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ABSTRACT

This booklet, one of a series developed by the Frederick County Board of Education, Frederick, Maryland, provides an instruction module for an individualized or flexible approach to 7th, 8th, and 9th grade science teaching. Subjects and activities in this series of booklets are designed to supplement a basic curriculum or to form a total curriculum, and relate to practical process oriented science instruction rather than theory or module building. Included in each booklet is a student section with an introduction, performance objectives, and science activities which can be performed individually or as a class, and a teacher section containing notes on the science activities, resource lists, and references. This booklet introduces the pupil to the study of the human body, body systems, and their functions. The estimated time for completing the activities in this module is seven weeks. (SL)

AIDS TO INDIVIDUALIZE THE TEACHING OF SCIENCE

Marvin G. Spencer

MINI-COURSE UNITS

BOARD OF EDUCATION OF FREDERICK COUNTY
1973

Frederick County Board of Education

Mini Courses for

Life, Earth, and Physical Sciences

Grades 7, 8, and 9

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1973

FOREWORD

The contents represented in these modules of instruction, called mini courses, is an indication of our sincere desire to provide a more individualized and flexible approach to the teaching of science.

Data was accumulated during the school year relative to topics in life, earth, and physical science that were felt to be of greatest benefit to students. The final selection of topics for the development of these courses during the workshop was made from this information.

It is my hope that these short courses will be a vital aid in providing a more interesting and relevant science program for all middle and junior high school students.

Dr. Alfred Thackston, Jr.
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LET'S LOOK AT YOU - THE HUMAN ORGANISM

Prepared by

Sharon L. Sheffield

CONTENT

Estimated Teaching Time

7 weeks

LET'S LOOK AT YOU - THE HUMAN ORGANISM

INTRODUCTION:

I am interested in me. What about you? Are you interested in you? I hope so, because in your world, you are the most important organism!

Because you are so important to yourself and to others, it is a good idea to learn as much about how you work as you know about other animals and plants. This may seem like an overwhelming task but it is surprisingly easy because you carry a living specimen (you) around with you all the time. As you learn, refer to yourself, and see how you are an example of your knowledge.

GENERAL OBJECTIVES (for the human body):

A. To appreciate ourselves as a multi-cellular complex organism capable of carrying on all life activities.

B. To understand the function of the various systems within the human body.

C. To recognize the adaptations within the human organism that sets it apart from other animals.

D. To recognize the importance of keeping our bodies healthy and strong.

E. To identify some of the disorders that can happen to the human organism and be aware of the treatments for them.

F. To understand the importance of good nutrition for a healthy body.

TOPIC ONE - AN INTRODUCTION

A. Behavioral Objectives (what you should be able to do at the end of this section)
   1. Name 3 ways man is adapted for life on land.
   2. Relate the 7 basic life activities to the human systems and their functions.
   3. Define man as a complex multi-cellular organism.

B. Activities
   1. Read to discuss: (small group 3-5)
      Life Science - A Modern Course (Man is a Biological Organism) p.235

      Modern Life Science, p.288, column I

      The World of Living Things, p.264, 266, 267 and 268 (top)

      When your group has finished reading, get together, discuss these topics and turn in a group report of your discussion.

Discussion Guide

1. What advantage is man's brain to him?

2. Why is man considered a land animal?

3. How has man adapted himself to other "alien" environments? Should we reclassify man from "land animal" to "multi-environment animal"? Why or why not?

2. Watch a movie: The Human Machine, take notes and then write a paragraph explaining the human body as a machine.

3. Do some reading:
   Living Things, pp.36-40
   Modern Life Science, pp.59-60
   Complete the "Worksheet on the Systems".

4. Do some reading:
   Living Things, pp.9-10
   Life Science, A Modern Course, pp.30-34
   Answer these questions:
   a. What are the 7 basic life activities?
   b. How do these activities work together to produce a functioning organism?

5. On a sheet of unlined paper, make a chart comparing man to the paramecium. Your comparison should be in structure and function.

Extra Credit

Is man different today from what he was in the past? Do some research on the early types of man to find out. Prepare a presentation of what you find. Include man's changes and tell how they are advantageous to him. (If they are!)

WORKSHEET ON SYSTEMS

I. Fill in the blank:

1. The human body is composed of trillions of _____.
2. In a multicellular organism, each kind of cell has a _____ job to do.
3. A group of similar cells working together is called a _____.
4. Several tissues working together as a single unit is called an _____.
5. If several organs work together to do one job, we call it a _____.
6. In complex organisms we find that there are many kinds of cells, not one cell doing all jobs, we call this _____ _____ _____.

