Grade 11 Biology (30S)

A Course for Independent Study
GRADE 11 BIOLOGY (30S)

A Course for Independent Study
Manitoba Education Cataloguing in Publication Data

Grade 11 biology (30S) : a course for independent study.


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Manitoba Education
School Programs Division
Winnipeg, Manitoba, Canada

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Any websites referenced in this document are subject to change.

Available in alternate formats upon request.
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- **Course Writer**
  - Julie Kalinowski
  - Western School Division

- **Content Reviewer**
  - Heather Marks
  - Winnipeg School Division

- **Manitoba Education Staff**
  - Louise Boissooneault
    - Coordinator
    - Document Production Services Unit
    - Educational Resources Branch
    - (after March 2010)
  - Lee-Ila Bothe
    - Coordinator
    - Document Production Services Unit
    - Educational Resources Branch
    - (until March 2010)
  - Janelle Kropp
    - Program Support Clerk
    - Distance Learning Unit
    - Instruction, Curriculum and Assessment Branch
  - Gilles Landry
    - Project Manager
    - Development Unit
    - Learning and Technology
    - Instruction, Curriculum and Assessment Branch
  - Tani Miki
    - Desktop Publisher
    - Document Production Services Unit
    - Educational Resources Branch
  - Grant Moore
    - Publications Editor
    - Document Production Services Unit
    - Educational Resources Branch
  - John Murray
    - Project Leader
    - Development Unit
    - Learning and Technology
    - Instruction, Curriculum and Assessment Branch
  - Cyril Parent
    - Desktop Publisher
    - Document Production Services Unit
    - Educational Resources Branch
  - Murielle White
    - Desktop Publisher
    - Document Production Services Unit
    - Educational Resources Branch
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Module 1

Wellness and Homeostasis

This module contains the following:

- Introduction
- Lesson 1: How to Succeed in this Course
- Lesson 2: Personal Wellness
- Lesson 3: Introduction to Homeostasis
- Lesson 4: Cells and Homeostasis
- Lesson 5: Energy
Module 1: Wellness and Homeostasis

Introduction

Welcome to the first module of Grade 11 Biology. This may be the most important course that you will ever take, because you will learn about your own body and how to stay healthy. You will study body systems, and complete your own wellness portfolio in which you will explore and reflect on your lifestyle and wellness.

This module is made up of 5 lessons. In Lesson 1, you will learn how to successfully complete this course. In Lessons 2–5, you will learn about wellness and homeostasis – the main themes of the entire course. Don’t worry if you don’t know what they mean. You will learn about them later in the course.

In order to complete this first module, you need to study Lessons 1 to 5, and complete the following assignments.

Assignments

You will be completing the following 4 assignments, which you will be sending to your tutor/marker when you have completed the module.

Assignment Checklist

- Lesson 1: There is no assignment in this lesson.
- Lesson 2: Assignment 1.1: Personal Wellness Goal
- Lesson 3: Assignment 1.2: A Walk in the Cold
- Lesson 4: There is no assignment in this lesson.
- Lesson 5: Assignment 1.3: Wellness and Homeostasis
Lesson 1: How to Succeed in this Course

Introduction

This first lesson is like the first day of school. You’ll learn about the different parts of the course and how you can learn as much biology as possible. More specifically, you will understand how this course is organized and what you need to do in order to complete it successfully.

This course is divided into six modules, organized as follows:

- Module 1: Wellness and Homeostasis
- Module 2: Digestion and Nutrition
- Module 3: Transportation and Respiration
- Module 4: Excretion and Waste Management
- Module 5: Protection and Control
- Module 6: Wellness and Homeostatic Changes

What Will You Need?

You do not need a textbook to complete this course. All of the content is in this package. There are some lessons where website links are offered as sources of information or for supplementary reading. However, if you do not have access to a computer you can still complete the course.

You will need a notebook on which you will answer the questions in your learning activities.

