ALBERTA DISTANCE LEARNING CENTRE

SCIENCE 20

Unit D: Changes in Living Systems
Student Guide

Revised May 2016

CANADIAN CATALOGUING IN PUBLICATION DATA

Science 20
Unit D: Changes in Living Systems
ADLC Student Guide

4601 - 63 Avenue
Barrhead, Alberta Canada T7N 1P4

Printed in Canada

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Unit D Changes in Living Systems

This unit tells a story about the stewardship of natural resources and species survival. The story takes stewardship from the local level within an ecosystem all the way to the biosphere. Included is the idea of species survival. You will consider species survival in response to the unintended consequences of human activities from the recent past. You will also consider species survival within the natural environment over vast geological time spans. In following this story of stewardship and species survival, you will describe the mechanics of energy flow and nutrient recycling and study the interrelationships and interactions of organisms.

- ❑ Read the Unit D introduction on pages 402 and 403 of the textbook.

- ❑ In Lesson 2.1 of Chapter 2, the "Succession on Land" and "Aquatic Succession" investigations require you to collect data over several days. Try to start these investigations as soon as you can. Check with your teacher about these investigations.

Chapter 1: The Biosphere of Life

In this chapter you will study factors that affect the survival of a species. These factors relate to both non-living and living components. The context for most of this chapter has an Alberta flavour. For example, the peregrine falcon is used to show the unexpected consequences of pesticide use on prairie wildlife. Near the end of Chapter 1 the view begins to widen to prepare you for Chapter 2, which has a more global context.

- ❑ Turn to page 404 of the textbook, and read the chapter introduction.

In the next activity you will identify conditions or factors that affect the survival of aquatic life in an aquarium.

Try This Activity: Life in a Fishbowl

- ❑ **Read the activity on page 405 of the textbook. Follow the directions, and answer the questions.**

Note: **If you do not have access to aquariums, use the Internet to find out what aquatic conditions must be maintained for goldfish and tropical fish.**

Check your answers with those in the "Suggested Answers" in the online course.

Lesson 1.1: Water: An Essential Abiotic Factor

In this lesson your attention will be drawn to the non-living components—the abiotic factors—of an ecosystem. The primary abiotic factors of an ecosystem are light, temperature, water, nutrients, and the wind. The focus of this lesson is water. You will also consider environmental issues relating to both the application of fertilizers and the use of fresh water.

❑ Read pages 406 to 408 of the textbook, ending at the investigation. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

If there is salt in water, the water is not drinkable. The salt in ocean water makes it unsuitable for drinking. How does salt affect the growth of plants? The next investigation deals with the effects of salinity on seed germination.

Investigation: The Effect of Salinity on Seed Germination

❑ **Read the investigation on pages 408 and 409 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read the remainder of page 409 in the textbook, and read page 410 to the investigation. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

For years there have been warnings of severe freshwater shortages to come in many regions of the world, including the Canadian prairies. Fresh water may yet become a scarce resource in Alberta. The next investigation deals with a controversial use of Alberta's fresh water.

Investigation: Take a Stand: Using Fresh Water for Petroleum Extraction

❑ **Read the investigation on pages 410 and 411 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read "1.1 Summary" on page 411 of the textbook. Then, complete "1.1 Questions" on page 412.

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 1.1: Water: An Essential Abiotic Factor.

Lesson 1.2: Biotic Factors: The Influence of Living Things

In this lesson, you will study what influence living things have on an ecosystem. The context for this will be the prairie grassland. First Nations perspectives play a vital role in this lesson.

❑ Read pages 413 to 419 of the textbook, ending at the investigation. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

When you think of a predator, such as a hawk, you think of a creature that destroys or devours. Naturally, you would expect that an increase in the hawk population would reduce the population of the prairie dog—its prey. Maybe what's not so clear is the effect that a change in a prey population has on its predator population. As you will discover in the next investigation, Hudson's Bay Company fur-trading records show that predator populations and prey populations are interrelated.

