

Fun with Bacteria

Objectives:

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

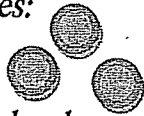
Materials

- Playdough

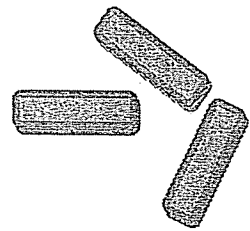
Part 1 – Shape of Bacteria

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

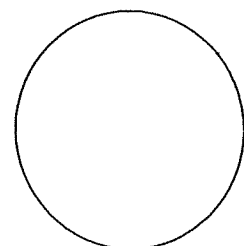
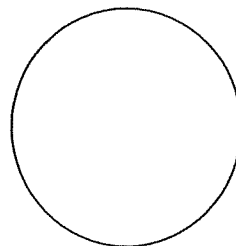
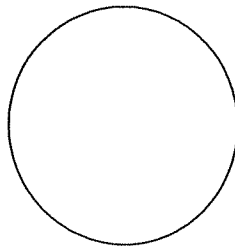
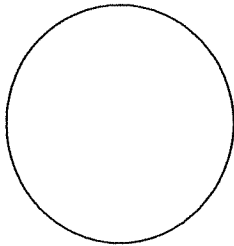


d. Vibrio – comma shaped




Activity 1:


1. Using your playdough (please don't eat it) model the three 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 

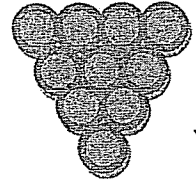
c. Streptococcus – a chain of cocci



d. Tetrad – four cocci in the shape of a square



e. Staphylococcus – 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

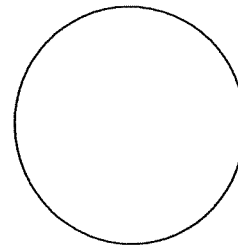
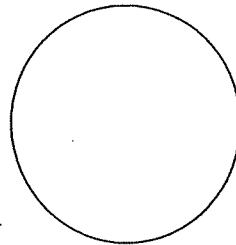
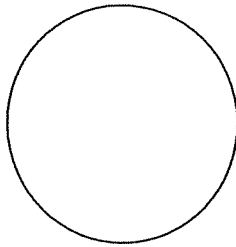
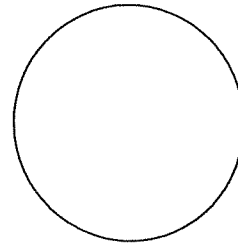
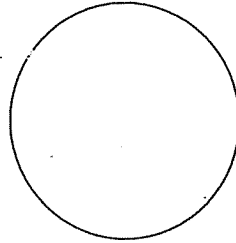
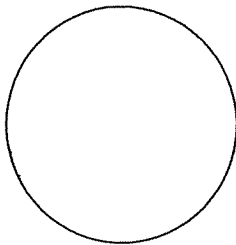


b. Streptobacilli – chains of bacilli

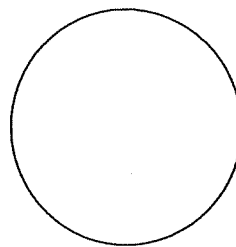
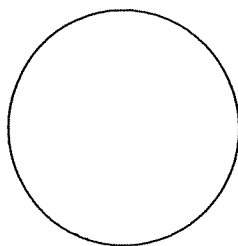


Activity 2:

