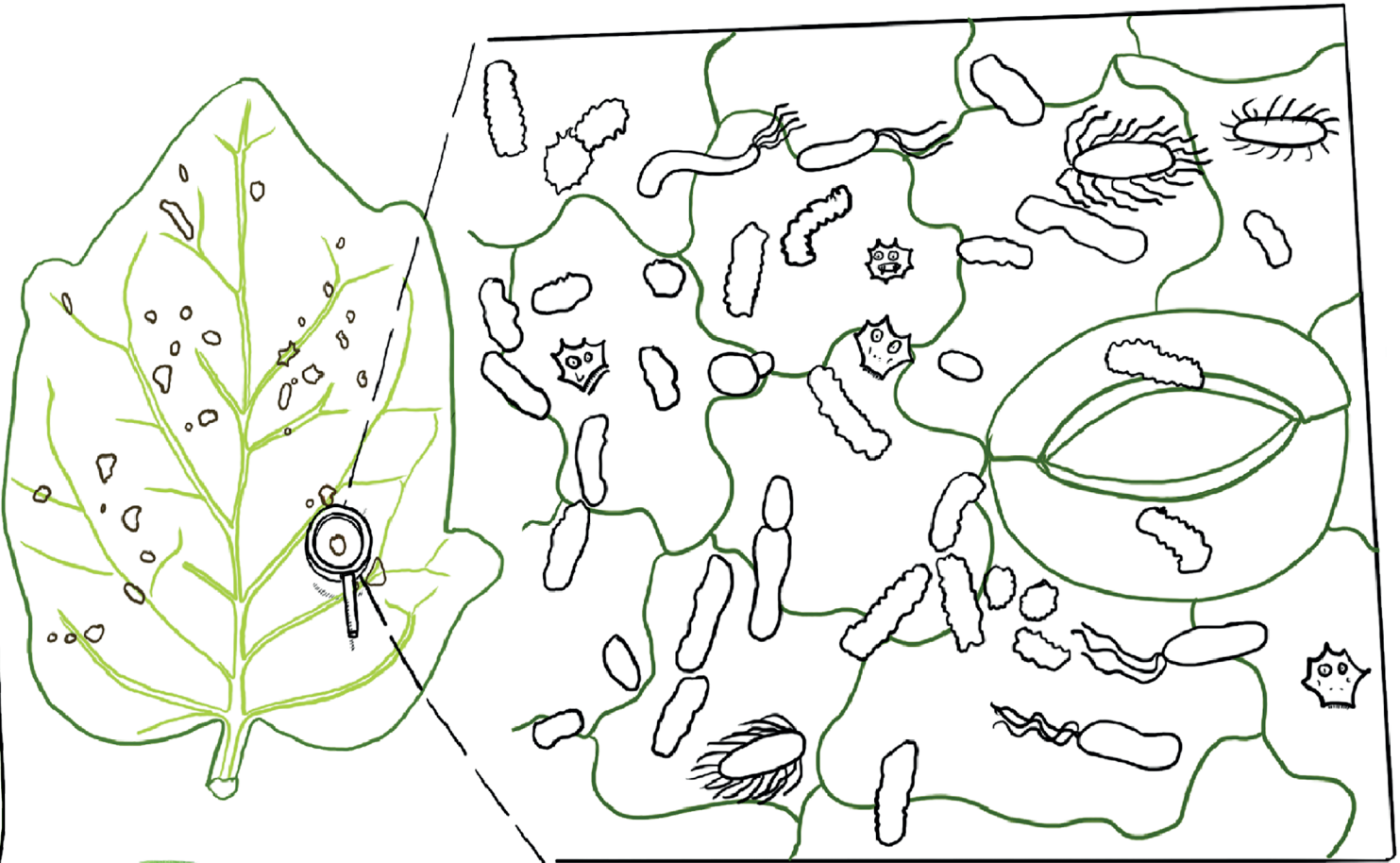


Leaf & Bacteria

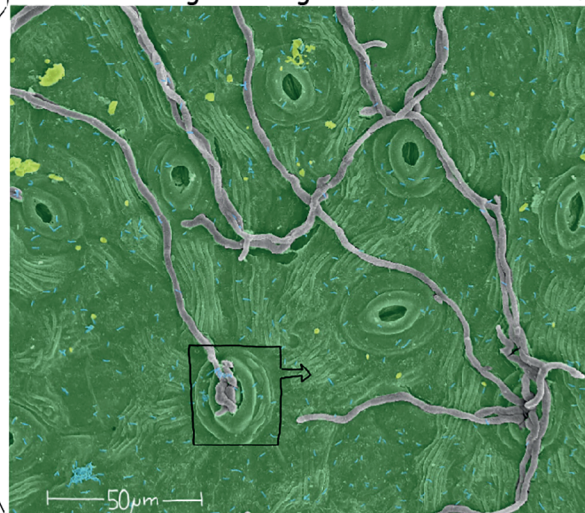
Can you find the stomata and the bacteria?

