**CHAPTER 27 READING GUIDE**

1. **Complete the chart below comparing/contrasting prokaryotes and eukaryotes.**

|  |  |  |
| --- | --- | --- |
|  | **Prokaryotes** | **Eukaryotes** |
| Presence of membrane-bound organelles? (Y or N) |  |  |
| Nucleus OR Nucleoid? |  |  |
| Genome Circular OR Linear? |  |  |
| Size? |  |  |
| Reproduction? |  |  |

1. Describe what plasmids are and what role they play in prokaryotes.
2. How can you differentiate between gram-positive and gram-negative bacteria? Structurally, how are these two categories of bacteria different?
3. Does the presence of flagella in prokaryotes and in eukaryotic sperm suggest a common ancestry? Why or why not?
4. What is the main way that prokaryotes (and eukaryotes) acquire genetic variation?
5. There are many ways that bacteria can exchange genetic information (aside from simple binary fission) and increase genetic variation. List them below.
6. **Match each mechanism of genetic exchange below with its definition.**
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: viruses transfer genes between prokaryotes

**Transformation**

**Transduction**

**Conjugation**

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: genes are directly transferred between prokaryotes using a “mating bridge” or sex pilus.
  2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: prokaryotes take up DNA from the surrounding environment.

1. **Prokaryotes have evolved diverse nutritional and metabolic adaptations. Match them below.**
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: use carbon dioxide but get energy from oxidizing inorganic compounds

**Photoautotrophs**

**Chemoautotrophs**

**Photoheterotrophs**

**Chemoheterotrophs**

**Obligate aerobes**

**Obligate anaerobes**

**Facultative anaerobes**

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:use light to make ATP but get carbon from fixed organic compounds
  2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: photosynthetic; use sunlight to convert carbon dioxide into organic compounds
  3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: get carbon and energy from organic compounds
  4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: require oxygen for cellular respiration; cannot survive without it
  5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: cannot survive in the presence of oxygen; may use fermentation to generate energy
  6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: will use oxygen if it is available, but will undergo fermentation when oxygen is absent

1. Some Archaea are known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because they can survive in very extreme environments.
   1. Extreme \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ live in very hot environments.
   2. Extreme \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ live in very salty (saline) environments.
2. Some archaea, called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, use CO2 and H2 to produce methane.
   1. These DO / DO NOT live in extreme environments. (circle one)
3. Many prokaryotes are symbiotic and form close, permanent relationships with other species. Recall:
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ both organisms benefit
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ one organism benefits; the other is unaffected
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ one organism benefits; the other is harmed
4. Bacteria can be very beneficial to humans. List at least 3 ways humans benefit or use prokaryotes:
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_