II. True or False

_____ 1. The cells of a tissue are very much alike in structure and function.

_____ 2. Tissue cells are quite independent of other kinds of cells.

_____ 3. The stomach, small intestine and large intestine are parts of a system.

_____ 4. Paramecium cells better illustrate what is meant by "division of labor" among cells than do cells of a dog.

_____ 5. A larger organism always has larger cells - not more cells.

III. Answer these questions:

1. In what ways is a single-celled organism a "jack-of-all-trades"?

2. Define "division of labor" and give examples from the human body.

3. Name 5 tissues of the human body.

4. Name 5 organs of the human body.

5. Name at least 10 systems of the human body.

6. How do all of the systems of the human body work together to make an efficiently functioning organism?

NUTRITION (You are what you eat!)

A. Behavioral Objectives (what you should be able to do at the end of this unit)
   1. Determine the presence or absence of starch, sugar, protein and fat of various foods.

   2. Determine the number of calories in a food sample.

   3. Evaluate a diet for calories, food group representation, vitamins and minerals.

   4. Identify the basic food groups and list some representatives of each.

   5. Name 5 minerals, describe their function in the body and list 3 food sources for each.

   6. List 6 vitamins, describe their function in the body and list 3 food sources for each.

B. Activities
   1. Keep a record of your diet for 3 days. Write down everything you eat for the 3 day period. Record quantity, too! At the end of three days, analyze your diet for each of the three days by:
      a. determining the number of calories you eat per day.
      b. list the foods you eat in the 4 Basic Food Groups.

      then answer these questions:
      a. Did you eat a balanced diet? Why or why not?
      b. How can you improve your diet?

2. LAB: Test for Starch!

Substances can be tested for the presence of starch with Lugol's iodine solution.

Iodine reacts with starch to give a characteristic blue-black color. Substances that absorb iodine easily (such as bread or crackers) can be tested by placing a few drops of iodine solution on them directly and observing if the color change takes place. In some cases, it may be necessary to heat the substance in iodine in order for the reaction to take place.

To test green leaves, it is first necessary to break down the cell walls and remove the chlorophyll from the leaves. Follow these steps to do this:

1. Boil the leaves for a few minutes in a beaker of water. (This breaks down the cell walls and makes the leaves soft and pliable.)

2. Transfer the leaves from the beaker of boiling water to a test tube and cover them with acetone. (Acetone dissolves the pigment chlorophyll in leaves.) Stand the test tube in the beaker of hot water and wait until the leaves lose most of their color.

CAUTION: Acetone is highly flammable! Never use near an open flame. Always heat in a water bath!

3. When the leaves are almost colorless, pour off the acetone and rinse the leaves with water.

4. Spread the blanched leaves (those with the color removed) flat in a beaker and cover them with iodine solution.

5. After 2-5 minutes, wash off the excess iodine solution with water and examine the leaves for the blue-black color indicating the presence of starch.

Record your results in the table provided. A plus sign (+) indicates the presence of starch. A minus sign (-) indicates starch was not present.

Save your table!

3. LAB: Test for Sugar!

To test for the presence of a simple sugar such as glucose, you will use Benedict's solution. This solution will indicate the presence of sugar by undergoing a color change when heat is added.

Put the substance to be tested in a clean test tube and add enough Benedict's solution to cover the substance. (If it's dry, you may want to add a few drops of water.) Boil the contents of the tube in a water bath for 10 seconds. If the substance contains a simple sugar, the solution will turn yellow, orange, or brick red depending on the amount of sugar present.

Record your results in the table provided. A plus sign (+) indicates the presence of sugar. A minus sign (-) indicates sugar was not present.

Save your table!

4. LAB: Test for Fat!

Rub the substance to be tested on a piece of unglazed paper. If fat is present in the substance, it will leave a permanent translucent spot on the paper. (Grease spot when dry)

To test liquids for fat, put 3-4 drops of the liquid on unglazed paper. If there is a translucent spot on the paper after the paper has dried, the liquid contains fat.

Record your results in the table provided. A plus sign (+) indicates the presence of fat, a minus sign (-) indicates that fat is not present.

Save your table!

5. LAB: Test for Protein!

Cut the substance to be tested into small pieces or cubes. The exact size of the pieces is not important, but they should be as small as you can cut them (preferably no larger than 5 mm on each side). Put a few pieces of the substance into a clean, dry test tube and 1 ml of 40% sodium hydroxide (NaOH) solution.

CAUTION: Sodium hydroxide is caustic. If any is spilled, it should be wiped immediately. If the NaOH solution comes into contact with your skin or clothing, rinse it off throughly with water and inform your teacher.

Add one drop of 1% copper sulfate ($CuSO_4 \cdot 5H_2O$) solution to the contents of the test tube. If the substance being tested contains protein, the solution in the test tube will turn blue or purple. The deeper the shade of blue or purple, the greater the quantity of protein present.

Record your results in your table. A plus sign (+) indicates the presence of protein, a minus sign (-) indicates no protein present.

Now, turn in your completed table. Don't forget to put your name on it!

