Solutions for Talaros Foundations in Microbiology 11th Edition by Chess

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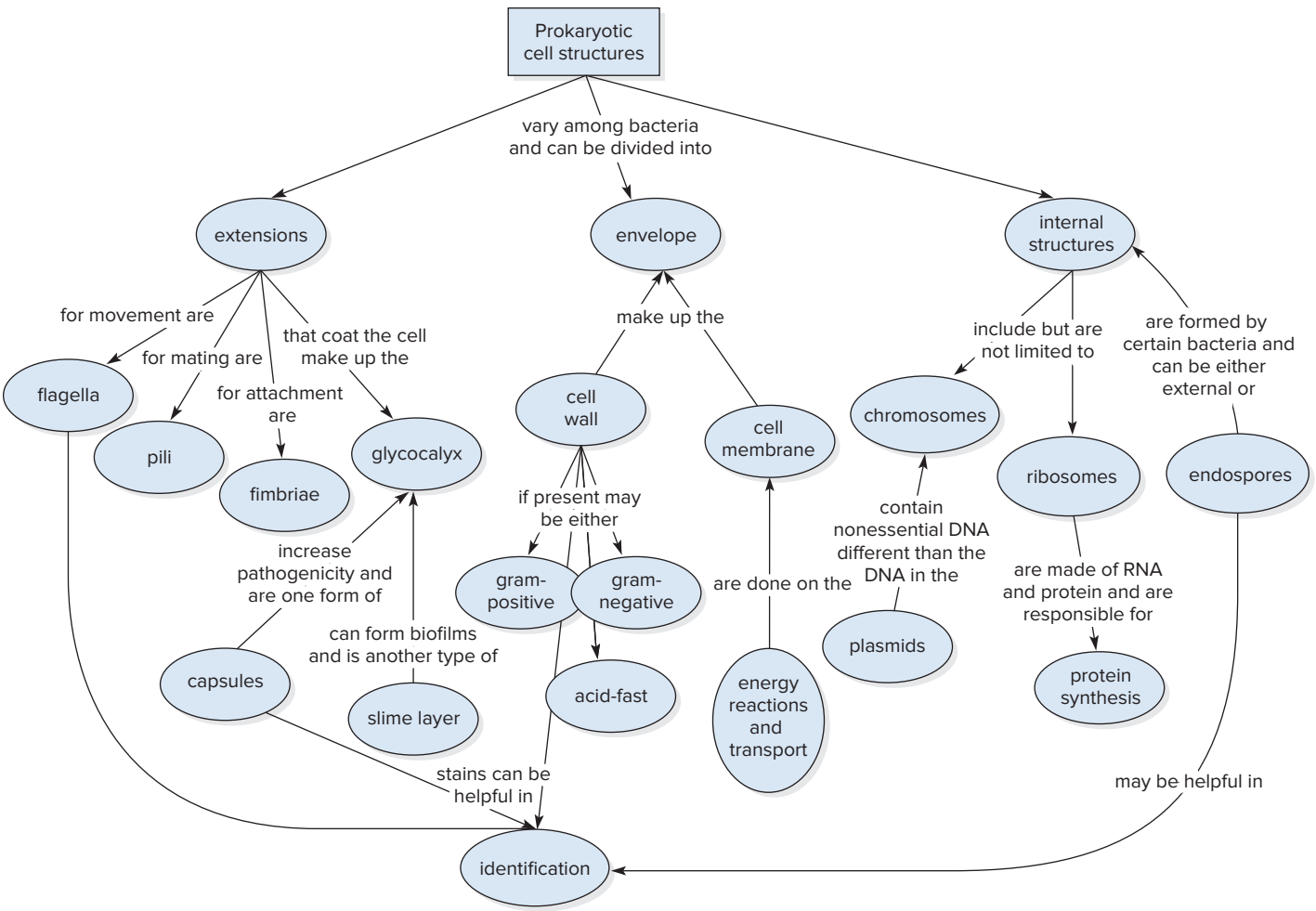
Solutions

An Introduction to Concept Mapping

Concept maps are visual tools for presenting and organizing what you have learned. They can take the place of an outline, though for most people they contain much more meaning and can illustrate connections and interconnections in ways that ordinary outlines cannot. They are also very flexible. There is an enormous number of ways that they can be put together and still be "correct." Concept maps are also a way to incorporate and exploit your own creative impulses, so that you are not stuck inside a rigid framework but can express your understanding of concepts and their connections in ways that make sense to you.

