

# Cloning

→ can be natural (through asexual reproduction) Ex) Binary Fission

→ Asexual means one parent duplicates themselves and splits into 2 identical daughter cells.

Example) Budding

→ Cloning is the process of forming identical offsprings from a single cell or tissue

## → Clone Plants

↳ easier to clone plants that grow under ground Ex) Carrots

↳ need plant hormones to promote cell division (cloning)

## Clone Animals

X → Extracted the nucleus from an unfertilized egg cell and inserted into a glass test tube.

→ egg cell that has no nucleus is called "enucleated"

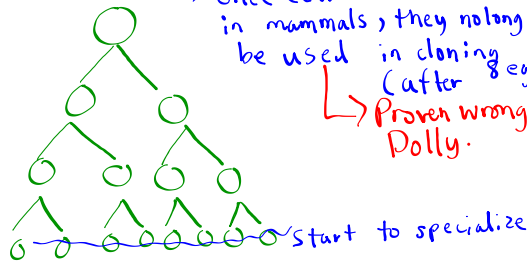
→ Now place the nucleus of "frog" embryo into enucleated cell

This cell will divide and grow to produce a new frog that is a clone.

→ cells nucleus must be taken at an early stage of the embryo

→ once cells start to specialize in mammals, they no longer can be used in cloning (after egg stage)

↳ Proven wrong with Dolly.



## Dolly

→ used genetic material from adult sheep to make clone.

→ Extracted genetic material from one sheep. Placed in a cell culture in a test tube (grew). Then placed this material in an unfertilized egg of another female sheep (grew) and she gave birth to a sheep that