Investigation: Predator-Prey Population Dynamics

❑ **Read the investigation on pages 419 to 421 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read page 421 of the textbook, beginning with "Competition".

❑ Read "1.2 Summary" on page 422 of the textbook. Then, complete "1.2 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 1.2: Biotic Factors: The Influence of Living Things.

Lesson 1.3: The Web of Life

In this lesson you will study the role of organisms in the flow of energy, and you will also study the recycling of matter within an ecosystem.

Organisms can be grouped according to what they eat. Some organisms eat plants, whereas other organisms eat the organisms that eat the plants.

❑ Read pages 423 to 425 of the textbook up to "Energy Flow in an Ecosystem". Answer Practice question 21.

Check your answers with those in the "Practice Answers" in the online course.

Energy flow in an ecosystem is described using an energy pyramid. The energy pyramid uses trophic levels, which are divisions of species within an ecosystem based on their energy source.

❑ Read page 425 of the textbook, starting at "Energy Flow in an Ecosystem". Then, read pages 426 to 428 up to "Food Chains and Food Webs". Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

More detailed information about interactions between ecosystem populations is provided by food chains and food webs.

❑ Starting at "Food Chains and Food Webs," read pages 428 to 431 of the textbook. Then, answer Practice questions 27 to 30 on page 432.

Check your answers with those in the "Practice Answers" in the online course.

❑ Read "1.3 Summary" on page 432 of the textbook. Then, complete "1.3 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 1.3: The Web of Life.

Lesson 1.4: Conducting a Field Study

In this lesson, you will study the presence of organisms and determine how they interact in a natural environment. You may be going on a field trip to a site, or you may do your study via a multimedia presentation.

❑ Read page 433 of the textbook.

In the next investigation, you will undertake a field study of a local ecosystem.

Investigation: A Field Study of a Local Ecosystem

❑ Read the entire investigation on pages 434 to 438 of the textbook.

If your teacher or supervisor is organizing a field trip for the investigation, do Path 1. If your teacher or supervisor is not organizing a field trip for the investigation, go to Path 2.

Path 1

❑ Follow the directions of the investigation, and answer the questions.

Note: Instead of taking the textbook with you on the field study, take the Lesson 1.4 handouts. The handouts are copies of the textbook lesson pages.

Path 2

For this path you will use a multimedia presentation to provide you with a simulated field study experience.

❑ View the segment titled "A Field Study Simulation of a Local Ecosystem" in the "Multimedia Segments" in the online course. Follow the directions, and answer the questions in the segment.

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read "1.4 Summary" on page 439 of the textbook. Then, complete "1.4 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 1.4: Conducting a Field Study.

Lesson 1.5: The Recycling of Matter

You are likely aware that recycling discarded items is better than just throwing them away to be buried in landfill sites. In natural environments, the recycling of matter is ongoing and essential since there is only a limited amount of matter to begin with.

In this lesson you will examine the natural movement of matter in the forms of elements and chemical compounds. You will investigate four main types of recycling between the living and non-living parts of an ecosystem: the water cycle; the carbon cycle; the oxygen cycle; and the nitrogen cycle.

❑ Read pages 440 to 443 of the textbook, ending at "The Recycling of Other Elements and Compounds". Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

Since elements and compounds are recycled, the atoms making up the bodies of living things are the same ones that were present when life began on Earth.

❑ Read the remainder of page 443 of the textbook. Also read from page 444 to "The Oxygen Cycle" on page 446. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

The oxygen cycle is vital to life on Earth and to the use of fossil fuels.

❑ Read page 446, beginning at "The Oxygen Cycle". Also read pages 447 to 449. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

Nitrogen is a key component in the proteins and DNA of living things. It is critical to life. However, it is not the abundant nitrogen gas in the air that can be used by plants and animals. The useful nitrogen must come in other forms, which are generated through the nitrogen cycle.

