



# ST NINIAN'S HIGH SCHOOL

## NATIONAL 4 BIOLOGY

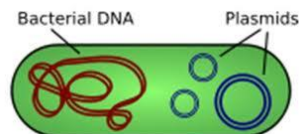


### LEARNING INTENTIONS

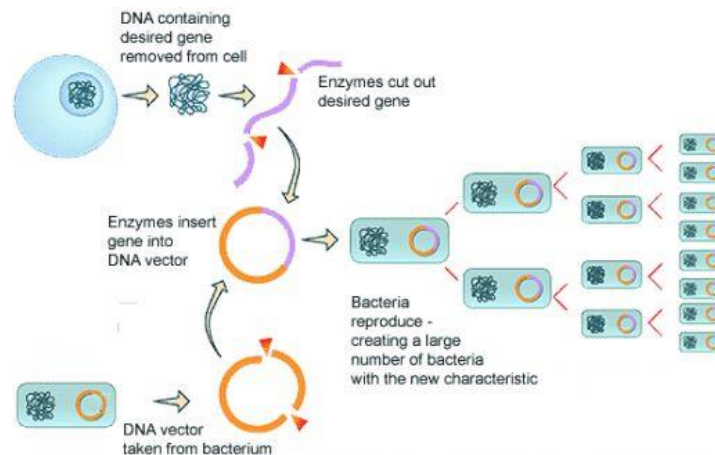
#### UNIT 1: CELL BIOLOGY      SECTION 1 THERAPEUTIC USES OF CELLS AND CONTROVERSIAL BIOLOGICAL PROCEDURES

### GENTIC ENGINEERING

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



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



- a) The **GENE** is identified and **REMOVED** from the **HUMAN CHROMOSOME**
  - b) The **PLASMID** is removed from the **BACTERIUM**
  - c) The plasmid is **CUT OPEN**
  - d) The gene is **INSERTED** into the plasmid
  - e) The plasmid is inserted into the bacterium
  - f) The bacteria **MULTIPLY** and **PRODUCE** the **PROTEIN**
  - g) 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**

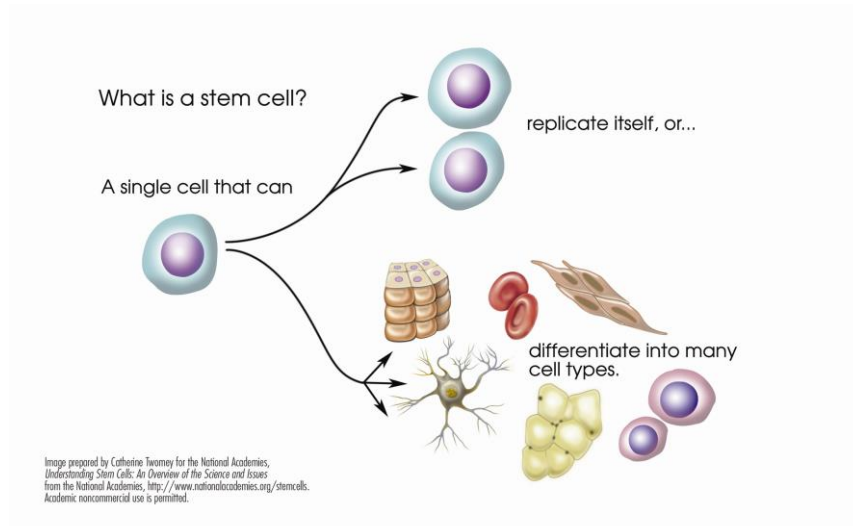


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**STEM CELLS**

- ☐ 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.