Table for Activities 2-5

FOOD	FAT	PROTEIN	SUGAR	STARCH

6. Read - as much as you need to read!

Sources

Modern Life Science, pp.314-322
Living Things, pp.292-303
How Your Body Uses Food, pp.1-16

Then complete the worksheet on Nutrition.

7. LAB: Food Use - The Final Step

Instructions will be provided by your teacher on a separate sheet.

Record all data, make calculations carefully and answer all questions.

NUTRITION WORKSHEET

I. Short answer

1. How many calories do you need a day?

2. How are eating habits related to gain and loss of body weight?

3. Why should the amount of roughage taken in be controlled?

4. What is meant by a balanced diet?

5. What things are done to food that remove or destroy vitamins?

6. What are three things that food does for the body?

7. Why is it important to have enough water in your diet?

II. Fill in the Chart

	Function in the Body	Results of Deficiency	Food Sources
Carbohydrates			
Fats			
Proteins			
Calcium			
Phosphorus			
Iron			
Vitamin A			
Vitamin B_1			
Vitamin B_2			
Niacin			
Vitamin C			
Vitamin D			

III. Matching (Match Column B with the best term from Column A)

A	B
1. roughage	a. energy foods
2. scurvy	b. sugar test
3. beri-beri	c. sunshine
4. calorie	d. indigestible part of food
5. rickets	e. starch test
6. iodine	f. muscle builder
7. Benedict's solution	g. unit that measures energy in food
8. protein	h. disease caused by deficiency of vitamin D
9. vitamin D	i. disease caused by deficiency of vitamin B_1
10. carbohydrates & fats	j. disease caused by deficiency of vitamin C

IV. True - False

_____1. Potatoes are richer in protein than is lean beef.

_____2. Calcium and iodine are the only mineral substances known to be needed by the human body.

_____3. British sailors have been known as "limeys" because for a long time, lime juice was used abroad British ships to prevent scurvy.

_____4. Under certain conditions, vitamin D is formed in the human skin.

_____5. Deficiency diseases cannot develop so long as enough calories are supplied to the body.

DIGESTION (How You Use What You Eat!)

A. Behavioral Objectives (what you should be able to do at the end of this unit)

1. Label the different types of teeth in a permanent set of teeth and relate the function to the structure of the types.

2. Label and describe the parts of a tooth in cross-section.

3. Identify and relate the function of the organs of the alimentary canal.

4. Trace a meal through the digestive canal and tell what nutrients are being digested in the various parts.

5. Relate the process of absorption to the structure of the small intestine.

6. Develop five rules for good dental health.

B. Activities

1. LAB: Starch and Saliva

Instructions will be provided on a separate sheet by your teacher. Follow instructions carefully and keep a careful record of your data. Answer the questions. Add this one for thought!

*How does this experiment demonstrate what happens in the alimentary canal?

2. LAB: Comparing Two Reactions

Instructions will be provided on a separate sheet by your teacher. Be sure to read the introductory section on enzymes before proceeding. Follow the instructions carefully and keep a careful record of your data.

3. LAB: Digestion of Protein

Instructions will be provided on a separate sheet by your teacher. Follow the instructions carefully and keep a good record of your data.

4. Read pages 304-310 in Living Things. Answer the Check Your Facts questions on page 311.

5. Read pages 248-253 in Life Science - A Modern Course.

6. Label the drawing of a permanent set of teeth. Then convert the diagram to show your set of adult teeth by:

a. Blackening out the teeth you have lost

b. Put x's in the teeth with fillings in them

c. Put o's in the teeth which have not come in yet

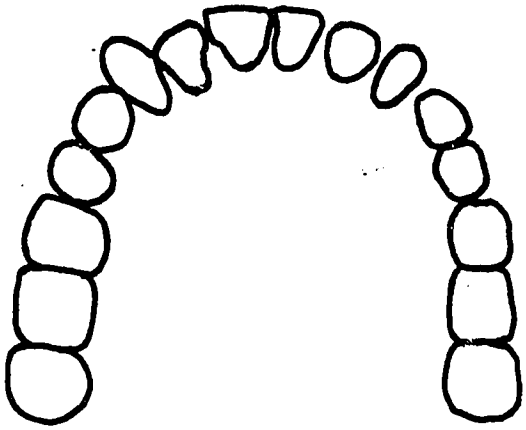
7. Label the tooth in cross-section.

8. Label the drawing of the digestive system.

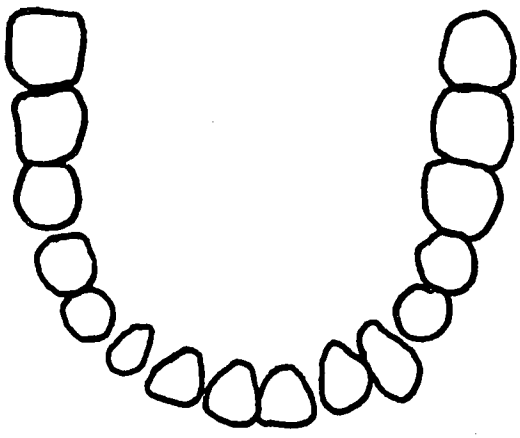
9. Read pp. 308-314 in Modern Life Science. Complete the Study Guide that goes with it.

