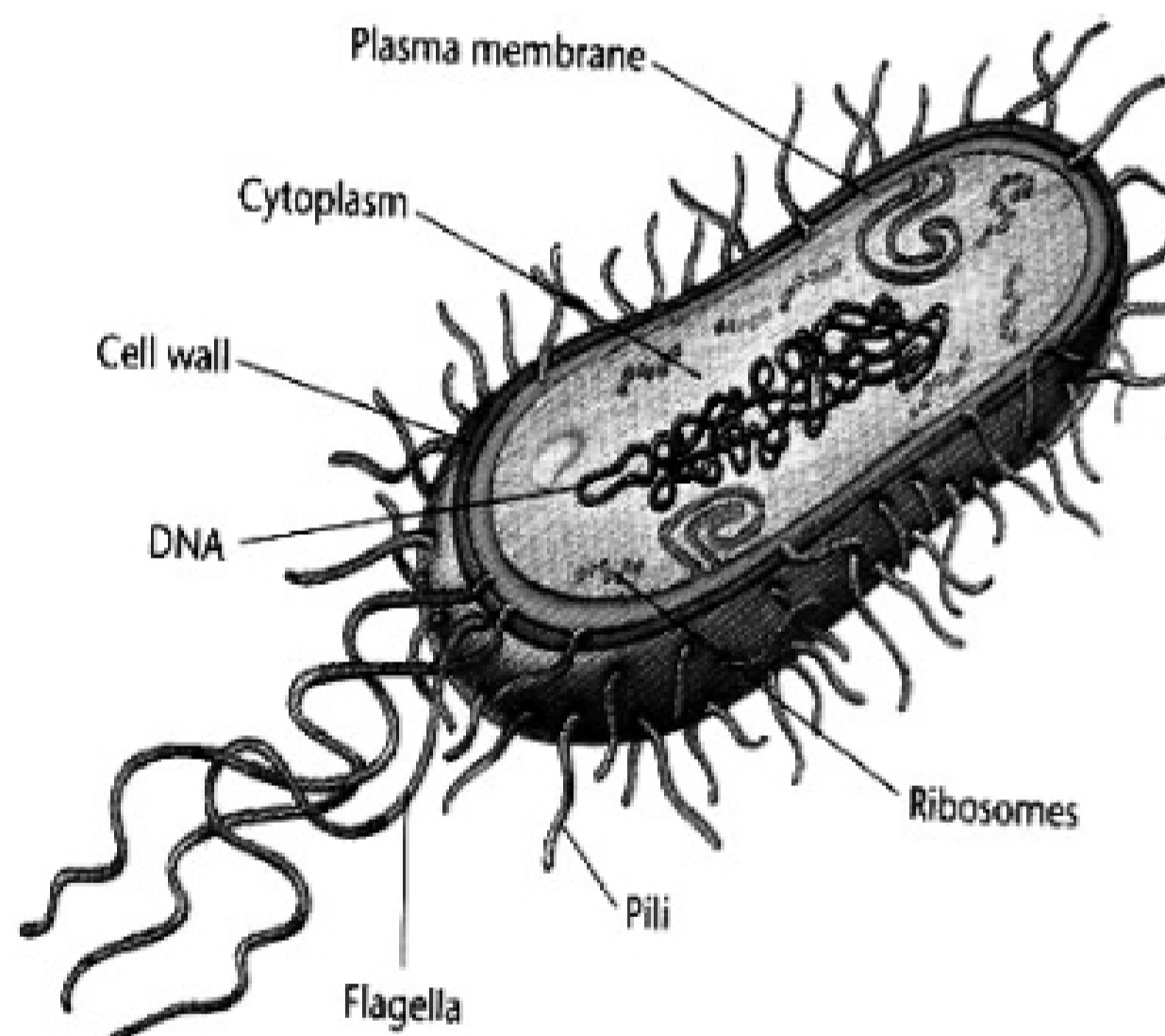


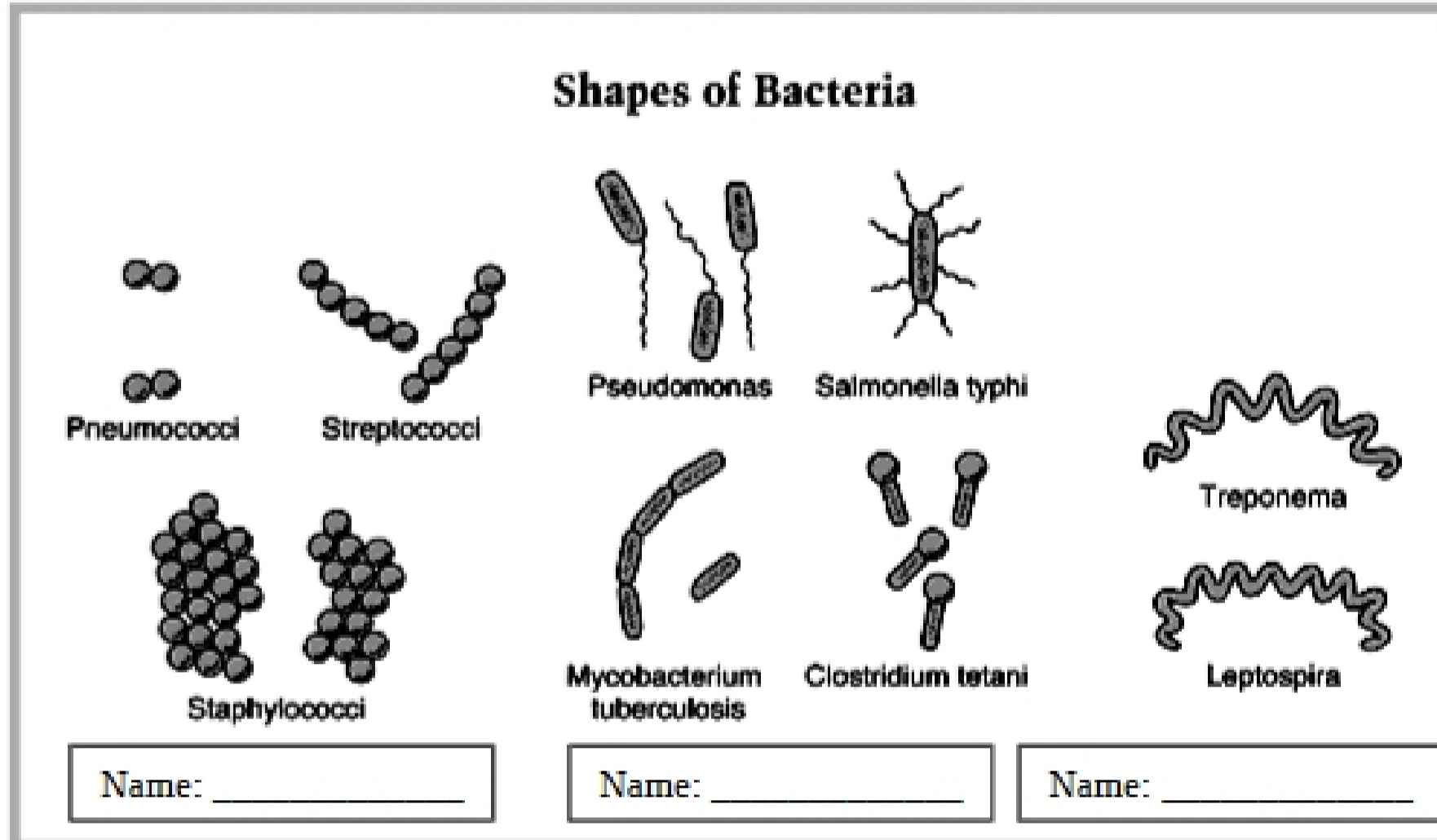
General Biology Laboratory Exercise

## Laboratory Exercise 10: Bacteria, Protists, & Fungi

1. **Bacteria & Archaea.** Prokaryotes are divided into two separate kingdoms: Bacteria and Archaea. In general, the archaea are generally anaerobic and can live in very extreme environments: e.g., extreme salt (halophiles), extreme temperature (thermophiles), or methane producing (methanogens). The Bacteria consist of both aerobic and anaerobic species and many have a symbiotic relationship with animal and plant hosts.
  - a. **General Structure.** The members of Bacteria and Archaea are prokaryotic: they have no membrane-bound organelles. Prokaryotic DNA is circular and found in a region of the cell called the nucleoid. Ribosomes are present in the prokaryotes although they are structurally different from eukaryotic ribosomes. Some bacteria form *endospores* that enable them to survive harsh conditions for long periods of time. Endospores are walled structures that form around DNA and a small amount of cytoplasm. Review the general diagram of a bacterium below.