It would also be very helpful if you had access to a photocopier. That way, you could make a copy of your assignments before sending them to your tutor/marker. So, if your tutor/marker wants to discuss an assignment with you over the phone, each of you will have a copy. It would also allow you to carry on studying or with further lessons while your original work is with the tutor/marker.

If you need help at any point in this course, contact your tutor/marker. There may be times when you do not know where to find information for a research topic. Likewise, you may be unsure if your choice of topic is appropriate. In these cases, your tutor/marker can help guide you in the right direction.
You will also need access to a copy of Canada’s Food Guide, especially if you do not have access to the Internet. One has been included with this course. If you cannot find one, contact the Independent Study Option at 1-800-465-9915.

How Will You Know How You’re Doing?

You will know how well you are learning by your successful completion of the following course components.

Learning Activities

One of the easiest and fastest ways to find out how much you have learned is by using the learning activities. These have been designed to let you assess yourself by comparing your answers with the answer keys at the end of each module. They are found in every lesson except this one. Some lessons have more than one. You will need a notebook to write your answers in.

Make sure you complete each learning activity. Besides giving you feedback, it will help you practice what you have learned and prepare you to successfully complete your assignments and examinations. Many of the questions on the examinations will be similar to the questions in the learning activities. Do not mail learning activities to your tutor/marker.

Assignments

Every module contains assignments that you will be sending to your tutor/marker for assessment. The assignments are worth 60% of your final mark. In order to do well on your assignments, you should complete all Learning Activities first and check your answers in the Answer Key provided. Remember to keep all assignments that have been marked and returned to you, as some will become part of your Wellness Portfolio.

Midterm and Final Examinations

The course contains a midterm examination and a final examination. You will write them both under supervision. The midterm examination is based on Modules 1 to 3 and is worth 20% of the final mark of the course. You will write it when you have completed Module 3. In order to do well on the midterm examination, you should review all of the work that you have completed from Modules 1 to 3, including all Learning Activities and Assignments.
The final examination is based on Modules 4 to 6 and is worth 20% of the final mark of the course. You will write it when you have completed Module 6. In order to do well on the final examination, you should review all of the work that you have completed from Modules 4 to 6, including all Learning Activities and Assignments.

You are responsible to make arrangements to have the examinations sent to the proctor from the Independent Study Option office. Contact the Independent Study Option office at 1-800-465-9915 if you need help arranging this.

In order to write your examinations, you will first need to apply for them. Here is how you can do that.

- **If you are attending school**, ask your school’s ISO Facilitator to add your name to the ISO examination eligibility list. Do this at least three weeks prior to the next scheduled examination week.

- **If you are not attending school**, check the Examination Request Form for options available to you. The Examination Request Form was mailed to you with this course. Fill in this form and mail or fax it three weeks before you are ready to write your examination. The address is
  
  ISO Registration  
  555 Main Street  
  Winkler MB  R6W 1C4  
  Fax: 204-325-1719  
  Toll-Free: 1-800-465-9915

**What is a Typical Lesson Like?**

The lessons in this course contain the following parts:

- **Introduction**: The introduction sets the stage for the lesson. It may draw upon prior knowledge or briefly describe the organization of the lesson. It also lists the outcomes for the lesson. These describe what you will learn.

- **Body of the Lesson**: The body of the lesson develops the concepts. It contains explanations, diagrams, and fully completed examples.

- **Learning Activity**: Most lessons have a Learning Activity. These include questions that you should complete in order to help you practice or review what you have just learned. Once you have completed a learning activity, you should check your answers with the answer key.

- **Assignments**: Assignments are found at the end of most lessons. In total, all assignments will be worth a total of 60% of your final mark. You will send these to your tutor/marker at the end of every module.
What if You Need Help?

There are two people who can help you be successful in your course.

Your Tutor/Marker

The first person who can help you is your tutor/marker. Tutor/markers are experienced teachers who tutor ISO students and mark assignments and examinations. If you are having difficulty at any time during this course, be sure to contact your tutor/marker. They are there to help you. If you are not sure how to contact your tutor/marker, phone the Independent Study Option office at 1-800-465-9915.

