

# *Cell Division:*

**Asexual Reproduction**

# OUTCOME QUESTION(S):

**S1-1-01:**

Why do cells divide and how does it work?

## Vocabulary & People

Mitosis

Asexual

Binary Fission

# Why do cells divide?

## 3. *Reproduction*

– *Pass on genetic information*

There are 2 types of organism reproduction:

*Asexual*

*and*

*Sexual*



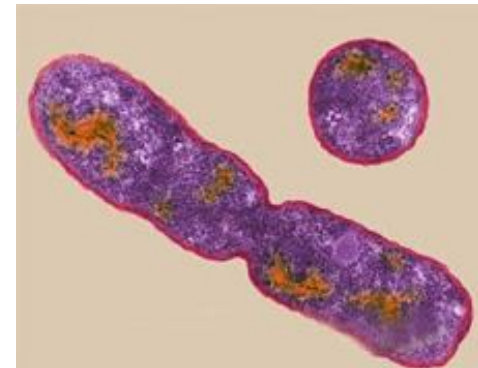
# Asexual Reproduction

→ children

- Create **offspring** from one parent organism
- Using basic cell division - Mitosis

1. **Rapid** and effective reproduction method
2. Cells are “**clones**” – genetically identical

Mitosis **IS** asexual reproduction: *making an identical copy (offspring) from an existing cell (parent)*



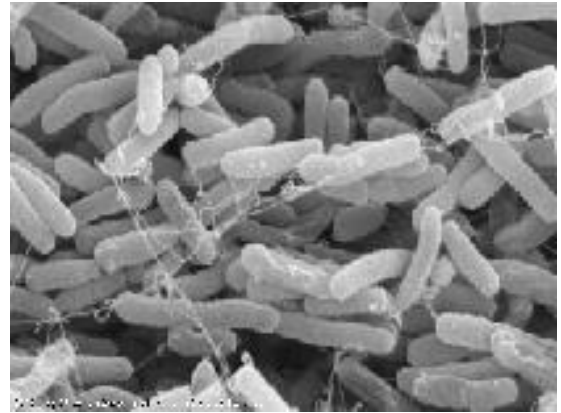
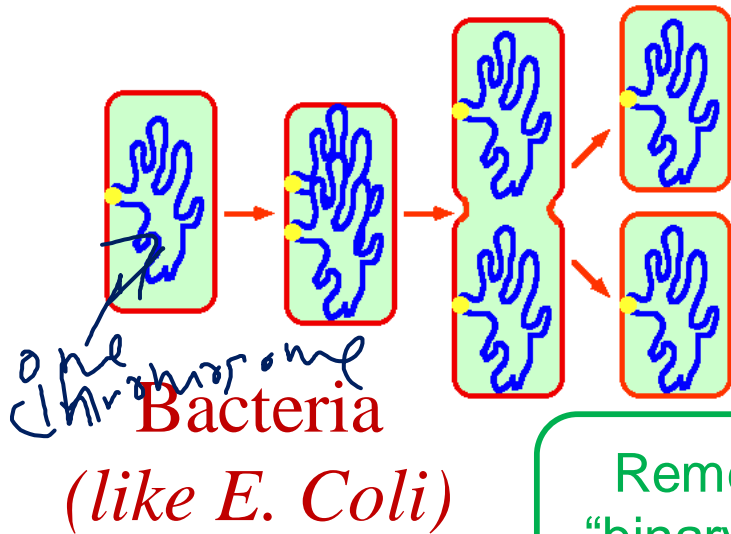
1. Binary Fission
2. Budding
3. Sporulation (Spores)
4. Regeneration (Fragmentation)
5. Vegetative Propagation  
(Vegetative Reproduction)

# 1. Binary Fission

• This is like mitosis but in bacteria

– Simple **single-cell** (*unicellular*) organisms

➤ Bacteria have *1 circular chromosome (plasmid)*



Remember: even though we call this "binary fission" it is still **just** a simplified **Mitosis**