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

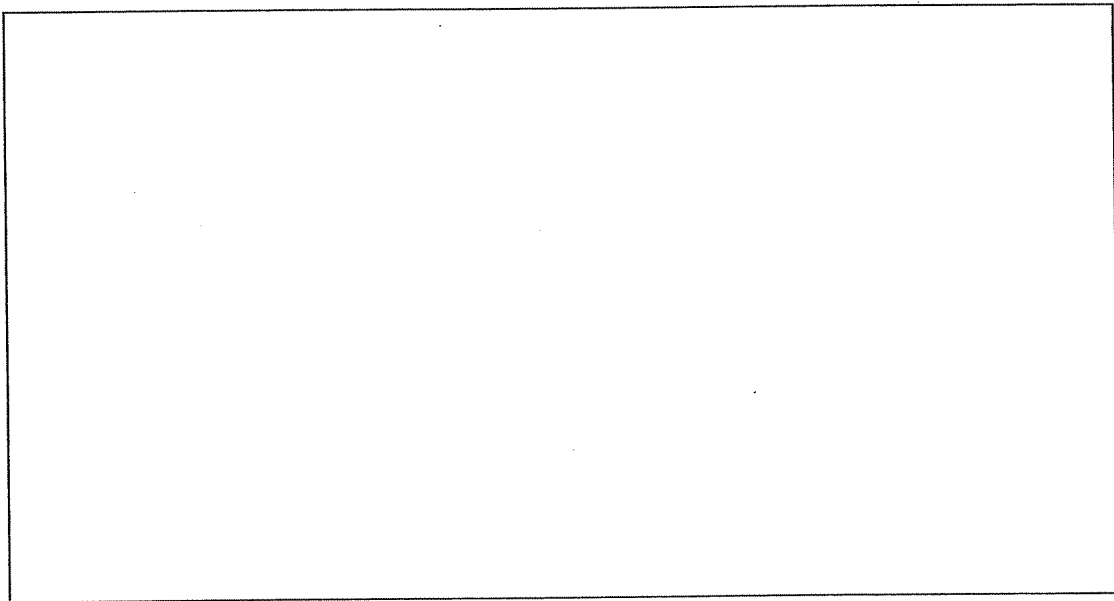
There is one way that bacteria reproduce:

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:

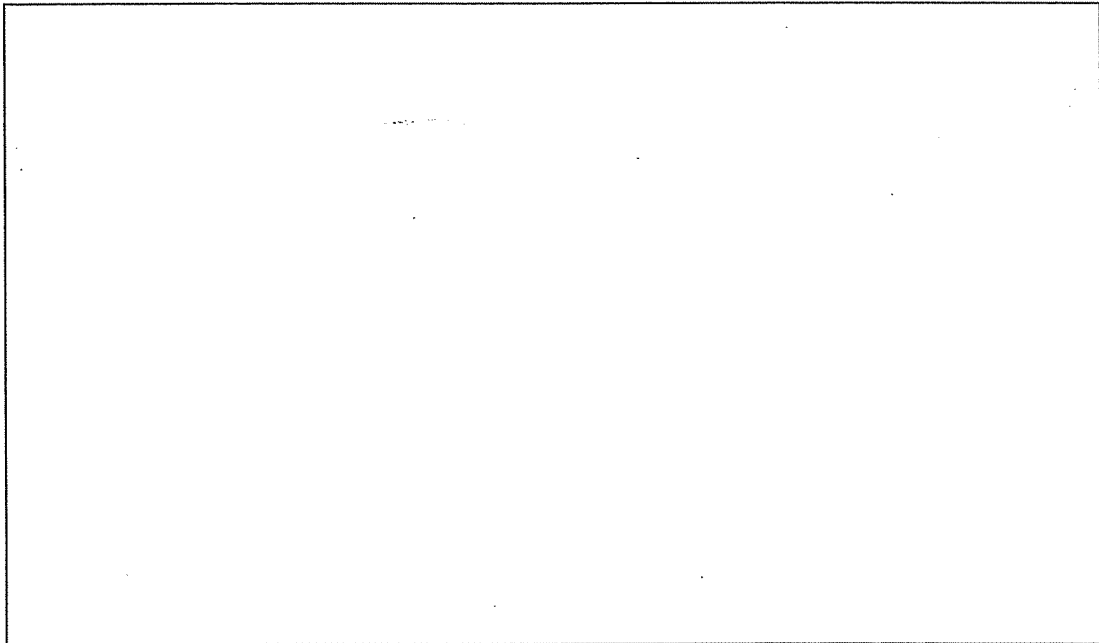
Conjugation

- *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.