10. Answer the Review Questions.

Permanent Teeth

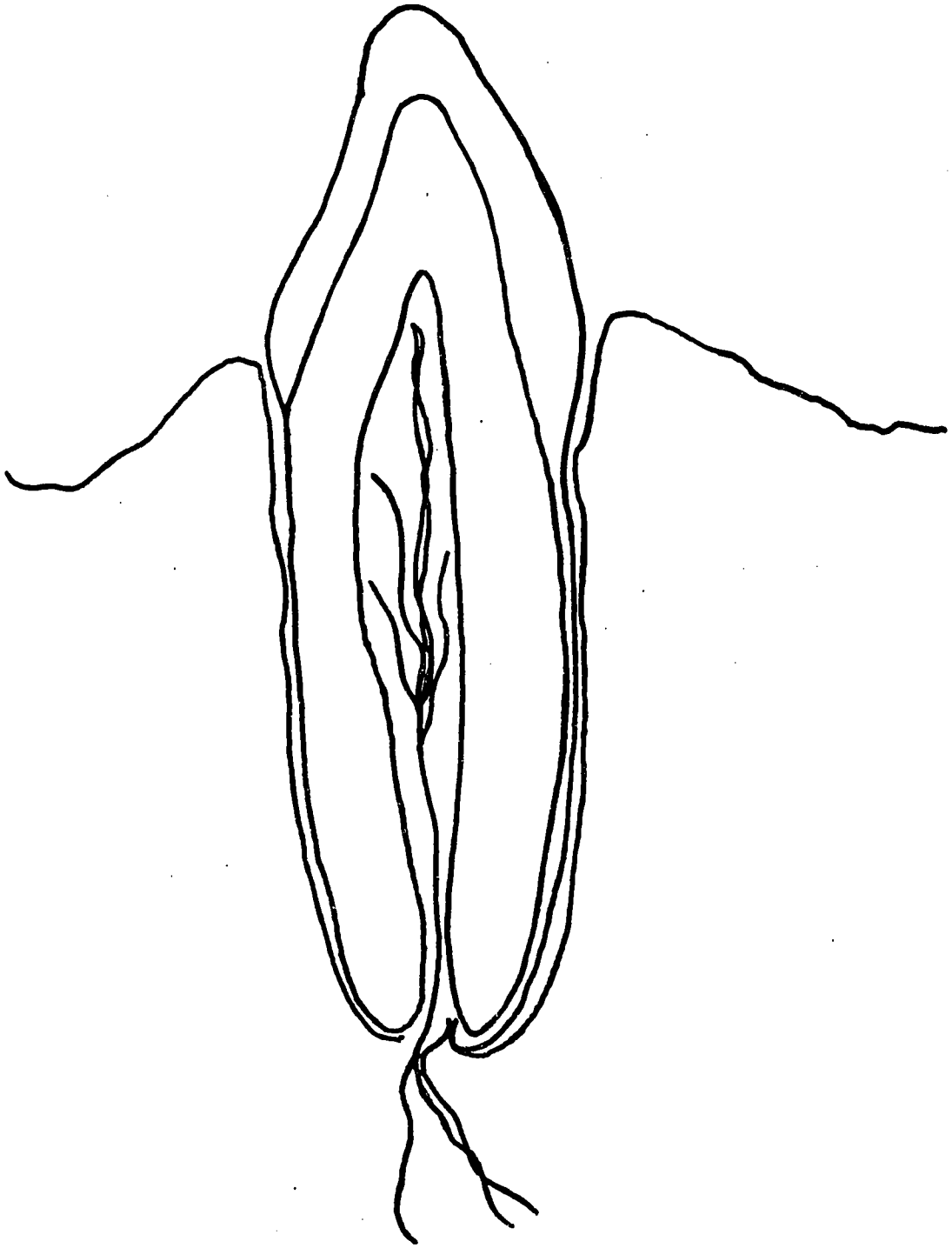


Upper

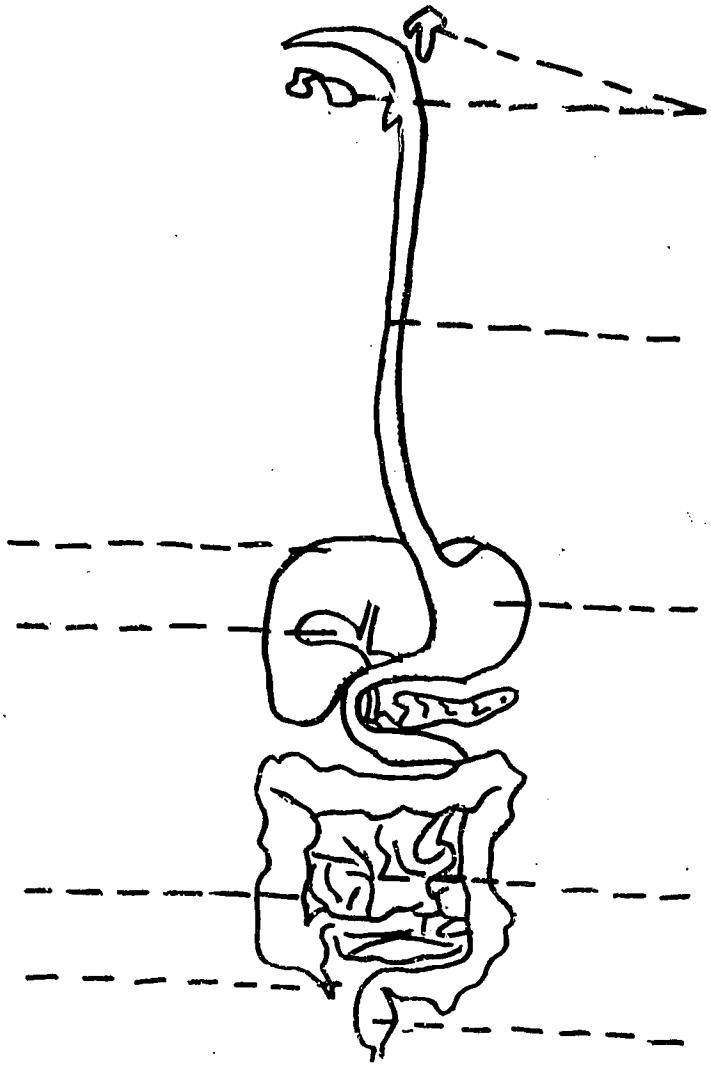


Lower

Cross Section of a Tooth



Digestive System



STUDY GUIDE ON DIGESTION

Modern Life Science pp.308-314

Level I:

1. Food substances must be broken down from complex to simple molecules -- we call this process _____.

2. Once in simple form, food materials can be _____ by the blood and carried to the _____.

3. The digestive or alimentary canal is a _____ 25-30 feet long.

4. Food enters the canal through the _____.

5. The teeth _____ the food and prepare it for digestion.

6. Human saliva contains an enzyme called _____.

7. A human adult gets _____ sets of teeth in a lifetime, 20 _____ _____ and 32 _____ _____.

8. The _____ keeps food between the teeth in the chewing process and aids in swallowing.

9. The tongue is also an organ of _____.

10. A tooth is made of _____, _____ and _____.

11. A _____ occurs when the outer layer of enamel is cracked by bacteria.

12. The muscular walls of the _____ force food on its way.

13. The _____ carries food from the pharynx to the stomach.

14. In the stomach, gland cells secrete _____ juice.

15. The stomach is made of _____ tissue.

16. A _____ regulates the amount of food that passes from stomach to _____ intestine.

17. The first part of the small intestine is the _____.

18. Most _____ takes place in the small intestine.

19. The _____ secretes enzymes which act on carbohydrates, proteins and fats.

20. _____ is produced by the liver and aids in breaking down fats.

21. Intestinal fluid acts on _____ and _____, not on fats.

22. The main absorption center is the _____ intestine.

23. The end products of digestion are absorbed by blood and lymph vessels in the _____ of the small intestine.

24. _____ is stored in the liver.

25. _____ is the main source of energy for the body cells.

26. _____ _____ from protein digestion go to make new protoplasm.

27. The _____ intestine water is absorbed.

28. Solid waste material is stored and the _____ from the body.

Level II:

Use the facts established in part one to support these statements:

1. Food molecules must be broken down from complex to simple molecules in order to be used for metabolic processes at the cellular level -- this is digestion.

2. Digestion takes place in the alimentary canal.

3. The accessory organs of the digestive system aid in the digestive process.

4. Once digested these simple molecules must be absorbed into the body to be distributed to the cells.

5. Waste materials are stored and eliminated from the body.

Level III:

1. Trace this meal through the digestive system:

   1 glass orange juice
   2 eggs
   2 strips bacon
   2 pieces of toast with butter and jelly
   1 glass milk