❑ Read pages 450 and 451 of the textbook. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

❑ Read "1.5 Summary" on page 452 of the textbook. Then, complete "1.5 Questions".

Assignment

❑ Go to Assignment 1.5: The Recycling of Matter.

Lesson 1.6: Biodiversity and the Heritage of Our Lands

Shopping is likely part of your lifestyle. But what does shopping have to do with environmental quality? The answer may not yet be clear to you. But your shopping choices may cause habitat destruction, a loss of biodiversity, the introduction of invasive species, and other unintended environmental consequences. In this lesson you will reflect on the environmental impact of your lifestyle and the lifestyles of other people.

❑ Read pages 453 to 459 of the textbook. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

Did you know that boats coming into Alberta are supposed to be cleaned? The boat motors and trailers also need to be cleaned. This directive from Alberta Environment is designed to prevent the introduction of an invasive aquatic weed called Eurasian water milfoil. The next activity is about purple loosestrife, another invasive species that threatens the natural environment of the province.

Utilizing Technology: Purple Loosestrife—An Invasive Species

If you do not have a group to work with, develop the bulletin on your own. Ask for feedback from your supervisor and from your family and friends. Base your evaluation on this feedback and on your own reflection of your work's quality.

❑ **Read the investigation on page 460 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read the remainder of page 460 of the textbook, all of page 461, and page 462 to "1.6 Summary". Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

❑ Read "1.6 Summary" on page 462 of the textbook. Then, complete "1.6 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 1.6: Biodiversity and the Heritage of Our Lands.

Chapter 1 Summary

❑ Read "Chapter 1 Summary" on page 463 of the textbook. Remember to use one of the given options to make your own summary of the key concepts and important chapter terms.

❑ Turn to "Chapter 1 Review Questions" on pages 464 to 467 of the textbook. Do questions 1, 3, 6, 9 to 14, 15, 17 to 21, 24, 26 to 28, and 29 to 31. Then, do as many of the remaining questions as you feel are necessary to understand the concepts covered in this chapter.

Check your answers with those in the "Suggested Answers" in the online course.

Chapter 2: Changing Populations

A large meteorite speeds toward Planet Earth. Upon impact with Earth, its deep impact throws so much dust up into the air that sunlight does not reach Earth's plants for years. With sunlight blocked from the surface, mass extinctions occur, eliminating most of Earth's species in a very short time. This event occurred at least once in Earth's history. Nowadays, there are still many events that cause changes in the populations of living things but, from a global perspective, they are mostly on a small scale. An example of such a frequent population-changing event is a forest fire ravaging a natural landscape.

In this chapter you will study species survival and extinction within the natural environment over vast geological time spans. This study provides a basis for understanding the human impact on the present environment and for understanding global ecological issues.

❑ Turn to pages 468 and 469 of the textbook, and read the Chapter 2 introduction.

Have you ever lost something like, say, an MP3 player only to find it—after a long search—simply left on a chair? If the chair and MP3 player both have the same colour, the player can easily get lost. The outward appearance of things—including living things—affects the ease with which they can be found (or stay hidden). In the next activity you will study this phenomenon by using toothpicks.

Try This Activity: Coloured Toothpicks

❑ **Read the activity on page 469 of the textbook. Follow the directions, and answer the questions.**

Note: **As you race to pick up toothpicks, pick them up without trying to favour any colour. If you are working alone, have a friend or family member scatter the toothpicks and inform you when approximately a minute has passed.**

Check your answers with those in the "Suggested Answers" in the online course.

Lesson 2.1: Primary Succession

Two active volcanoes in Hawaii—Mauna Loa and Kilauea—erupt 1000°C lava. Lava flows into the Pacific Ocean and becomes rock. On the exposed, bare rock, life in the form of ferns and other simple, but tough, plants takes hold. This plant life is but the first part of succession—a long sequence of living things coming one after the other. In this lesson you will investigate how succession begins.