This is an example of a relatively large concept map:



There is a wide variety of ways to work with concept maps, such as using them as an introductory overview of material or using them as an evaluation tool. Software programs enable concept mappers to create elaborate maps, complete with sound bytes and photos. Some of these will even convert an outline into a concept map for you. In the end-of-chapter materials in this book, we use only three different methods, all of them fairly simple. These three are explained and illustrated here.

All concept maps are made of two basic components:

1. Boxes or circles, each containing a single *concept,* which is most often designated by a noun. The boxes are arranged on the page in vertical, horizontal, or diagonal rows or arrangements. They may also be arranged in a more free-form manner.
2. Connecting lines that join each concept box to at least one other box. Each connecting line has a word or a phrase associated with it—a linking word. These words/phrases are almost never nouns—but are verbs (e.g., "requires") or adjectives or adverbs (e.g., "underneath").

In the end, a picture is created that maps what you know about a subject. It illustrates which concepts are bigger and which are details. It illustrates that multiple concepts may be connected. Experts say that concept maps almost always lead us to conclude that all concepts in a subject can be connected in some way. This is true! And nowhere is it truer than in biology. The trick is to get used to finding the right connecting word to show how two concepts are, indeed, related. When you succeed, you will know the material in a deeper way than is possible by simply answering a single question or even a series of questions.

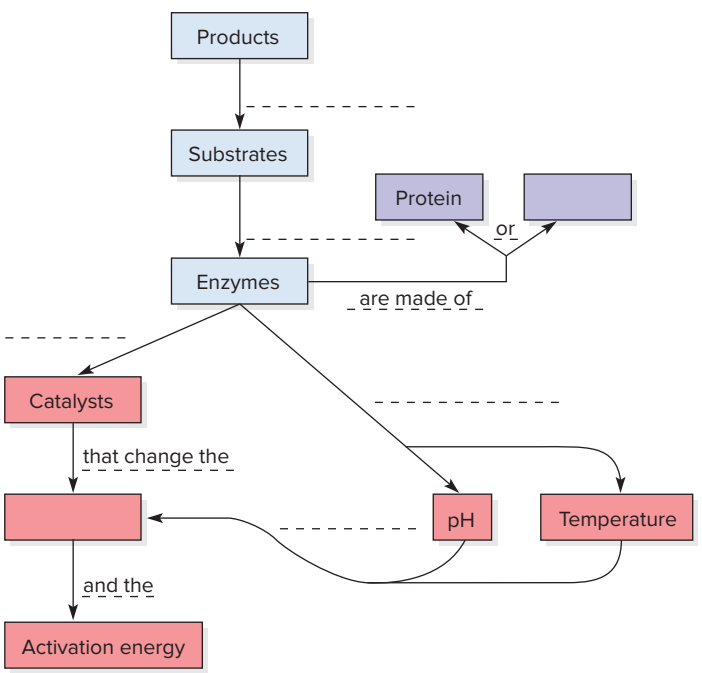
The first kind of concept map used in this book is the "fill-in-the-blank" version. In these concept maps, you are provided with all the boxes and most of the concepts in the boxes. Some boxes may be blank for you to fill in with the appropriate concept. You will do this by looking at the concepts close to the box and examining the connecting word. In these maps, you will also encounter blanks for linking words/phrases. Sometimes all the blanks will be filled in, but there will be no connecting lines or phrases and you will have to supply these. In a few of these maps, you may be asked to draw the linking lines themselves.