Your Learning Partner

The next person who can help you with your course is your learning partner. A learning partner is someone you choose who will help you learn. It may be someone who knows something about biology, but it doesn’t have to be. A learning partner could be someone else who is taking this course, a teacher, a parent, a sibling, a friend, or anybody else who can help you. Most importantly, a learning partner should be someone you feel comfortable with and who will support you as you work through this course.

Your learning partner can help you keep on schedule, check your work, help you make sense of assignments, read your course with you, or look at your learning activities and respond to them. You may even study for your examination with your learning partner.

How Much Time Will You Need?

Learning through independent study has several advantages over learning in the classroom. You are in charge of how you learn and can choose how quickly you will complete the course. You don’t have to wait for your teacher or classmates, and you can work as quickly as you want. You can also complete as many lessons at a time as you want. Read the next few pages to get an idea of how to pace yourself.
Chart A: Semester 1

Here is a suggested timeline that you can follow if you start your course in September and need to complete it by the end of January.

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<td>Module 4</td>
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<td>Module 5</td>
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Chart B: Semester 2

Here is a suggested timeline that you can follow if you start your course in January and need to complete it by June.

<table>
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<td>Module 2</td>
<td>mid-March</td>
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<tr>
<td>Module 3 and Midterm Examinations</td>
<td>early April</td>
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<td>Module 4</td>
<td>late April</td>
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<td>Module 5</td>
<td>mid-May</td>
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<tr>
<td>Module 6 and Final Examinations</td>
<td>late May</td>
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Chart C: Full School Year (Not Semestered)

Here is a suggested timeline that you can follow if you have registered for this course in September and would like to complete it by June.

<table>
<thead>
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<th>Completion Date</th>
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<tr>
<td>Module 1</td>
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<tr>
<td>Module 2</td>
<td>mid-November</td>
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<tr>
<td>Module 3 and Midterm Examinations</td>
<td>mid-December</td>
</tr>
<tr>
<td>Module 4</td>
<td>late January</td>
</tr>
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<td>Module 5</td>
<td>mid-March</td>
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<tr>
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Do not wait until the last minute to complete your work, since your tutor/marker may not be available to mark it. Make sure that you leave enough time for your work to travel through the mail, as it might take over a week. It may also take a few weeks for your tutor/marker to mark everything and send the marks to your school.

If you need this course to graduate this school year, remember to schedule and complete your final examination by June 1.
When and How Do You Send in Your Assignments?

You’ll be mailing your assignments to your tutor/marker six times during this course—at the end of each module.

Mailing your Assignments

Each time you mail something, you must complete and attach the appropriate Cover Sheet. All Cover Sheets are found at the end of this lesson. If you can, make a photocopy of your assignments before sending them to your tutor/marker.

Emailing Your Assignments

If you have email access, you may be able to email your assignments to your tutor/marker, as long as you have arranged it in advance. Please be advised that this option is not appropriate for some assignments and your tutor/marker will permit it at his or her discretion.

- **Attending Students**
  
  Please notify your ISO School Facilitator (person who signed your ISO registration/admission form) to receive permission to email your assignments and to determine your school’s procedure for emailing assignments.

- **Non-attending Students**
  
  Please discuss with your tutor/marker to arrange in advance permission to submit work electronically.

**How to submit your work** (files must not exceed 5 MB)

Depending on the file type, please submit your work as shown below:

- **Written work**: Microsoft Word (doc) or as an rtf
- **Spread sheet assignments**: Microsoft Excel (xls)
- **Picture and graphic files**: jpeg, gif
- **Scanned file**: pdf (save multiple pages on one file)
- **Audio file**: compressed wav (zipped)
- **Video file**: wmv
How to send your email

1. Use the following format to compose your email.

<table>
<thead>
<tr>
<th>To:</th>
<th><a href="mailto:distance.learning@gov.mb.ca">distance.learning@gov.mb.ca</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cc:</td>
<td>(email address from your ISO school facilitator—if required)</td>
</tr>
<tr>
<td>Subject:</td>
<td>Jane Doe Grade 10 Science</td>
</tr>
<tr>
<td>Attach:</td>
<td>lesson 1_mod_1_assign_1.doc</td>
</tr>
</tbody>
</table>