# Protists (*like amoebas*)

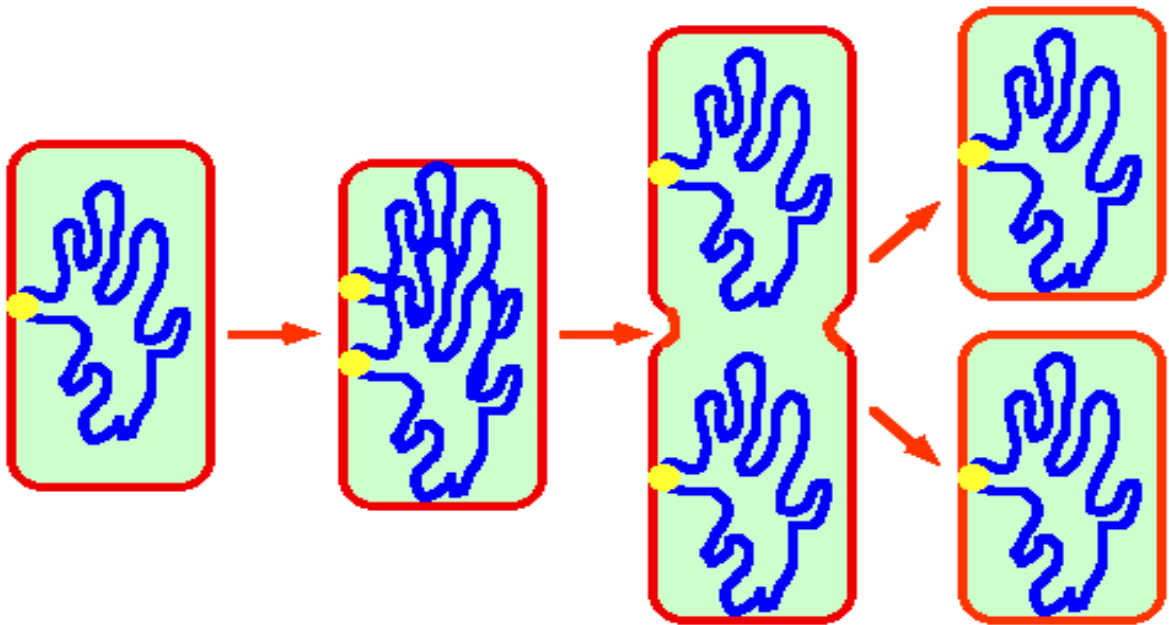


Telophase, maybe?



Unlike bacteria, these ones actually have a nucleus and a few chromosomes

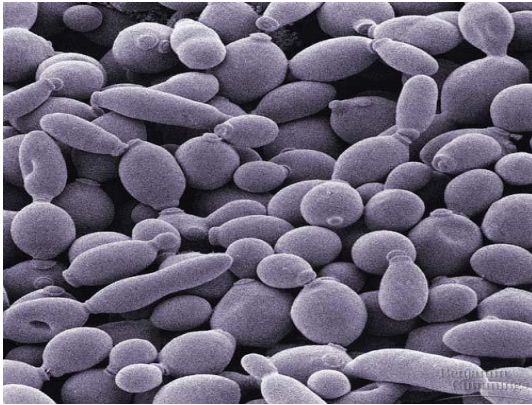
# Diagram



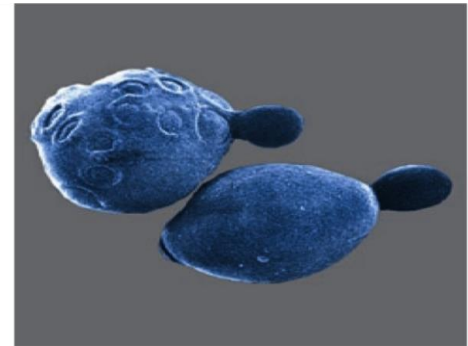


## 2. Budding

- Cell duplicates nucleus, forms outgrowth
- New cell is *smaller than original* cell



Fungi  
(*yeast*)

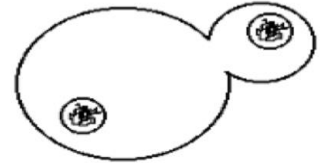


Replicating Yeasts: Fission vs. Budding

The key is *unequal* mitotic division – think of it as creating a “mini-me” that will grow bigger...eventually



