Fun with Bacteria

Objectives:

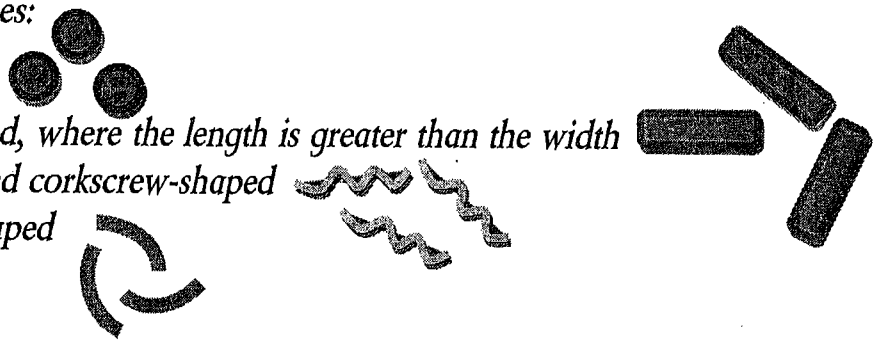
- Understand the shapes and arrangements of bacteria
- Understand how bacteria reproduce

Materials

- Playdough

Part 1 – Shape of Bacteria

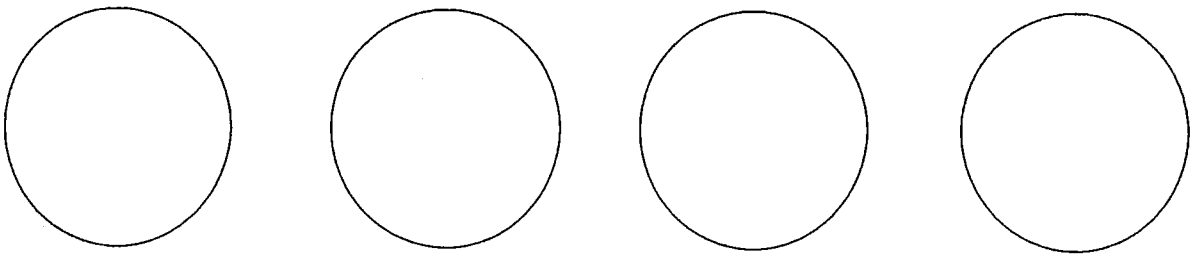
Bacteria come in four shapes:



a. *Coccus – spherical*
b. *Bacillus – rod-shaped, where the length is greater than the width*
c. *Spirillum – spiral and corkscrew-shaped*
d. *Vibrio – comma shaped*

Activity 1:

1. *Using your playdough (please don't eat it) model the four above shapes of bacteria. Also draw and label them in the below circles.*

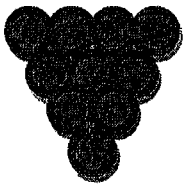


Part 2 – Arrangement of Bacteria

Cocci can be arranged in many different ways:

a. *Coccus – one singular cocci*
b. *Diplococcus – two cocci side by side, di means two*

c. *Streptococcus – a chain of cocci* 
d. *Tetrad – four cocci in the shape of a square* 

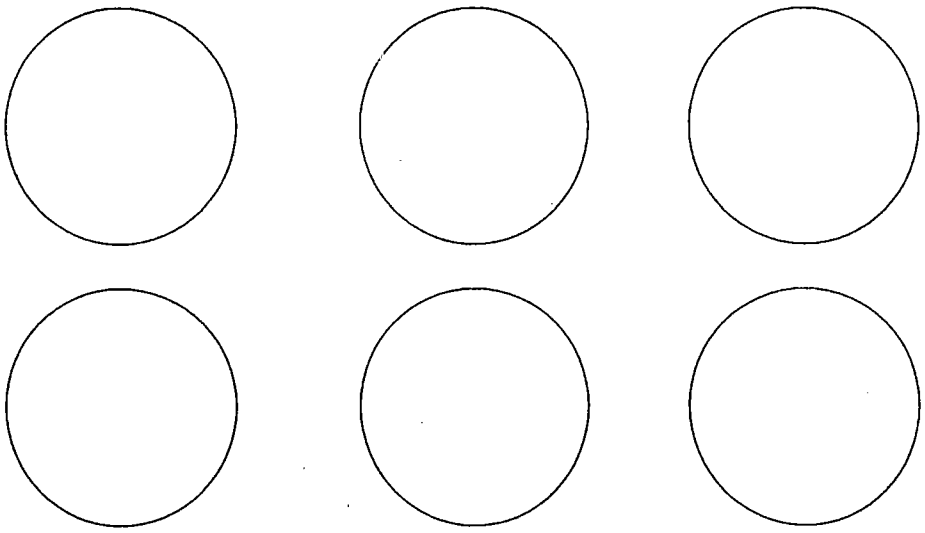
e. *Staphlococcus – many cocci in the shape of a bunch of grapes* → 
f. *Sarcina – eight cocci in the shape of a cube* 