❑ Read pages 470 and 471 of the textbook up to the investigation.

In the next investigation you will observe, over approximately a two-week period, the growth of seeds and seedlings. The growth you see will demonstrate the importance of humus-rich soil, which is an end product of succession.

Investigation: Succession on Land

❑ Read the entire investigation on pages 471 and 472 of the textbook.

If you can set up seeds in various potting materials—garden soil, clay, sand, and rock chips—then, do Path 1. If you are unable to set up seeds in various potting materials, do Path 2.

Path 1

Note: Tomato seeds are easy to obtain and give good results, but bean seeds or other garden seeds are also suitable. By planting three seeds in each material, you will ensure that there is at least one good seed in each material.

Styrofoam cups or yogurt containers are suitable pots for growing, but any small containers can be used.

As you do the observations, keep in mind that germination only requires water and warm temperatures, so the seeds will most likely sprout quickly in all potting conditions. You do not have to measure the height or diameter of the seedlings with a ruler; you just have to compare the seedlings in a qualitative manner.

❑ Follow the directions of the investigation, and answer the questions.

Check your answers with those in the "Suggested Answers" in the online course.

Path 2

For this path you will use a multimedia presentation to provide you with a simulated investigation of seeds growing in various potting materials.

❑ View the segment titled "Succession on Land" in the "Multimedia Segments" in the online course. Follow the directions presented in the segment.

❑ Answer questions 3 to 5 on page 472.

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read "Succession Continues" on page 472 of the textbook.

Succession in Hawaii occurs on the bare rock formed from lava flows. Could succession play a role in making the rocky surface of Mars as fertile as Earth and ready for human colonization? This is the research topic of the next activity.

Utilizing Technology: Researching Primary Succession on Mars

❑ **Read the activity on page 473 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

Succession is not only a process that occurs on land—a type of succession also occurs in water.

❑ Read "Aquatic Succession" on page 473 of the textbook.

For the next investigation you will be given two alternatives to observe stages of aquatic succession.

Investigation: Aquatic Succession

❑ **Read the entire activity on pages 474 and 475 of the textbook.**

Do Path 1 if you have access to a supervised laboratory, as well as soil and grass materials obtained from a natural environment. If you do not have access to a supervised laboratory, go to Path 2.

Path 1

Your teacher may provide you with the required soil and grass materials obtained from a natural environment. Otherwise, this path may involve a supervised field trip to a natural environment.

Adding small amounts of soil and grass or hay will introduce microbes into the water. These microbes will act as the pioneers in your aquatic succession.

Note that you will need to conduct daily observation periods over about a one-week period.

❑ **Read the investigation on pages 474 and 475 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

Path 2

For this path you will use a multimedia presentation to provide you with a simulation.

❑ **View the segment titled "Aquatic Succession" in the "Multimedia Segments" in the online course. Use the segment to complete a table similar to the one on page 474 of the textbook. Omit the columns "Number of Organisms Observed" for each flask. Answer questions 2 to 6 on page 475 of the textbook.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read "2.1 Summary" on page 475 of the textbook. Then, complete "2.1 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 2.1: Primary Succession.

Lesson 2.2: Secondary Succession

Have you seen the charred landscape left after a forest fire? Even after such devastation, it is remarkable how ecosystems recover. Succession is responsible for this recovery.

❑ Read pages 476 to 477 of the textbook, ending at the investigation.

Have you ever weeded a garden? It seems that no matter how well you do the job, the weeds seem to come back. The return of plants to a plot of cleared soil is an example of secondary succession. In the next investigation you will examine your local area for evidence of succession.

