e-Learning Activity
During this laboratory, you will complete a tutorial to learn about vitamin B12 metabolism and deficiency. This laboratory builds on your understanding of biochemical methods learned by completing the Iron Deficiency Virtual Laboratory. Using laboratory methods from the Iron Deficiency Laboratory and new methods, you will identify a condition known as Pernicious Anemia.

Objectives
- Be able to recognize the clinical signs and symptoms associated with vitamin B12 deficiency.
- Recognize the physiological functions of vitamin B12 as they relate to signs and symptoms of deficiency.
- Based on the results of laboratory tests be able to differentiate between iron deficiency anemia and pernicious anemia.
- Recognize the equipment and type of sample required for laboratory tests used in the diagnosis of different types of anemia.
- Be able to document your assessment of a patient in the form of a SOAP note.

Assignment
As you read the tutorial answer the following questions.

Case Study
List five symptoms associated with Pernicious anemia (Linus's symptoms).

1.
2.
3.
4.
5.

List the signs of pernicious anemia observed by the physician.

1.
2.
3.
4.
**Tutorial**

Why is the stomach needed for vitamin B12 absorption?

What happens to red blood cells when vitamin B12 is not available?

What happens to nerve transmission during vitamin B12 deficiency?

**Laboratory Tests**

*Go to the hematocrit assay.*

What three pieces of equipment are required to determine a hematocrit?

1. 

2. 

3. 

What is Linus's hematocrit value? ______________

Would you consider him to have anemia? ____________

*Go to hemoglobin assay.*

What three pieces of equipment are required to determine hemoglobin?

1. 

2. 

3. 

What is Linus's hemoglobin value and would he be classified as having anemia?
List two ways that red blood cells in Linus's blood smear differ from red blood cells in a normal blood smear.

1. 

2. 

What is Linus's MCV value and would this indicate that the cells are macrocytic?

When vitamin B12 is present in adequate amounts, what happens to methylmalonic acid (MMA)?

Without vitamin B12 what happens to MMA?

What type of sample is required to measure MMA? ____________________

What laboratory instrument is used to measure MMA? ____________________

What is Linus's urinary MMA value? ____________________

Does this value indicate vitamin B12 deficiency? ____________________
Go to Schillings Test

What is the purpose of the Schillings Test?

What do the results of the Schillings Test tell us about the cause of Linus's anemia?

Nutritional Care Plan

As part of the Health Care Team, your assessment and treatment of the patient becomes part of the medical record. Your notes are recorded in a standardized format known by the acronym SOAP. The SOAP note contains the following parts:

(S) Subjective data: Information provided by the patient and family that is relevant to the problem. This would include information such as the patient’s perception of how he/she feels including a list of his or her symptoms and complaints.

(O) Objective data: This includes laboratory data and reliable observations made by members of the Health Care Team. Weight, height and physical signs observed by Health Professionals as well as laboratory results would be listed here.

(A) Assessment: Based on the subjective and objective data, an evaluative statement is given suggesting a possible diagnosis and/or severity of the problem.

(P) Plan: Based on the assessment, an immediate plan for treatment is given. This plan may be a special diet, patient education or consultation to obtain additional information. Plan for follow up is included.

LABORATORY REPORT: Write a SOAP note for Linus.