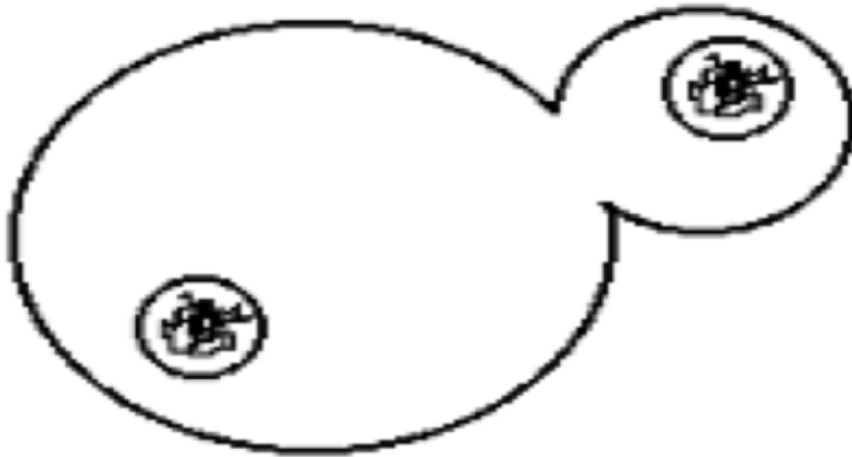
Standard mitosis



Budding

 = nucleus containing DNA genome

# Diagram



**budding yeasts**

*Saccharomyces spp.*

### 3. Sporulation

- Creation of **spores** that are released into the air
- Spores are made to survive and grow anytime later

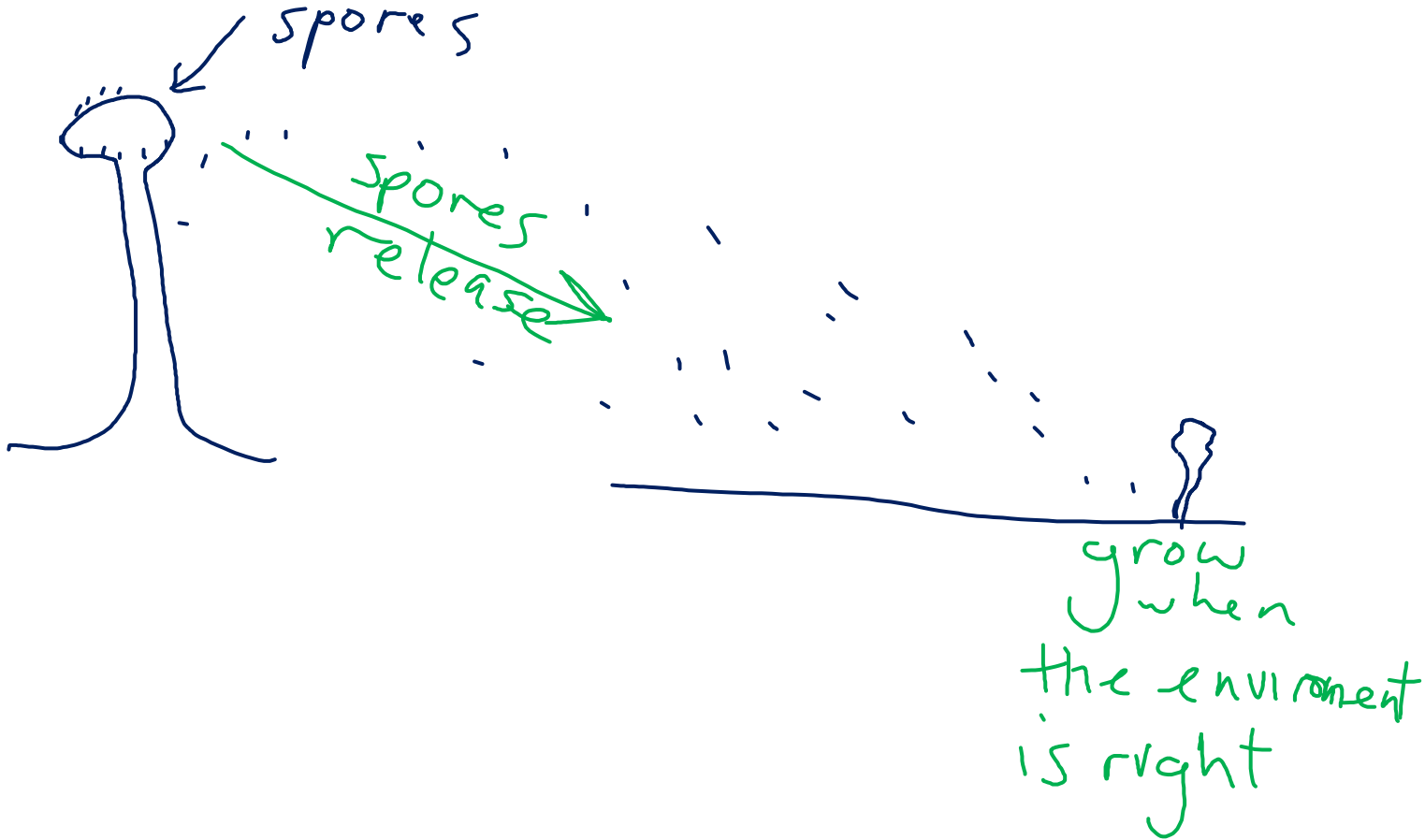
This is similar to budding – but in very large numbers  
(like creating 1000s of “mini-me’s” at once)