Investigation: Observing Primary and Secondary Succession

❑ **Read the investigation on page 477 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read pages 478 and 479 of the textbook, ending at the "Forest Harvesting" activity. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

Many trees are destroyed during a forest fire, and it takes some time for the forest to return to maturity. When the forest industry removes trees from a forest, reforestation is legally required. Reforestation with seedlings from a nursery returns the forest to maturity in less time than natural processes. Yet the recovery of the forest depends very much on the method by which the forest was harvested.

Utilizing Technology: Forest Harvesting

- ❑ **Read the activity on page 479 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

- ❑ Starting at "Sustainable Development" on page 479, read up to"2.2 Summary" on page 481. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

- ❑ Read "2.2 Summary" on page 481 of the textbook. Then, complete "2.2 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

- ❑ Go to Assignment 2.2: Secondary Succession.

Lesson 2.3: Populations

Did you know that ancient Rome reached a population of one million people? However, at that time this population was too large to sustain as a city. The supply of water, food, and other resources could not be maintained for such a high population. Rome's population diminished to just 20 000 people before again reaching its modern size.

Population pressures are now on a global scale. As the human population grows worldwide, people will face even greater challenges meeting the demand for resources than the ancient Romans did. Do you think the human population can continue to grow without a Roman-like decline?

In this lesson you will describe key factors that influence populations. You will study human population growth using exponential growth models and other models. And you will also discuss the potential ecological impact of a growing human population.

❑ Read page 482 of the textbook.

In the next activity, you will see that human population growth is not a phenomenon confined to faraway regions of the world. You will use bar graphs to see how the populations of Alberta and Canada have grown over the past 100 years.

Utilizing Technology: Graphing Populations

❑ **Read the activity on page 483 of the textbook. Follow the directions, and answer the questions.**

Remember that your graph should have a title above the grid. The two axes are to be labelled and their scale should be appropriate for the data.

A computer spreadsheet will save you time. If you use Microsoft® Excel for graphing, then, you should follow these directions.

Step 1: Enter the data to be graphed into two columns. Titles are not necessary at this point.

Step 2: Highlight both columns, and open the Chart Wizard.

Step 3: The Chart Wizard will guide you through the graphing procedure. There are four steps.

(1) First, you will be asked to choose the type/format of graph that best suits the data. A line graph will work well for population statistics. (After you make each choice, press the Next button to move on.)

(2) Second, you will be asked how you would like the data displayed.

(3) In the third step, you will be asked to give the graph a title and label the *x* and *y* axes.

(4) Last, you will be asked where you want to save and display the chart you have created. Click the Finish button to complete the procedure.

The graph can be printed separately, with the original data, or it can be copied and pasted into any Microsoft® Word document.

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read page 483 to 486 of the textbook, beginning with "Exponential Growth". Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

❑ Read "2.3 Summary" on page 487 of the textbook. Then, complete "2.3 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 2.3: Populations.

Lesson 2.4: Adaptations

The most endangered species in Banff National Park is the Banff Springs snail. These snails can live in only five thermal springs on Sulphur Mountain. But many other snail species have adapted to different habitats. In adapting to various habitats, over many generations, the shape and form of snail shells changed. Since snail shells do not decompose easily, the fossil record does an excellent job of preserving these changes.

In this lesson you will examine the process of adaptation by focusing on the fossil record of snails.

❑ Read pages 488 and 489 of the textbook. Answer the questions as you encounter them.

In the next investigation you will analyze and interpret the fossil record to trace the changes in snail shells over a period of thousands of years.

Investigation: Investigating the Fossil Record: Plotting Changes Over Time

If you are working in a non-classroom environment, you may want to work with a friend or family member. Remember that there is more than one way to interpret evidence. When you compare the shells of different layers, you may want to use the partially completed chart as a guide.

Note: Fossils can be dated according to the rock layer they were found in. Fossils found in any given layer are younger than fossils found in a lower layer. This relative dating of fossils follows from the law of superposition, which is studied in Unit C. This law states that in a sequence of rock layers, the higher strata are younger than the lower strata.