Colour the stomata green!

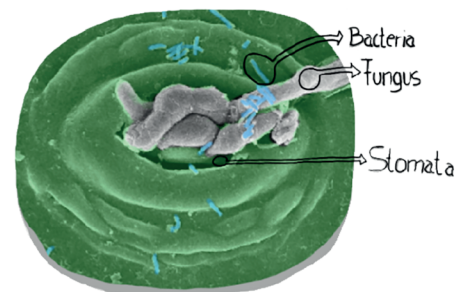
Colour the bacteria orange!



SEM image: Pathogen infected orchid leaf



Arabidopsis thaliana (model plant) leaf infected with bacterial pathogen *Pseudomonas syringae* (DC3000).





Become A Plant Scientist!

Lets do an experiment!

Leaf + water

1

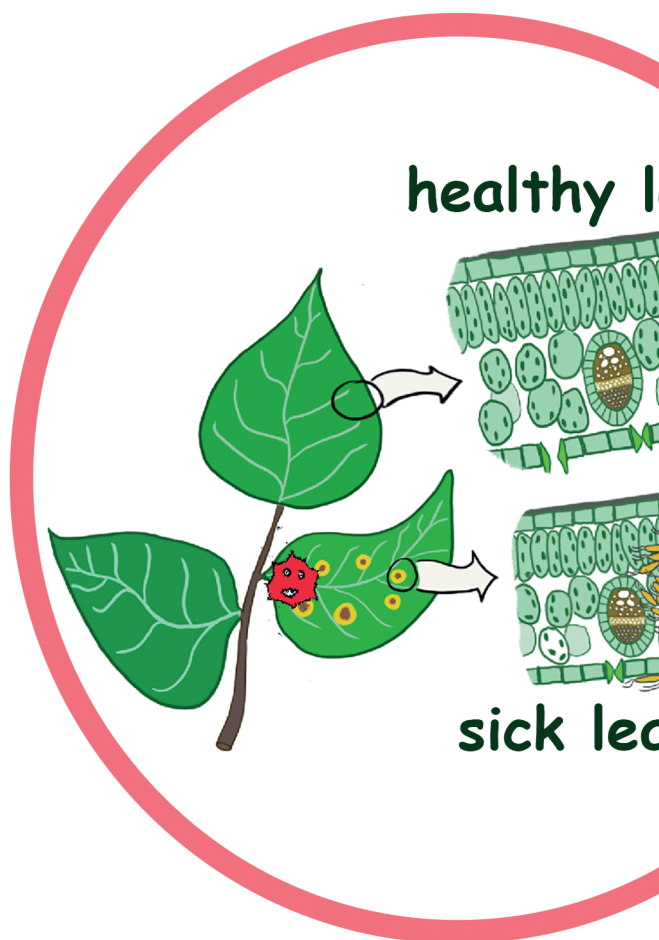
2

3

4



Leaf + **Bacteria** 



Bacteria can make plants sick!

Leaves infected with bacteria are sick and yellow





Can you find the infected leaves? Count them!

