UNIT 4 ACTIVITIES

Step 1. Read Chapter 4 in your textbook (Principles of Environmental Science, 7th ed. by Cunningham and Cunningham) and answer the questions in these worksheets. For hints, or to double-check your answers, go to the Biology 105 website.

Step 2. For lab points, use the EcoBeaker software program to complete the lab activity entitled “Barnacles.” You must use the computers in the Biology Learning Center to do this lab activity. Go to the Biology 105 website to learn about options for getting the instructions for running the computer model and completing the lab activity. There are worksheets for this activity in the lab packet. When you have completed the activity, take your worksheets to the front desk in the Biology Learning Center for lab points.

Step 3. For lab points, do the lab activity entitled “The Rule of 70.” This activity can be completed at home. The instructions for the lab activity are on the Biology 105 website. There are worksheets for this activity in the lab packet. When you have completed the activity, take your worksheets to the front desk in the Biology Learning Center for lab points.

Step 4. Do the lab activity entitled “Questions and Hypotheses: More Practice.” This lab can be done at home, and the instructions for the lab activity are on the Biology 105 website. There are worksheets for this activity in the lab packet. When you have completed the activity, take your worksheets to the front desk in the Biology Learning Center for lab credit.

Step 5. For 42 points, do the assignment entitled “Desert Ecology Experiment Assignment.” This activity includes a desert ecology experiment that you will design and complete. This assignment can be completed at home. The instructions for the assignment are on the Biology 105 website. There are several steps to this assignment and several deadlines. Please check your syllabus and/or the deadlines page on the class website for information.

Step 6. Prepare for the Unit 4 Exam. Study your completed worksheets and take the online multiple-choice self test (on the Biology 105 website).

Step 7. Come in to the Biology Learning Center to take your Unit 4 Exam. The exam will consist of 40 multiple-choice questions.

STEP 1: TEXTBOOK WORKSHEETS

Read Chapter 4 in your textbook, and answer the following questions. For hints or to double-check your answers, go to the Biology 105 website. [NOTE: Read the textbook to learn and understand the subject, but be sure to focus on the UNIT 4 LEARNING OBJECTIVES.]
1. Read the Case Study: Population Stabilization in Brazil at the beginning of the chapter. This case study illustrates a creative approach to birth control that is very different from what is common in the United States.

2. Use the web links on the Unit 4 web page to find the approximate population of the United States. What is it?

3. Use the web links on the Unit 4 web page to find the approximate population of the world. What is it?

4. REVIEW: What pattern of growth (introduced in Chapter 3) describes how the human population grows?

**Past and Current Population Growth are Very Different**
5. What is the current world population growth rate?

6. You will need to be able to answer simple population growth questions on the exam using the “Rule of 70.” See the “Rule of 70” lab activity (there is a link on the Unit 4 web page) for a tutorial and practice problems.

**Past and Current Population Growth are Very Different: Human Populations Grew Slowly Until Recently**
7. How have the doubling times of the world population of humans changed since 5000 B.C.?

**Perspectives on Population Growth: Does Environment or Culture Control Human Population Growth?**
8. Summarize the viewpoints of Thomas Malthus and Karl Marx regarding the human population.
**Perspectives on Population Growth: Technology Increases Carrying Capacity for Humans**

9. What factors did Malthus **not** take into account when he predicted impending famine and disaster?

---

**Many Factors Determine Population Growth**

10. Define demography.

---

**Many Factors Determine Population Growth: How many of us are there?**

11. The countries of the world are often thought of as being divided into two categories: “more developed countries” and “less developed countries.”

   a. Which category contains 80% of the world population?

   b. Which category is predicted to contribute 90% of projected growth by 2100?

---

12. There are many graphs in Chapter 4; all of them quite interesting. However, as a previous edition of your textbook cautioned “... it is important to recognize that graphs can be as truthful or misleading as the person who creates them intends to be.” This is an important concept in this course (and in life), as you will be looking at and interpreting many graphs.