REVIEW QUESTIONS

1. Why does food have to be digested?

2. How are the human mouth parts adapted to prepare food for digestion?

3. How is food moved from one part of the digestive system to another?

4. What are the end products of digestion and how do they get into the blood stream?

5. What is the function of the large intestine? Why is it so important?

6. What are enzymes? Of what value are they in digesting food?

7. How are our body cells supplied with digested food?

THE SKELETON

A. Behavioral Objectives (what you should be able to do at the end of this unit)

1. State the four major functions of the skeleton.

2. Identify on the skeleton all of the major bones with 80% accuracy.

3. Identify the axial and appendicular skeleton and explain the reasons for this division.

4. Relate the structure of a long bone to its function.

5. Identify, give an example and describe the function of the different kinds of joints.

6. Relate diet to strong, healthy bones.

7. Describe symptoms, treatments and effects of some common bone diseases, deformities, and injuries.

8. Identify and give examples of these bone types: long, short, flat and irregular.

9. Define these terms: (1) bones; (2) skeleton; (3) joint; (4) ligament; (5) marrow; (6) periosteum.

10. Construct a working model of a movable joint.

11. Evaluate your posture or that of your friends. Then propose corrections for the person so that his posture will be better.

B. Activities

1. Do "Evaluating My Body Mechanics" (worksheet).

2. Evaluate your posture! (Instructions follow) Work in groups of 2.

   a. Read pp.160-166 in You and Your Health, "Posture and Personality".

   b. Make a checklist of things to look for in good posture.

   c. Now observe your partner and evaluate his or her posture according to the checklist you devised for sitting, standing and walking.

   d. Exchange checklists and let each person evaluate his/her posture for himself. How can you improve your posture? Make a list of things you need to work on.

   e. On page 167 (#6 Work for Better Health) are some exercises designed to help improve your posture. Select the ones you need and Practice!

3. Do some reading!

pp. 288-294, Modern Life Science "The Body Framework". Answer the following questions:

1. Approximately how many bones are there in the human skeleton?

2. What is the function of bone marrow?

3. What is cartilage? Compare it with bone.

4. How does an adult skeleton differ from a child's skeleton in number of bones and amount of cartilage present?

5. What is the function of a ligament? a tendon?

6. What parts of the body are protected by the:

   a. skull

   b. backbone

   c. ribs

4. LAB: Composition of a Bone

You need to bring a chicken bone - a leg or thigh bone is good.

Bone is strong because it has hard minerals held together by flexible proteins. This is a lot like fiberglass, which has glass fibers imbedded in plastic. You can show the presence of the two materials like this:

Place the chicken bone in diluted hydrochloric acid (provided by your teacher) overnight. Caution: Hydrochloric acid is corrosive and pungent. Do not let it come into contact with your skin or clothing. Do not inhale the fumes. If some acid does get on your skin or clothing, flush immediately and copiusly with water and notify your teacher. Also, wear goggles -- it's a state law!

The next day, observe your bone and answer these questions:

1. What shape does the bone have after this treatment?

2. What material does the acid dissolve?

3. Can you bend the bone? Why?

4. What conclusions can you draw about bone from this experiment?

5. Read some more!

pp. 141-149 and 162-163 in You and Your Health. Do the worksheet on You and Your Health.

6. LAB: Inside a Bone

A. Examine the longitudinal and cross sections of the bones provided.

B. Locate the thin outer covering of hard bone.

C. Inside the hard bone there is a part that is not so hard -- in fact, in young bones, it is almost spongy and is called spongy bone.

D. Through the center of the bone is the marrow. Marrow is made up of tissue in which are living bone cells, blood and nerves.

E. Make a sketch of both the longitudinal and cross sections of the bones. Label them.

F. Answer these questions:

a. What is the function of the hard bone?

b. What is the function of the spongy bone?

c. What special job does marrow do?

d. How do bones grow?

7. Read some more:

pp. 268-270 in Life Science - A Modern Course. Answer these questions:

a. What are the two main divisions of the skeleton? What bones or groups of bones are included in each of these 2 parts?

b. What is the pectoral girdle?

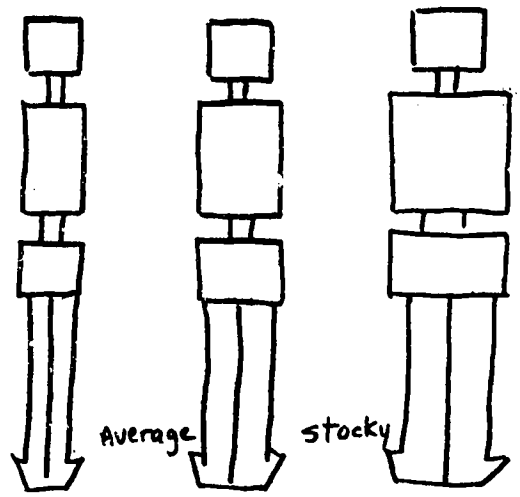
c. What is the pelvic girdle?

d. Why do joints need to be padded and lubricated?