❑ **Read the investigation on pages 490 and 491 of the textbook. Follow the steps of the procedure. (If you are working in a non-classroom environment, you may do just part of step 8 since you may be unable to look at and discuss the finished work of any other group.)**

❑ **Answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read pages 492 to 495 of the textbook. Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

❑ Read “2.4 Summary” on page 496 of the textbook. Then, complete “2.4 Questions”.

Check your answers with those in the “Practice Answers” in the online course.

Assignment

❑ Go to Assignment 2.4: Adaptations.

Lesson 2.5: Evolutionary Theory

In 2003, the spacecraft Mars Express was launched to orbit Mars and explore the planet. On board was a smaller vehicle designed to land on the planet’s surface. This lander, called “Beagle 2,” was to search for evidence of life on Mars. Beagle 2 was named after the sailing ship HMS *Beagle*. This ship was originally made famous for its round-the-world voyage with naturalist Charles Darwin more than a century before the launch of Beagle 2 into space. On Darwin’s historic voyage, he encountered thousands of animal and plant species and noted the adaptations that enabled life to thrive in a variety of conditions. From his observations, Darwin developed a profound new theory.

❑ Read pages 497 and 498 of the textbook, ending at the investigation. Answer the questions as you encounter them.

Check your answers with those in the “Practice Answers” in the online course.

In the next investigation you will study the connection between beak types and their suitability in terms of food sources. The study will be based on a simulation in which you and several other people will use plastic forks and small food items to take the role of birds.

Investigation: Investigating Natural Selection - A Simulation

You should be doing this investigation with at least three other people. If you are working in a non-classroom environment, you may adapt the steps of Procedure on pages 498 and 499 of the textbook so that the investigation can be done by just a few participants. Choose some friends or family members to take the role of parent birds, and let each cup itself be a chick.

There should be just one chick for each parent and its nest. The chicks must be placed equal distances from the bowl of food.

Be sure to wear protective goggles and gloves when breaking plastic tines off the forks.

Modify the plastic forks so the number and placement of tines vary. Use Figure D2.37 on page 498 of the textbook as an example.

Before doing the simulation, predict which fork variation will be most successful at acquiring food.

❑ **Read the investigation on pages 498 and 499 of the textbook. Follow the directions, and answer the questions.**

Check your answers with those in the "Suggested Answers" in the online course.

❑ Read pages 499 to 503 of the textbook, starting at "Darwin's Theory of Evolution". Answer the questions as you encounter them.

Check your answers with those in the "Practice Answers" in the online course.

❑ Read "2.5 Summary" on page 504 of the textbook. Then, complete "2.5 Questions".

Check your answers with those in the "Practice Answers" in the online course.

Assignment

❑ Go to Assignment 2.5: Evolutionary Theory.

Chapter 2 Summary

❑ Read "Chapter 2 Summary" on page 505 of the textbook. Remember to use one of the given options to make your own summary of the key concepts and important chapter terms.

❑ Turn to "Chapter 2 Review Questions" on pages 505 to 509 of the textbook. Do questions 3, 6, 9, 12, 15 to 17, 18, 20 to 22, 24, 27, and 30. Then, do as many of the remaining questions as you feel are necessary to understand the concepts covered in this chapter.

Check your answers with those in the "Suggested Answers" in the online course.

Unit D Conclusion

- ❑ Read the Unit D conclusion, including “Career Profile: Forestry Development Officer,” on page 510 of the textbook.

- ❑ Turn to “Unit D Review Questions” on pages 511 to 516 of the textbook. Do questions 2, 6, 10, 14 to 21, 22 to 28, and 33 to 38. Then, do as many of the remaining questions as you feel are necessary to understand the concepts covered in this unit.

Check your answers with those in the “Suggested Answers” in the online course.

Assignment

- ❑ Go to the Unit D Review Assignment, and answer all the review questions. Be sure to submit your completed assignment.

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Revised May 2016