Message:
Lesson 1, Module 1, Assignment 1.1, 1.2 and 1.3
My tutor/marker is _______________________________________________________
My school is ____________________________________________________________

2. Attach your files (files must not exceed 5 MB).

3. Email your assignments to <distance.learning@gov.mb.ca> only. Do NOT email your assignments directly to your tutor/marker. Emails sent directly to tutor/markers will be returned unread.

*Your tutor/marker will electronically mark your work and email it back to you.*
What are the Guide Graphics For?

Graphics have been placed inside the margins of the course to identify a specific task. Each graphic has a specific purpose to guide you. A description of each graphic is described below:

**Assignment:** This is an assignment that you complete and send to your tutor/marker. You will be sending in your assignments at the end of every module.

**Internet:** If you have access to the Internet, you can use it to get more information. Internet access is not required for this course.

**Learning Activity:** Complete this learning activity to help you review or practice what you have learned and prepare for your assignment and examination. You will not send learning activities to your tutor/marker.

**Mail-in:** It is now time to mail in your assignments.

**Examination preparation:** This graphic alerts you to when it is time to write an exam.

**Learning Partner:** This is a good time to ask your learning partner for help.
A Note to Classroom Teachers
The specific learning outcomes for each lesson are listed in the appendix found at the end of this course.
Lesson 2: Personal Wellness

Introduction

Now that you learned how to succeed in this course, it’s time for you to start learning about personal wellness. You will also start working on your Personal Wellness Portfolio. It will give you a great chance to learn more about yourself and your own wellness, and to discover ways to improve your personal health and wellness.

What is Biology?

Since this is a biology course, you need to know what biology is. Biology is the study of living things. It is a very broad discipline and includes many specific areas of study. That is because “living things” vary in form from very simple, one-celled organisms to very complex, multi-cellular organisms. The diversity of living things on our planet is incredible.

In this course, you will learn more about the human organism. You will study the structure of the human body (anatomy) and also how the human body works (physiology). These two areas—structure and function—are closely related. You will see this relationship reinforced many times throughout this course.

Lesson Focus

In this lesson, you will

- become more aware of your personal wellness
- increase your understanding of your family’s health history
- learn the differences between health and wellness
- begin working on your Personal Wellness Portfolio by completing a Personal Wellness and Family Health History questionnaire
- increase your awareness of how one person’s health and wellness affects other people
All living things, including human beings, age and eventually die. Like a car needs consistent and careful attention, a living organism must be adequately maintained. Life requires maintenance because it is a delicate state, a balance between “too much” and “too little” of a wide variety of factors.

As humans, we are concerned not only with staying alive, but with the quality of our lives. We want to be both fit and well. This lesson explores personal health and wellness, and also considers the successful maintenance of health and wellness that is homeostasis.

Note
At the end of this lesson, there is an assignment that you will mail to your tutor/marker for marking. Normally, you will mail in your assignments at the end of each unit. This lesson is an exception in that you will mail your assignment in at the end of the lesson.

Personal Health and Wellness

What are the differences between personal health and personal wellness?

Health usually refers to the physical and mental well-being of an individual.

Wellness is a broader term and refers to the relationship between the five factors of well-being, which are physical, emotional, spiritual, intellectual, and social.

- Physical wellness includes caring for your body in terms of sleep, exercise, proper nutrition and hydration; exposure to various drugs and medications; and regular medical check-ups. Physical well-being is to some extent an individual and unique state of balance.

- Emotional wellness involves the existence of healthy emotions as we experience the events in our lives and the relationships that we have with other people. It is natural to have negative emotions but they must be balanced by positive emotions.

- Spiritual wellness is harder to define and is different for each individual. It refers to the human need to understand the deeper meanings of life, the forces that control our present and shape our future. For some people, spirituality involves formal religion while for others it does not.