Plant Set#1



All Leaves 😊 ☹️

Sick Leaves ☹️

leaf



leaf

Plant Set#2



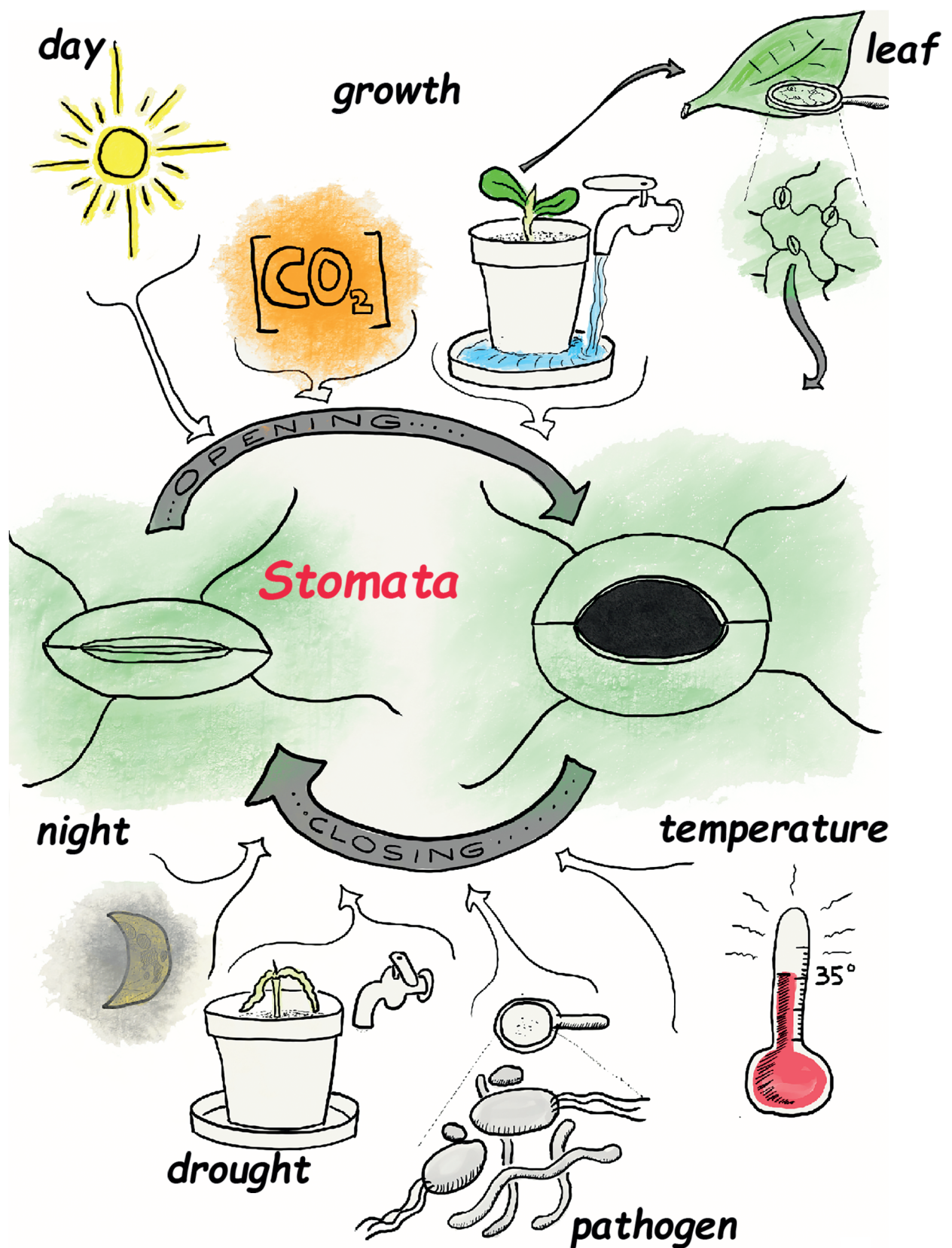
All Leaves 😊 ☹️

Sick Leaves ☹️

yellow.



Stomata are tiny openings on leaves!



Stomata 'open' and 'close' to control what goes 'in' or 'out' of the plant.

Complete the drawing!



StomaToy is designed and constructed by

R. Karnik Lab



Plant Science Group, IMCSB, University of Glasgow

Dr. Abe Karnik

Interactive Systems Group, SCC, Lancaster University

Lancaster
University



StomaToy Activity book concepts & design by

Dr. Rucha Karnik, Plant Scientist

Dr. Mathis Riehle, Cell Engineer & Artist

Art by **Dr. Mathis Riehle**

StomaToy Project co-ordinator **Ms Claire Osborne**

Admin. & Public engagement co-ordinator, IMCSB



Plant images by Lingfeng, Harry & Matthew (students, Karnik lab)

SEM Images by Margaret Mullin

Stomatoy Video edited by Lingfeng Xia & Flora Leask

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Interactive StomaToy & Video are funded by
Royal Society Public Engagement Award to Rucha Karnik



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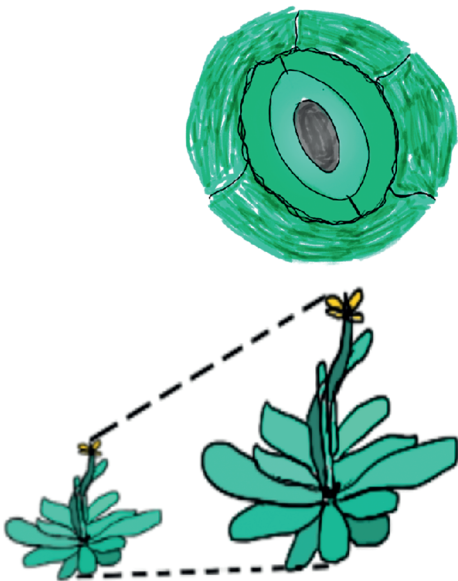
StomaToy Activity book & Paper StomaToy Cube are funded by
MVLS Engagement Award to Rucha Karnik



University
of Glasgow

Stomata - Guardians of The Plants

Stomata are tiny holes on leaves which 'close' to prevent microbes from entering the plant.



For plants to grow, stomata must open to allow exchange of gases for photosynthesis. Open stomata cause plants to lose water.

Microbial infection can make the plants sick. Plant scientists study plant - microbe interactions to understand plant diseases and immunity. This knowledge helps develop disease-resistant crop plants.