This is an exercise most like answering a simple question. In the example below, for instance, say to yourself "Enzymes are _____ by pH and temperature." You might ask yourself, "What relation do pH and temperature have with enzymes?" Either way, you would probably end up with a linking phrase like *are affected by* or *can be regulated by*. There is some variation in what is a correct answer, but not wide variation.

The second kind of concept map you will see is one in which you will be provided with a list of words to be used as concepts. You will be asked to draw the boxes and fill in the words to make sense. Here, there will be a lot of variability based on your view of how the concepts might relate to each other. After you put the concepts in your own boxes, you will need to add linking words/phrases. By the time you have drawn your boxes and added the concepts, you will have many ideas about what kind of linkers you want.

The last type of concept map in this book is the "freestyle" version. You will simply be asked to choose 6 to 10 keywords from the Chapter Summary and create a map—complete with linking words.

Many students report that their first experiences with concept mapping can be frustrating. But when they have invested some time in their first few concept maps, many of them find they can never "go back" to organizing information in linear ways. Maps can make the time fly when you're studying. And creating concept maps with a partner or a group is also a great way to review material in a meaningful way. Give concept maps a try. Let your creative side show!



Case 1

A 24-year old female automotive technician presents herself at the doctor's office. She complains of fever and of pain in her left hand.

On physical examination, the patient had a deep wound on her left palm that was oozing pus. She had purplish, red streaks running up her left arm. She had enlarged lymph nodes at the elbow and under her arm. The patient's skin was warm and dry.

In her history, the patient had punctured her left palm with sharp metal from the undercarriage of a "real cherry" 1977 Malibu about a week earlier. She said the wound had bled for a few minutes and she thought that she had washed it "real good" with soap and water. She had covered the wound with a large "band-aid" and gone back to work. She developed a fever about three days later. For the past couple of days, she "did not feel so good" and had vomiting and diarrhea.

1. What type of infection do you believe she has in this hand?
    a. *Streptococcus pyogenes*
    b. *Staphylococcus aureus*
    c. *Clostridium*
    d. *Pseudomonas*
    e. *Pasteurella multocida*
2. From complaint and physical examination, which of the symptoms lead you to your choice of agent?
    a. the fever and pain in the hand
    b. the fever, wound with oozing pus and enlarged lymph nodes
    c. the lymph nodes and red streaks
    d. the warm dry skin
    e. the pain, red streaks and enlarged lymph nodes
3. From the history, which of the information confirmed your choice?
    a. The wound had bled for a while.
    b. The wound was cleaned with soap and water.
    c. The wound had been covered and had perhaps become anaerobic.
    d. She had diarrhea and vomiting.
    e. The cut was from a rusting car frame.
4. Which of the following is most likely to follow this infection?
    a. gangrene and amputation
    b. toxic shock syndrome
    c. muscle spasms
    d. neurological disfunction of the hand
    e. arthritis

Case 2

A 27-year old white female presented at the walking clinic of her local physician on August 15. On physical exam, the patient had a fever of 38.5C. She appeared fatigued, had tender joints, and complained of a headache, a stiff neck and a backache. The physician noticed a circular "rash" about 5 inches in diameter, with a bright red leading edge and a dim center in the form of a "bull's eye". The physician noted an irregular heart beat. The patient complained of lack of ability to concentrate.

The patient gave the following history: She is a graduate student in the wildlife program at the university in town. She was in the field for three weeks in Wisconsin during the months of May and June. She tracks small mammals in the field and studies their behavior. It had been a warm, wet spring and she complained of a large number of biting flies, mosquitoes and ticks in the area. She felt well until about 2 weeks after returning to her home. Since that time, many of her symptoms had progressed. She finally found that she could take it no more.

1. What is your best diagnosis of this case?
2. What features are critical to your diagnosis?
3. What further steps should be taken to clear up the problem?