



# ST NINIAN'S HIGH SCHOOL

## NATIONAL 4 BIOLOGY



### LEARNING INTENTIONS

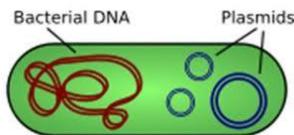
#### UNIT 1: CELL BIOLOGY

#### SECTION 1 THERAPEUTIC USES OF CELLS AND CONTROVERSIAL BIOLOGICAL PROCEDURES

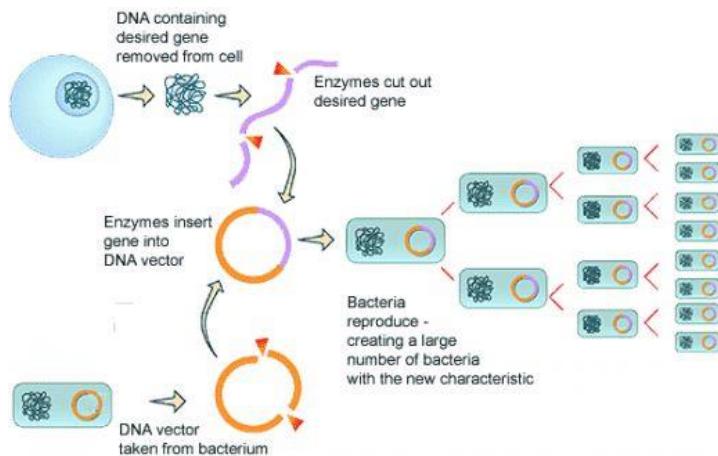
### GENETIC ENGINEERING



1. State that **BACTERIA** contain circles of **DNA** called **PLASMIDS**



2. Describe how **GENETIC ENGINEERING** uses plasmids to transfer DNA between organisms



- The **GENE** is identified and **REMOVED** from the **HUMAN CHROMOSOME**
- The **PLASMID** is removed from the **BACTERIUM**
- The plasmid is **CUT OPEN**
- The gene is **INSERTED** into the plasmid
- The plasmid is inserted into the bacterium
- The bacteria **MULTIPLY** and **PRODUCE** the **PROTEIN**
- The protein is **EXTRACTED** and **PURIFIED** before use



3. State that genetic engineering can be used to mass produce **INSULIN**, **HUMAN GROWTH HORMONE** and a blood clotting compound called **FACTOR VIII**



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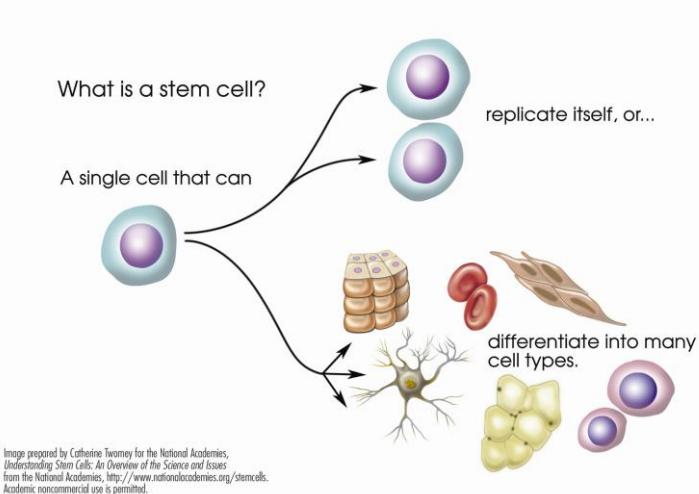
## NATIONAL 4 BIOLOGY



### LEARNING INTENTIONS

#### STEM CELLS

4. Define **STEM CELLS** as **CELLS** that can **DIVIDE** and become **ANY** type of cell



5. List some of the current **USES** of **STEM CELL TECHNOLOGY** including:

- Using **CELLS** to grow **ARTIFICIAL ORGANS**
- To carry out **BONE MARROW TRANSPLANTS**

#### CONTROVERSIAL BIOLOGICAL PROCEDURES

6. Understand the advantages and disadvantages of **CONTROVERSIAL BIOLOGICAL PROCEDURES** such as:

- Gene therapy; and
- Transgenic organisms.