Bacilli can be arranged two different ways:

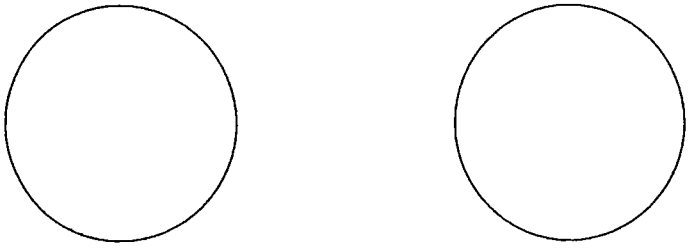
a. *Rods or bacilli – singular* 
b. *Streptobacilli – chains of bacilli* 

Activity 2:

1. *Please create all six arrangements of cocci out of your playdough (a-f). Also create both arrangements of Bacilli out of your playdough (a&b).*
2. *Please Draw and Label all 6 arrangements of cocci in the circles below:*



3. *Please Draw and Label the 2 arrangements of bacilli in the circles below:*



Part 3: Reproduction of bacteria

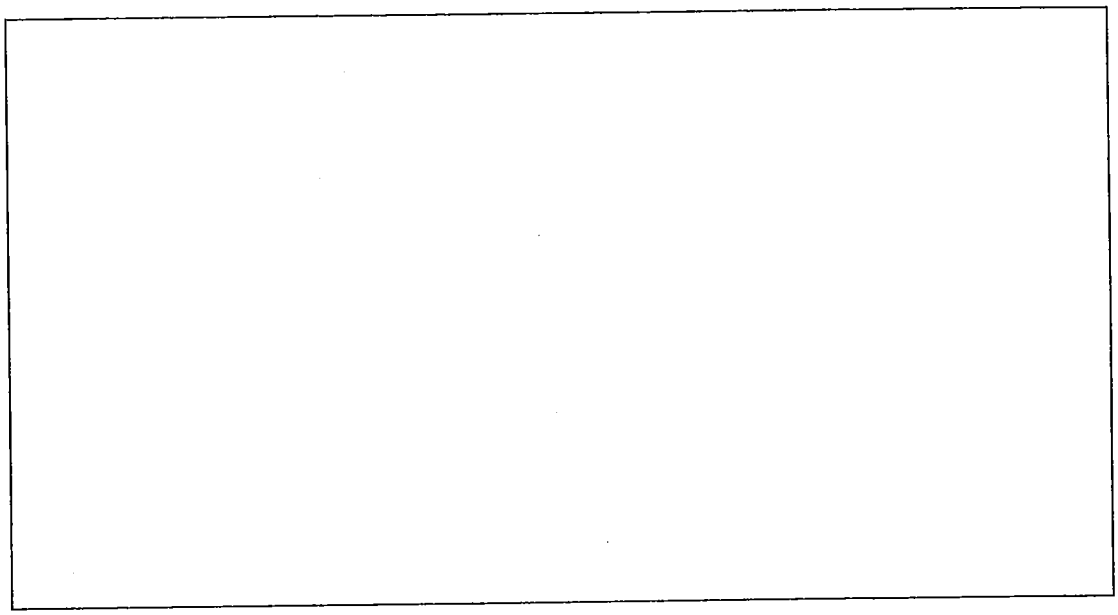
There is one way that bacteria reproduce:

Binary Fission

- *parent cell divides into two identical daughter cells*
- *results in two daughter cells with identical genomes*
- *form of asexual reproduction*

Activity 3:

a. *Please draw at least three steps of binary fission in the box below. Please label the parent cell and daughter cells.*



b. *Please model the steps of binary fission using the playdough.*

Means of Genetic Transfer:

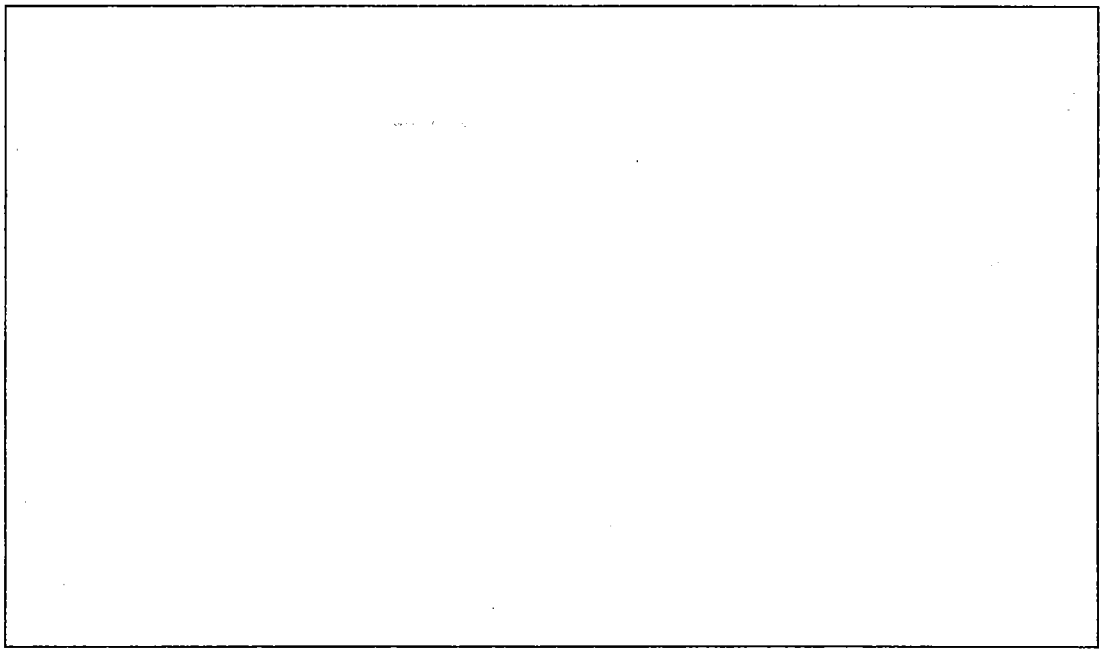
Conjugation

- *A hollow bridge forms between two bacterial cells (sex pili)*
- *A plasmid (ring of DNA) from the donor cell is duplicated and sent through the sex pili to the recipient cell*
- *End result = both donor and recipient cells have the plasmid*

- *Conjugation results in an exchange of genetic material which increases genetic diversity in populations of bacteria.*
- *In a way this can be looked at as sexual reproduction.*

Activity 4:

1. *Please draw the steps of conjugation in the box below. Label the plasmid, sex pili, donor cell and recipient cell.*



2. *Using your playdough, please model the steps of conjugation.*

QUICK QUIZ

1. *A group of eight cocci in the shape of a cube are called* _____
2. *A chain of rods is called* _____
3. *The corkscrew shaped form of bacteria is called* _____
4. = _____
5. _____ _____ *is the process by which bacteria reproduce.*
6. _____ *is the process by which genetic diversity is increased.*
7. _____ *is the genetic material transferred in conjugation.*
8. *The* _____ *cell receives genetic material from the* _____*cell in conjugation.*
9. *Binary fission is a form of* _____ *reproduction.*