Agricultural Implications

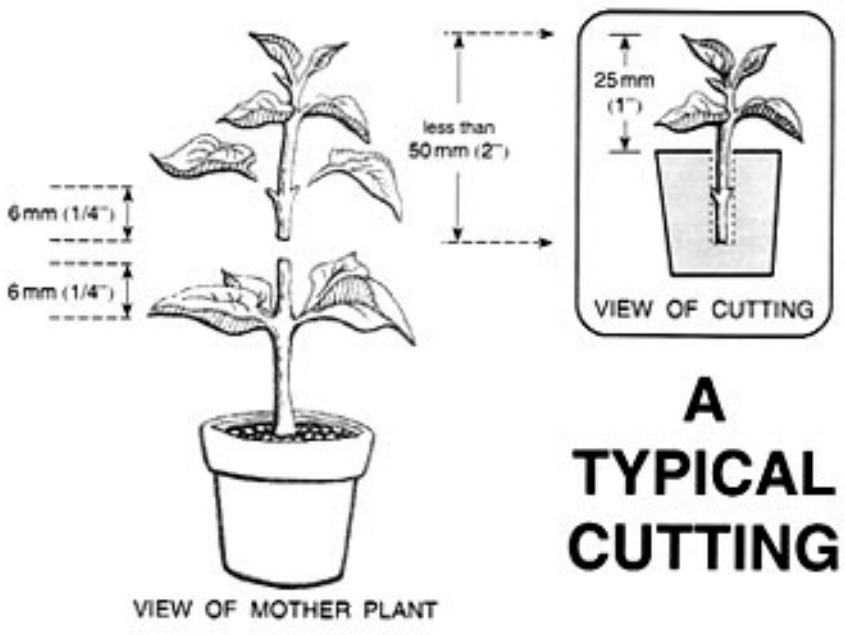
S1-1-04 Investigate and describe agricultural applications of asexual reproduction. Examples: cloning, cuttings, grafting (vegetative propogation), bulbs

Vegetative Propagation:

When a **NEW PLANT** is grown from a **PIECE** of another plant. There are several ways a plant can reproduce this way:

CUTTINGS:

- Cut a leafy **ROSE STEM** and place it into wet **SAND**/**WATER**. New **ROOTS** will grow, creating a **NEW PLANT**.



Vegetative Propagation:

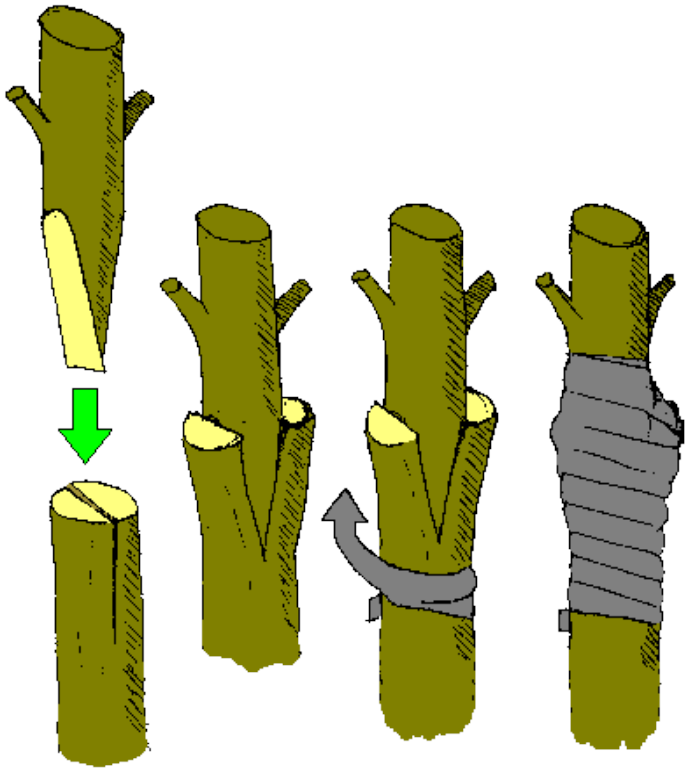
BULBS:

- Are thick, fleshy **UNDERGROUND STEMS**.
- They have a large store of **FOOD**, which allow them to survive for a while **BEFORE** being **PLANTED**. (**ONIONS**, **TULIPS**)

Vegetative Propagation:

GRAFTING:

- A **BRANCH** of one type of plant is placed into the **CUT** of **ANOTHER**. They must be **CLOSELY RELATED**. (**APPLE TREES**, etc)



Cloning

You'll be surprised to hear that cloning is not the "mad science" that you see in the movies. In fact, **CLONES** are around you all the time.

Cloning is a **NATURAL** process by which **MOST** organisms **REPRODUCE**.

In all types of **ASEXUAL REPRODUCTION**, organisms make **EXACT** genetic **DUPLICATES** of themselves, which are essentially clones!

→ they have the exact same **DNA**.

In cloning, there is only **ONE PARENT**. If there were two, then the offspring wouldhave a combination of DNA from each parent.