- Intellectual wellness is being willing and able to learn new things while stimulating and challenging your mind. Because life is always changing, it is important that everybody learns new things in order to adapt to those changes and to prevent intellectual stagnation.
- **Social wellness** refers to the degree to which a person interacts successfully with others. This is important because human beings are interdependent on one another.

Your health and wellness depend on a number of factors, such as accidents, illness, environmental conditions, and your family’s health history. Environmental factors, like smog and pollution, affect everyone’s health and wellness. Certain conditions, illnesses, and predispositions are partly genetic and therefore can run in families. Examples of these include some types of cancer and diabetes.

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**Learning Activity 1.1**

It is now time for you to complete **Learning Activity 1.1**. Remember, Learning Activities are **not** sent in for assessment. However, this Learning Activity will help you complete **Assignment 1.1** (which you **will** send in for assessment).
Learning Activity 1.1

Wellness and Family Health History

This questionnaire will help you to become more aware of your own health, as well as your family’s health history, and may be useful in developing your personal wellness goals. You will be referring to these answers when completing Assignment 1.2 in lesson 3. Answer each question honestly and do not be concerned with what you think your answers “should” be.

Please note that, because of the nature of the questions, this learning activity does not have an answer key, though most learning activities do.

Part I: Checklist

Put a “check mark” ✓ next to the items that apply to you most of the time.

1. _____ I am aware of diseases that tend to run in my family.
2. _____ I know what illnesses I have had in my life so far.
3. _____ I know what type of medications that I have had in the past.
4. _____ I have supportive family members and friends.
5. _____ I am involved in community activities.
6. _____ I am a lifelong learner.
7. _____ I can cope with stress safely and consistently.
8. _____ I laugh easily and often.
9. _____ I know how to relax when I need to.
10. _____ I sleep well and generally feel rested.
11. _____ I like myself.
12. _____ I consider how my actions affect others.
13. _____ I eat a variety of foods.

continued
Learning Activity 1.1 (continued)

14. _____ I limit my intake of fast foods.
15. _____ I choose low fat items in my daily diet (low fat dressings, low fat milk, etc.).
16. _____ I include high fibre foods in my diet (whole wheat breads, fruit, etc.).
17. _____ I eat fruit and vegetables every day.
18. _____ I eat dairy products every day (milk, cheese, yogurt, etc.).
19. _____ I eat whole grain products every day (bread, cereal, pasta, etc.).
20. _____ I eat meat or meat alternatives every day (eggs, meat, peanut butter, etc.).
21. _____ I limit my junk food intake.
22. _____ I taste my food before I add salt.
23. _____ I limit my sugar intake.
24. _____ I don’t drink alcohol.
25. _____ I maintain a healthy body weight by balancing exercise and healthy eating.
26. _____ I do activities to make myself more flexible, such as stretching.
27. _____ I do activities to make myself stronger, like weight-lifting.
28. _____ I do activities to improve my cardiovascular fitness, like swimming.
29. _____ I get 30 minutes of non-stop, moderately intense activity at least 3 times a week.
30. _____ I know if my blood pressure is in a normal range.
31. _____ When I exercise, I don’t get out of breath too quickly or feel too uncomfortable.
Part II: Personal Wellness

Choose 5 of the following questions and respond with a few sentences for each question. Do not be concerned with writing what you think you “should” write, just be as honest as you can.

1. Do you have a physical sickness or disease at the present time? What is it, and how are you treating it?
2. Have you had a physical sickness or disease in the past which you believe may reoccur in the future? Are there any steps you can take to prevent a reoccurrence?
3. Do you have a healthy diet? If not, why not? If so, why is it important to you?
4. How often do you get physical check-ups with your doctor? Is that often enough?
5. What types of exercise do you engage in regularly? Do you think it is often enough? Do you think it is too much?
6. Do you get an adequate amount of sleep every night? If not, why not?
Learning Activity 1.1 (continued)