Fungi  
(*mold*)



# Diagram



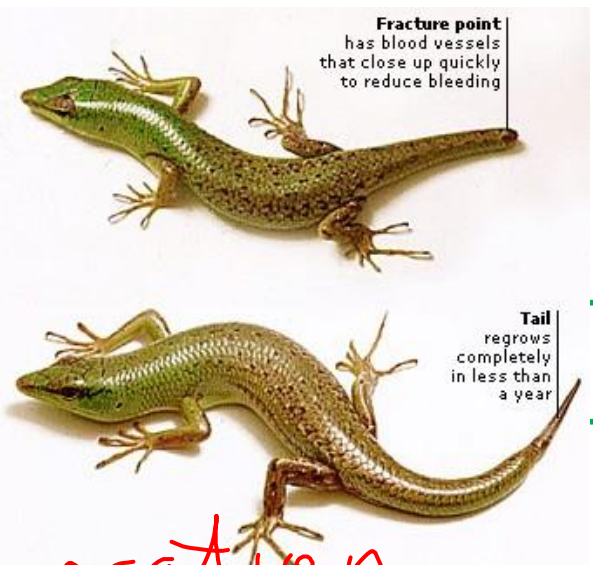
# A1 Regenerating a limb

A newt can regenerate an entire limb within 7-10 weeks.