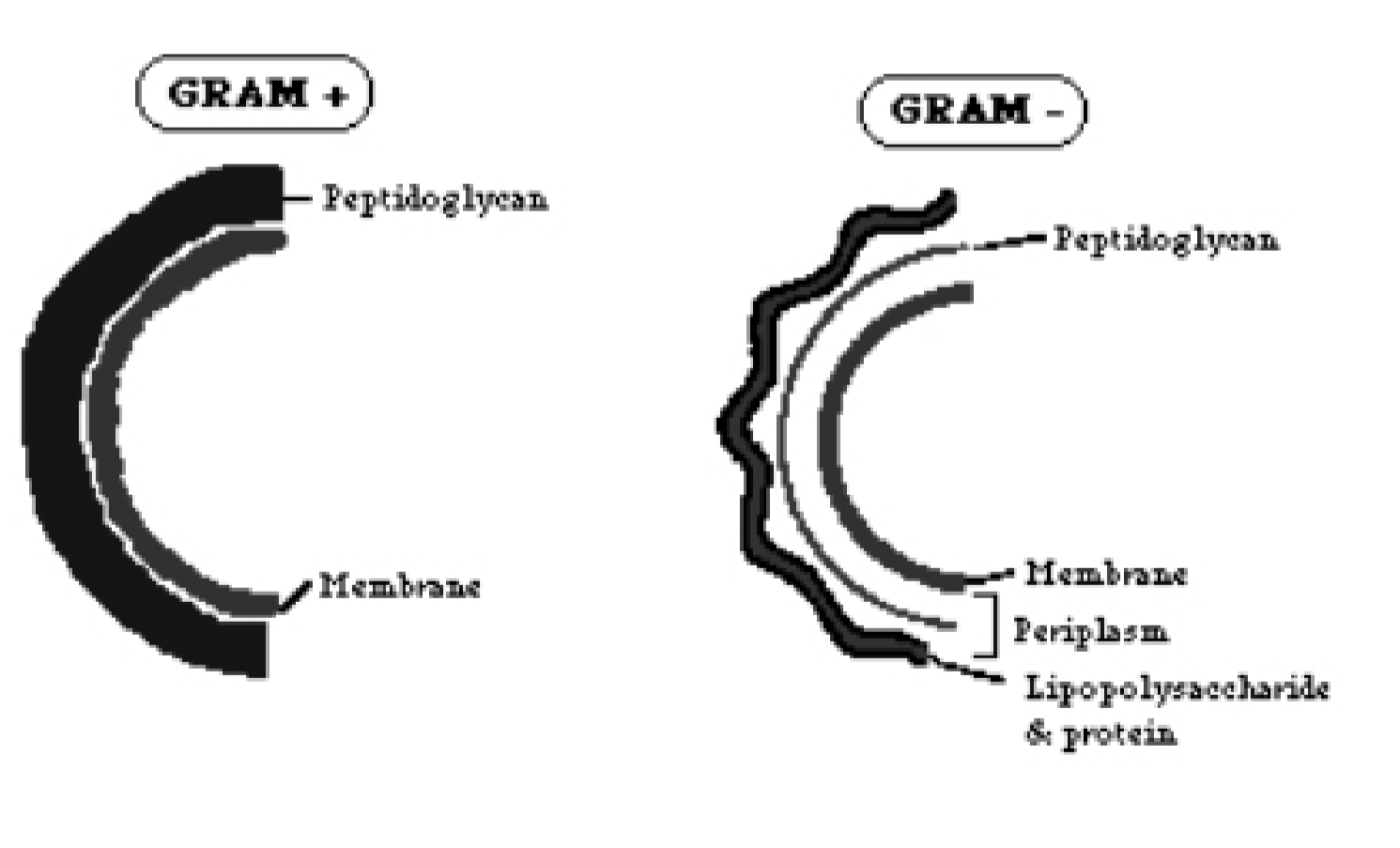


- b. Bacteria are found in three general shapes: rods, spheres, and spirals. These shapes are in the diagram below. What are the *names* for each shape?



- c. Most bacteria are surrounded by a cell wall. A cell wall of peptidoglycan surrounds most bacteria but archaea do not have peptidoglycan in their cell wall. Penicillin inhibits the reproduction of bacteria by interfering with the formation of the peptidoglycan cell wall.

The Gram Stain distinguishes between differences in cell wall architecture. With the Gram Stain, we can see that **gram positive cells stain purple** due to a thick layer of peptidoglycan and **gram negative cells stain pink** due to a thin layer of peptidoglycan. The outer membrane found in gram negative bacteria is responsible for the toxic effects seen clinically with gram negative infections (e.g., *Salmonella*). Which are susceptible to penicillin? \_\_\_\_\_



d. **Bacterial Shapes Activity.** Examine the diagram on screen and the prepared slides of bacterial smears. Find and draw the following:

		Gram + or - ?
Coccus		
Bacillus		
Spirillum		

e. **Photosynthetic Bacteria.** Cyanobacteria, sometimes called blue-green bacteria or *mistakenly* blue-green algae, are autotrophic photosynthetic bacteria. They are found in aquatic environments. One example of cyanobacteria is *Oscillatoria*, which form long stranded colonies.

*Oscillatoria*

Total magnification: \_\_\_\_\_

2. **Protists.** All organisms called “protists” are eukaryotes. These organisms were once grouped into a single Kingdom Protista, but are now recognized to belong to many different kingdoms. The various kingdoms contain autotrophs, heterotrophs, unicellular organisms, and multicellular organisms. *For all drawings, label visible structures (nucleus, cell membrane, etc.).*

3. **Animal-Like Protists.** These protists are eukaryotic heterotrophs. We will consider *Giardia*, *Trypanosoma*, ciliates, and *Amoeba*.

a. ***Giardia.*** *Giardia* are intestinal parasites of mammals, often acquired from drinking contaminated water (including clear mountain streams, as it is carried by other species such as beaver). Review the life cycle of *Giardia*.