13. This section contains many facts and figures. You should know the following:

   a. China is currently the most populous country, with over 1.3 billion people.

   b. India is expected to become the most populous country, with a projected population of 1.6 billion by 2050.

   c. The projected population of the United States by 2050 is over 420 million.

   d. The “more developed countries” include USA, Canada, the countries of Western Europe, Japan, Australia, and New Zealand.

   e. Many countries have declining populations, including most European countries, Japan, and Russia.

   f. AIDS/HIV is having a major impact on the populations of many African countries. In some countries, over 30% of the adult population has AIDS or are HIV positive.
**Many Factors Determine Population Growth: Fertility Varies Among Cultures and at Different Times & Mortality Offsets Births**

14. Distinguish between fecundity and fertility.

15. Define the following terms.

   a. crude birth rate

   b. total fertility rate

   c. zero population growth

   d. population momentum

   e. crude death rate

16. It is important to note that although the human population is growing exponentially, the fertility rates of many countries are dropping. For example:

   a. The fertility rate in Bangladesh has dropped from 6.9 children per woman in 1980 to 2.8 children per woman in 2009.

   b. In China, fertility rate has dropped from 6 in 1970 to 1.7 in 2010.

   c. In Mexico, fertility rate has dropped from 7 in 1975 to 2.3 in 2010.

17. Declining mortality, not rising fertility, is the primary cause of most population growth in the past 300 years. Crude death rates began falling in Western Europe during the late 1700s.

**Many Factors Determine Population Growth: Life Expectancy is Rising Worldwide**

18. Distinguish between life span and life expectancy.
**Many Factors Determine Population Growth: Living Longer Has Profound Social Implications**
19. Compare the age class histograms of a rapidly growing country like Niger with that of a country with a relatively stable population, like Sweden.

20. Define dependency ratio.

**Fertility is Influenced by Culture: People Want Children for Many Reasons**
21. Define and describe pronatalist and birth reduction pressures.

**Fertility is Influenced by Culture: Education and Income Affect the Desire for Children**
22. Use Figure 4.13 to answer the following questions about United States birth rates.

   a. Describe the cause of the demographic transition from 1910 to 1929.

   b. In what years did the baby boom occur?

   c. What was the “echo boom?”

**A Demographic Transition Can Lead to Stable Population Size: Economic and Social Conditions Change Mortality and Births**
23. Referring to Figure 4.14, describe birth and death rates (i.e., are they high or low) during the time period of highest population growth.
A Demographic Transition Can Lead to Stable Population Size

24. What is a demographic transition? Describe four factors that help to stabilize populations.

A Demographic Transition Can Lead to Stable Population Size: Two Ways to Complete the Demographic Transition

25. Compare the approaches to population growth of Kerala and Andra Pradesh.

A Demographic Transition Can Lead to Stable Population Size: Improving Women’s Lives Helps Reduce Birth Rates

26. Your textbook describes the importance of reducing infant mortality. “Often, the best way to improve child survival is to ensure the rights of mothers.” Describe ways to help mothers and improve family welfare.

Family Planning Gives Us Choices: Humans Have Always Regulated Their Fertility and Today There Are Many Options

27. There are six major categories of birth control techniques described by your textbook.
   a. avoidance of sex during fertile periods (for example, celibacy or using changes in body temperature or cervical mucus to judge when ovulation will occur)

   b. mechanical barriers that prevent contact between sperm and egg (for example, condoms, spermicides, diaphragms, cervical caps, and vaginal sponges)
c. surgical methods that prevent release of sperm or egg (for example, tubal ligations in females and vasectomies in males)

d. chemicals that prevent maturation or release of sperm or eggs, or that prevent embryo implantation in the uterus (for example, estrogen plus progesterone, or progesterone alone, for females; gossypol for males)

e. physical barriers to implantation (for example, intrauterine devices)

f. abortion

WHAT KIND OF FUTURE ARE WE CREATING NOW?
28. On an off from about 1984 until 2010, the U. S. Congress did not authorize payments to the United Nations Family Planning Fund because some of the 135 countries that receive UN aid include abortion as part of population control programs. In 2010, the United States began funding the UN Family Planning Fund again.

29. Successful family planning programs require significant societal changes. Describe the five changes listed in your textbook.

30. Note from instructor: One of the reasons I like this textbook is that it presents all sides of each issue in an unbiased way. (It is not a “preachy” textbook.) However, there is one especially human statement on page 92 that everyone should see, related to population control: “We may find some or all of these techniques unpleasant or morally unacceptable, but we shouldn’t assume that other people are too ignorant or too primitive to make decisions about fertility.”

31. You need to be able to locate and identify the following 4 regions and countries (all of which are discussed in Chapter 4) on a map of the world for your Unit 4 test: Thailand, Mexico, Russia, and Bangladesh. You also need to be able to identify all of the regions and countries assigned in previous units. There are two foldout maps at the back of your textbook to help you.

End of Step 1.

Copyright © 2011. Nan Schmidt. All rights reserved. To request permission to use materials contained in this document please send an email to Nan Schmidt at nschmidt@pima.edu