two b  
ckbone  
out back

a/s – usu

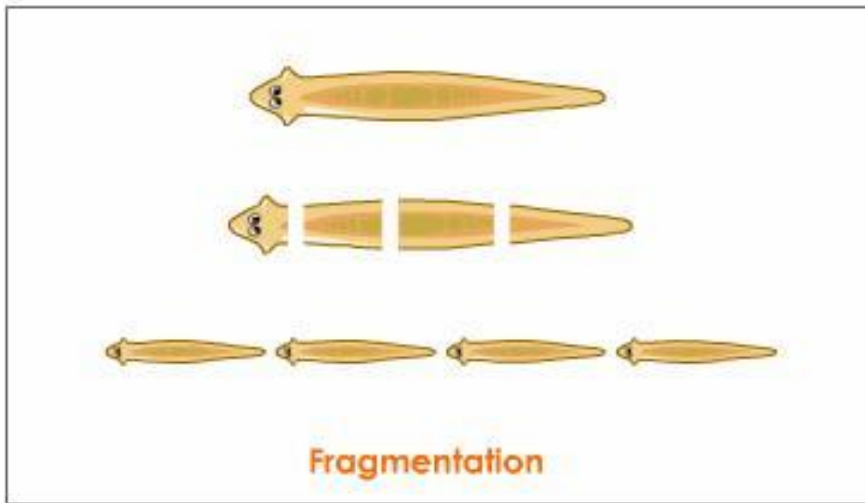


## 4. Fragmentation

*or Regeneration*

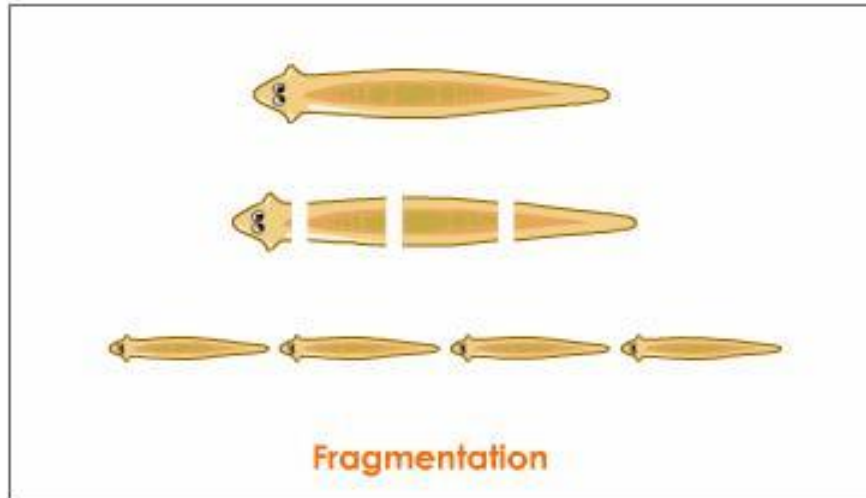
- Ability to regenerate (*regrow*) fragments of the body **OR** have that fragment grow into separate identical organism

The “simpler” the animal the better it will be at fragmentation



Many experiments have been done to investigate the regeneration and **fragmentation** of simple organisms