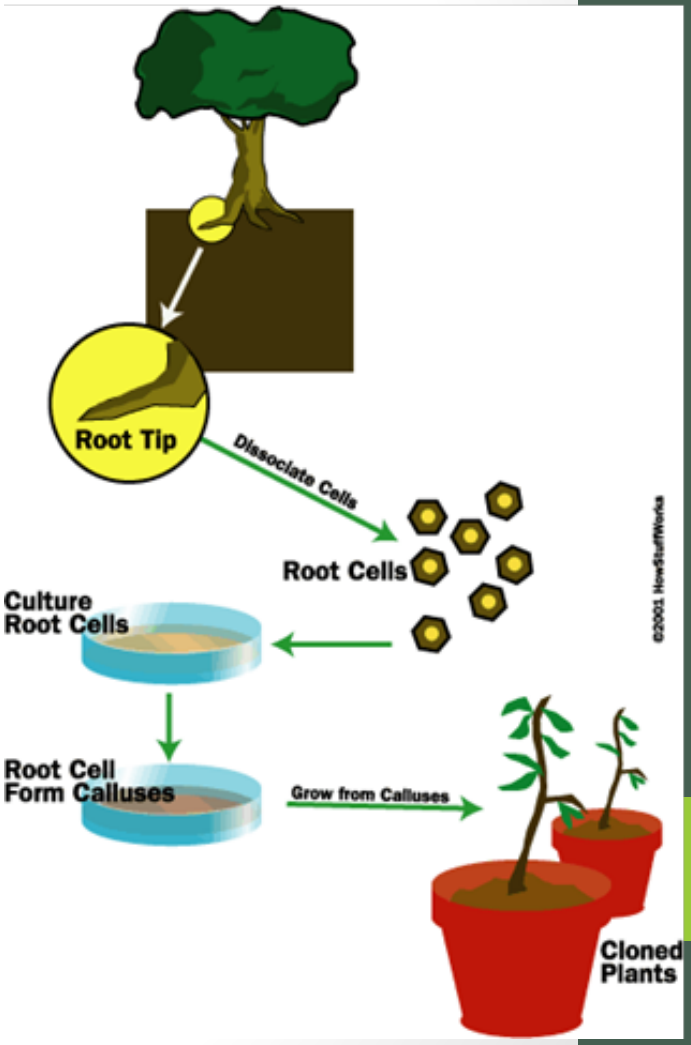
Hence, **ASEXUAL REPRODUCTION** produces **CLONES**.

Cloning a Plant From a Single Cell:

In 1958, Frederic Stewart cloned a **CARROT**. He took a cell from the **ROOT** of the **PARENT** carrot, and grew a "**CLONE**" from it.

Today, plants are bred with desired **TRAITS**, and are then **CLONED** to keep **REPRODUCING** these **TRAITS**

Examples of this are **SEEDLESS WATERMELONS**, **ORANGES**, different varieties of **FLOWERS**, etc.

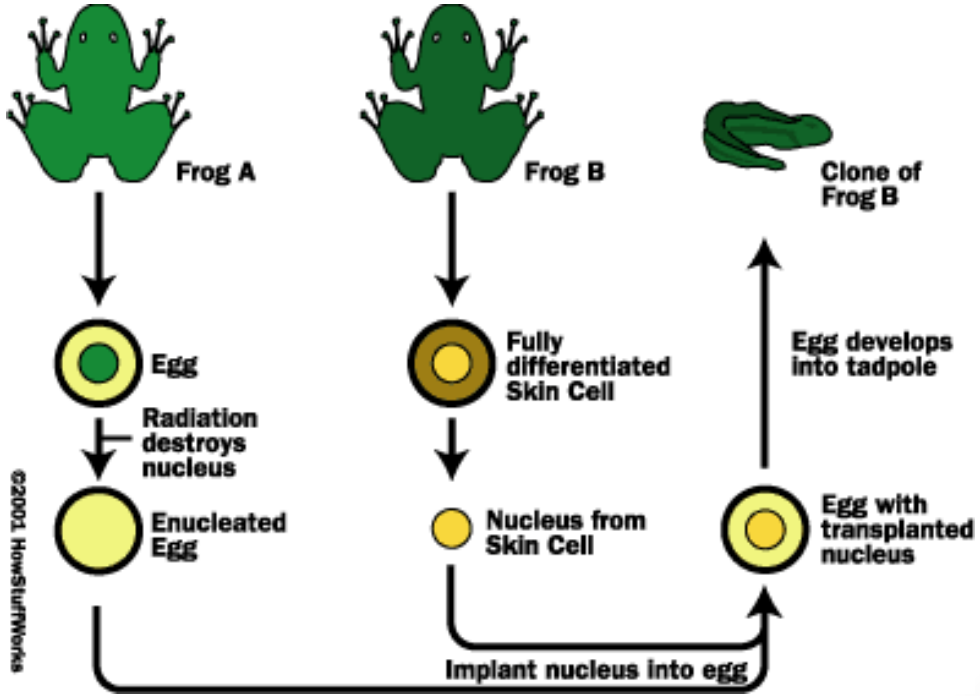


In fact, some animals have even been cloned…

How a Frog Was Cloned

In the 1970s, a scientist named John Gurdon successfully cloned **TADPOLES**.

- He **TRANSPLANTED** the **NUCLEUS** from a **SPECIALIZED** skin cell of one frog into an **UNFERTILIZED EGG** of another frog in which the **NUCLEUS** had been **DESTROYED** by **UV LIGHT**.
- The egg with the **TRANSPLANTED** nucleus developed into a **TADPOLE** that was genetically **IDENTICAL** to the first frog.



The "Dolly" Revolution

Scientists later cloned an adult sheep. The clone was called Dolly.

How Dolly Was Cloned:

- Cells from the **UDDER** of a **FINN DORSET SHEEP** were taken.
- The **NUCLEUS** was taken out and then placed in an **ENUCLEATED EGG CELL** of another sheep.
- The new cell was placed into a **BLACKFACE SHEEP**…which gave birth to **DOLLY**, a **CLONE** of the **FINN DORSET**.