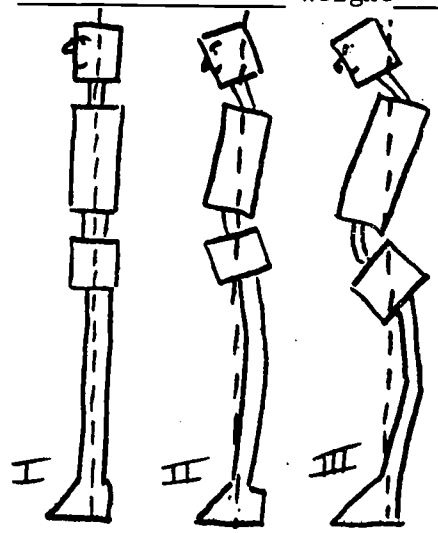
e. What is periosteum? What does it do?

Evaluating My Body Mechanics

Name_____ Date_____ Weight_____

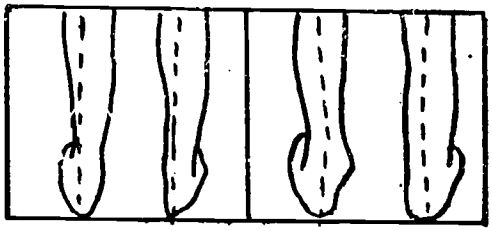


1. My body type is _____.



2. I stand most like figure No._____.

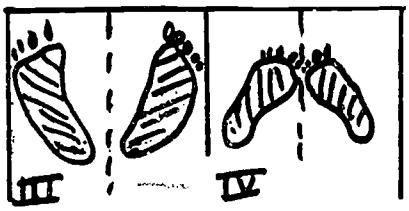
3. My footprint shows my arches are _____.



4. My ankes are _____.

5. In walking I --

	Yes	No
1. keep my toes point straight ahead, 2½ to 3 inches apart.	☐	☐
2. place one foot in front of the other which is poor for body balance.	☐	☐
3. turn my toes out which weakens by ankles and can make my feet roll inward.	☐	☐
4. turn my toes in which causes me to trip and knock my knees together.	☐	☐
5. place my heel down first, shift on to the ball of my foot, then to my toes.	☐	☐



6. I need to work on the following things to improve my general body mechanics.

_____
_____
_____
_____

YOU AND YOUR HEALTH WORKSHEET

Written Work:

1. Select the term from column B that best matches the items in column A.

Column A	Column B
_____ Upper arm bone	Skull
_____ Connections between bones	Vertebrae
_____ Breastbone	Ribs
_____ Separates vertebrae	Pelvis
_____ Bones of the trunk	Ligaments
_____ Another name for skull	Femur
_____ Upper thigh bone	Cranium
_____ Bands which hold bones together	Spinal column, ribs, pelvis
_____ Bones which support intestines	Cartilage
_____ Bones which protect heart & lungs	Sternum
_____ Bones of the spinal column	Joints
_____ Holds and protects the brain	Humerus

2. How is the skull constructed to best protect the brain?

3. What happens to the number of bones in the spinal column as you grow?

4. How is the spinal column constructed to provide a "central pillar" for the body?

5. What are the three different kinds of ribs?

6. How is the foot constructed to support man's body?

7. How is a joint constructed? What is the function of synovial fluid?

8. What is the function of immovable joints?

9. What are the two important minerals found in bone? Name 5 food sources for these minerals.

10. Why is vitamin D called the "calcium helper"?

8. Label the drawing of the human skeleton. (Use the scientific names!) Color the axial skeleton blue. Color the appendicular skeleton red.

9. LAB: Compare some skeletons by answering these questions:

   a. Are most of the bones the same?

   b. What bones are present in one skeleton but not another?

   c. Why is the connection between the hips and backbone so much heavier in the human skeleton?

   d. Why are human leg bones so much stronger than arm bones?

   e. Do animal skeletons (other than humans) show this same difference? Explain.

   f. Notice the size of the bones of the face compared with the bones of the brain case. How do animal and human skulls compare in this respect?

10. Make a chart illustrating the various kinds of joints, describing their movement and/or functions.

11. Do the skeleton worksheet.

12. Make a working model of a joint.

13. Bone and related injuries and disease. Find out about these and their treatment.

    a. sprains

    b. dislocations

    c. fractures (simple, compound, greenstick)