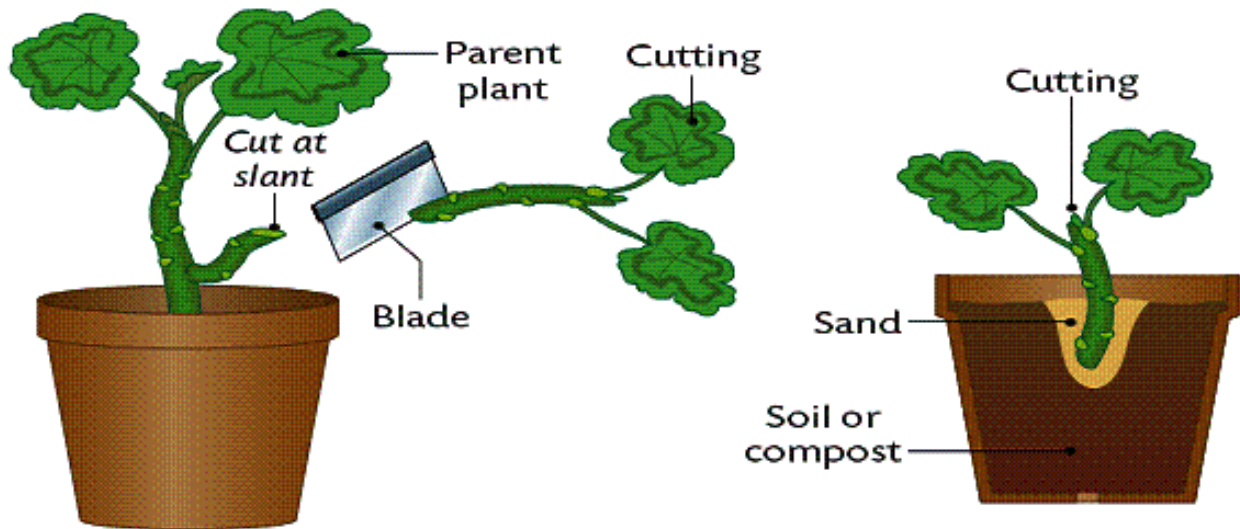
# Diagram



# 5. Vegetative Propagation

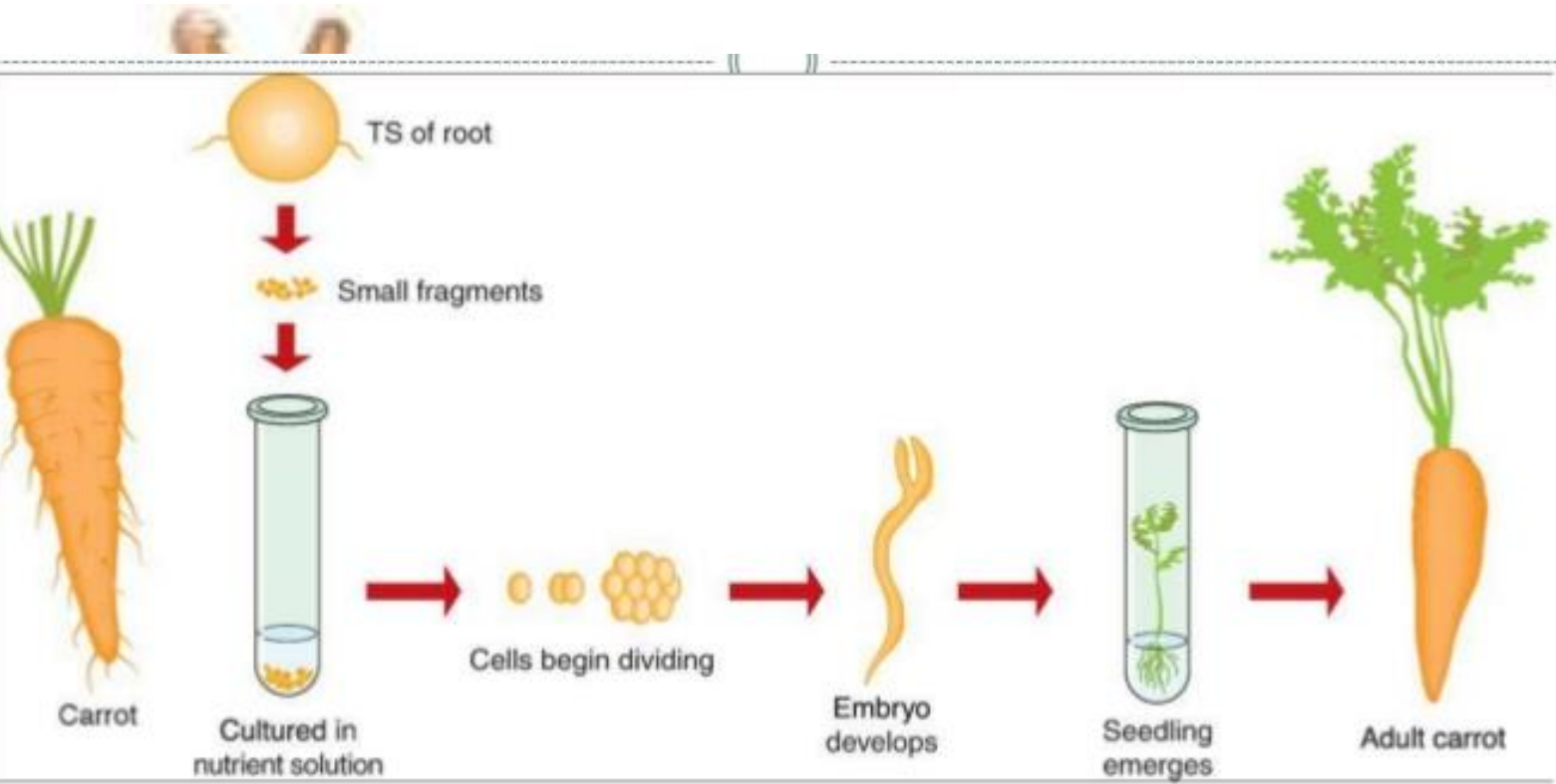
- Creation of new plant from any of the growing parts of a plant – *roots, leaves, stems*

This is how we can get a whole new plant from an old one!