7. Are you a happy person? Why or why not?
8. Do you usually have a positive outlook on your future? Why or why not?
9. What do you like most about yourself? Name three things.
10. Do you forgive yourself for past mistakes? Why or why not?
11. Do you forgive others for past mistakes? Why or why not?
12. Do you feel that you communicate openly with those you are closest to? Why or why not?
13. Do you have problems controlling your anger? Why or why not?
14. Do you keep a personal journal? Why or why not?
15. How often do you pray or meditate? Do you think that is often enough?
16. How often do you read? What types of literature do you most enjoy?
17. Do you enjoy listening to speakers at special interest workshops or presentations? Why or why not?
18. Do you enjoy discussions with others on challenging topics? Why or why not? Who do you enjoy conversations with most?
19. Do you watch educational television? If not, why not? If so, what do you watch?
20. Do you see yourself as a flexible, open-minded person? Why or why not?
21. What activities in your community are you involved in?
22. Do you volunteer your time with any community organizations? If so, which ones? If not, why not?
23. Do you enjoy meeting new people and trying new things? Why or why not?
Part III: Wellness and Homeostasis

The creation of a personal Family Medical History in the Wellness Portfolio is not mandatory. Teachers need to be sensitive with regard to students who may not be able to contact family members, or for families who wish to keep medical histories private. The goal of this activity is to develop an understanding of how some health and wellness issues may be hereditary. A family history may also be an excellent gateway to inquiry into diseases, heredity, and so forth.

You’re the Doctor!

A Patient’s Family History

Doctors often ask patients if any medical conditions persist in their family. In this activity, you will conduct a family history on a “patient”. This may be a general family history that tracks ages, illnesses, and so on or you may track a particular medical condition through a family tree.

Doctor-patient confidentiality requires that you use fictitious names.

Here is a list of questions you should ask your patient:

- Do you have any medical conditions?
- Have you had any hospital visits? What for?
- Do you have any allergies? What kind of allergy? Do other members of your family have allergies?
- How long did your longest surviving relative live?
- Do multiple births (twins, triplets, etc.) occur in your family?
- Were people in the family smokers or non-smokers?
- When were your parents and grandparents born?
- Did any family members experience any medical conditions during their lifetime (e.g., heart attack, diabetes, cancer, arthritis, asthma, allergies, seizures, multiple sclerosis, strokes, ulcers, colon cancer, ovarian cancer, breast cancer, prostate cancer, melanoma)? [NOTE: A doctor works through the different organ systems in this question.]
- If a family member has died, when did it occur? How old were they when they passed away? Did any known conditions cause their death?
Wellness Choices

You are not able to control your genetic makeup. However, you do have control over the choices you make and your own behaviour. The five aspects of wellness discussed earlier in this lesson are all very strongly affected by your lifestyle choices and behaviour. For example, you determine how much sleep you get every night. You make daily dietary decisions. You decide whether or not to read for relaxation. You decide whether or not to smoke.

Learning Activity 1.1 (continued)

TASK:

1. Ask these questions of someone who will be your “patient” and go back as far into their family tree as you can. You may want to ask these questions of another family member of theirs to fill in gaps.
2. Make notes of these interviews and include them in your Wellness Portfolio.
3. Summarize your work as a medical family tree. Note each person, how the individuals are related, and relevant information about them.

For purposes of a genetic history, what you are creating is a medical tool called a pedigree. You are doing a basic pedigree with added notes. All information is considered private.

Assessment

This assignment is intended to give you as complete a picture of your “patient” as you can have. You will be graded on inclusion of interview notes and completeness of the medical family tree. There is no prize for having the family with the most disorders!
These decisions affect other people. The lifestyle choices made by a pregnant woman affect her unborn child. The choices made by a father affect his children. The choices made by an individual affect his or her co-workers. The choices made by an individual family affect their community. The province of Manitoba has a “Healthy Living” website that is informative and may help you reflect on your own health and wellness. At the time this course was written, the website was found at:
http://www.gov.mb.ca/healthyliving/index.html

Assignment 1.1

It is now time to complete Assignment 1.1: Personal Wellness Goals.