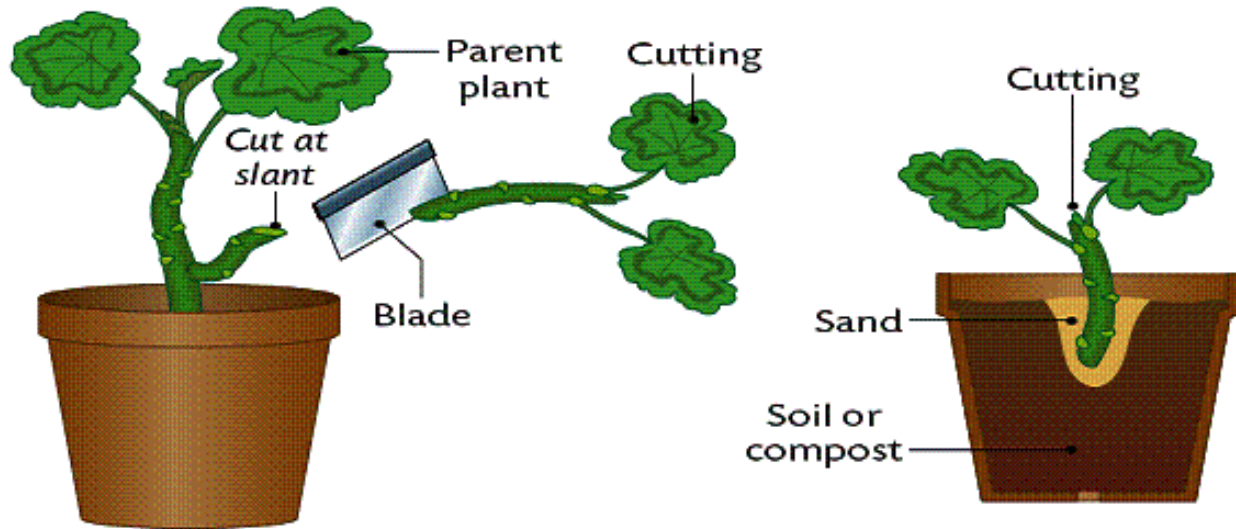


# This can occur in many different plants!

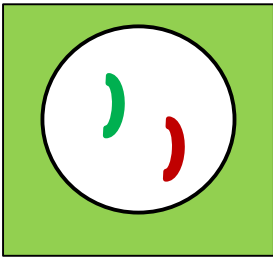


root

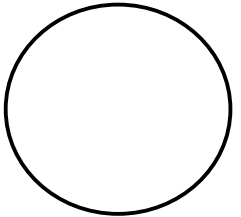
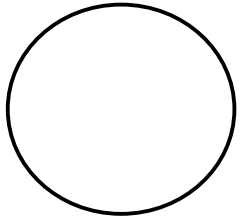
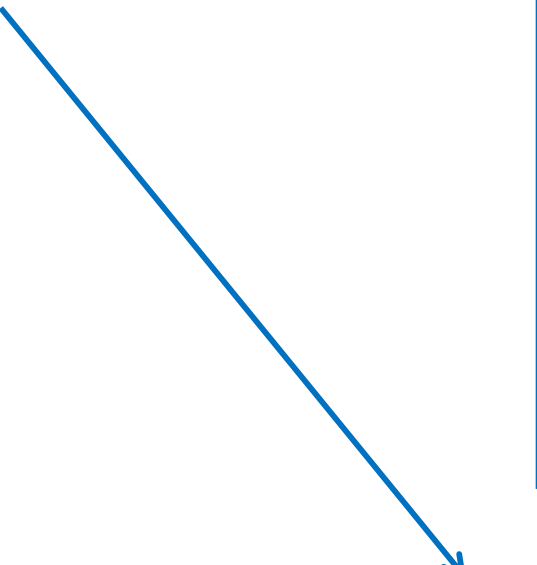
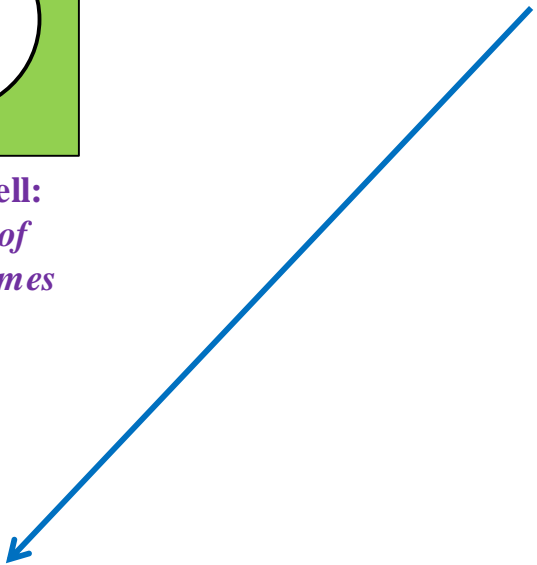
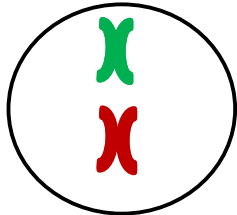
# Diagram



# MITOSIS – *in general*



**Parent cell:**  
*Full set of  
Chromosomes*



**Daughter cells:**  
*Full set of  
Chromosomes*

**2 identical *daughter cells***

P  
M  
A  
T

Remember: **ALL** these  
**asexual** methods of  
reproduction are like a  
**fancy-named Mitosis**