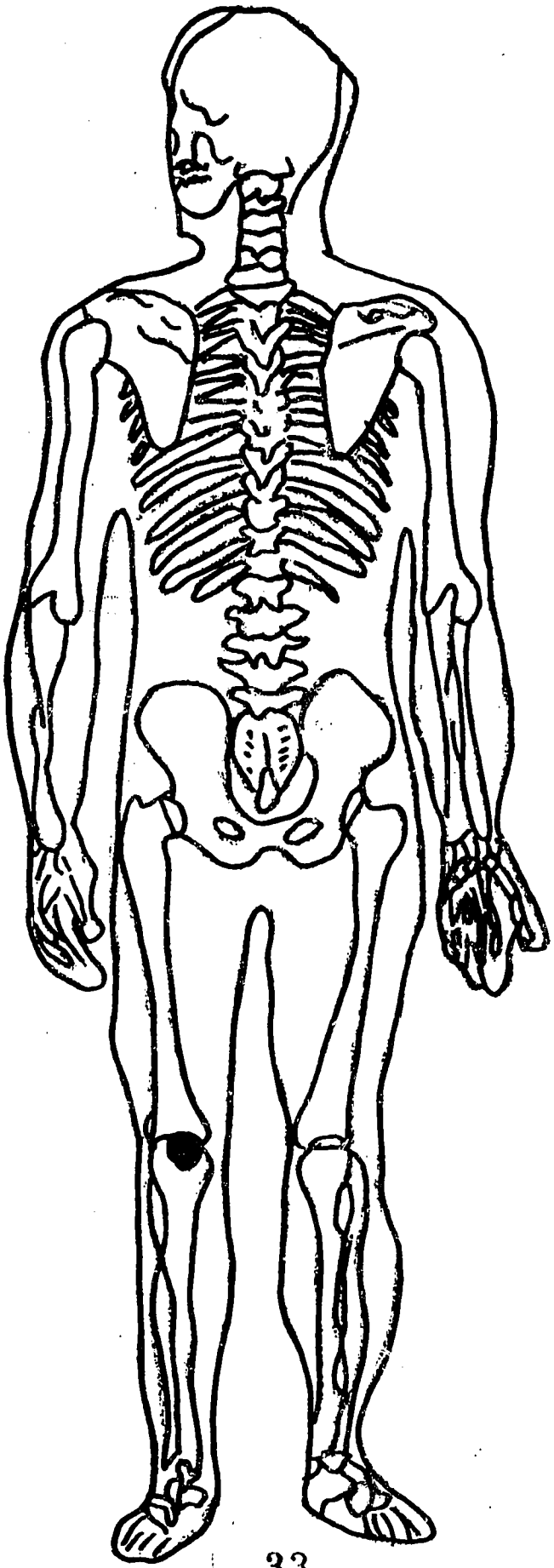
    d. arthritus

    e. bursitis

Extra Credit

Work on the study questions -- answer as many as you have time or energy to do!

SKELETAL SYSTEM



SKELETON WORKSHEET

The framework of _____ bones making up the human body is called the _____. The skeleton provides support for the body and gives it _____. The bones of the skeleton help produce body movement and provide protection for the internal _____. The _____ and _____ are protected by the bones of the skull. The column of bones which holds the body straight is called the _____. It is made of many small bones called _____. A pad of elastic tissue called _____ between each vertebrae makes the spine flexible and absorbs some of the jarring caused by walking and running. Attached to the spine are the skull, ribs, the hipbones, and other bones.

Minerals, such as _____ and _____, obtained from certain foods, make the bones rigid and strong.

The region where two or more bones meet is called a _____. Without _____, it would be impossible for the bones of the body to move. There are many kinds of joints allowing certain kinds of movement. Some movable joints are _____, _____ and _____. There are some joints, such as those found in the skull which are called _____. In this kind of joint, the bones meet in such a way to prevent _____.

Bones are held together at the joints by bands of strong tissues called _____.

STUDY QUESTIONS - ANSWER AS MANY AS YOU CAN - LIST SOURCES USED

1. List and describe four functions of bone.

2. Describe how the organic and mineral structure of bone produce both brittleness and strength.

3. What is marrow? How does it function? In what kinds of bone is it found?

4. Why do bones of older people heal slower than those of the young?

5. What are osteoblasts? Osteoclasts? What role do these cells play in bone formation and repair?

6. What happens if bone is placed in acid solution for any amount of time?

7. Name and describe some industrial uses for bone.

8. Describe the functions and importance of ligaments as related to bones.

9. Calcium phosphate is the basic mineral in bone. How can its level be maintained in the body?

10. Compare and contrast compact and spongy bones.

11. Name and describe the different kinds of joints in the human body.

12. What is arthritis? Bursitis? Why are these important to the study of bones?

13. Compare and contrast cartilage and bone.

14. Describe the process whereby bone replaces cartilage as a person grows older.

15. Compare and contrast endoskeletons and exoskeletons. Name several organisms representative of each type.

16. List several long bones and several flat bones. What is the significance of long bones, besides providing support?

17. What is Rickets? How may it be prevented?

18. What is osteomyolitis? Why is it troublesome for Mickey Mantle?

Do not write questions on your answer sheet.

Some of these questions are NOT easy. You may use any source available.

GOOD LUCK!!

TOPIC ONE - AN INTRODUCTION

B. Activities

1. Small groups are recommended for this activity rather than class discussion since there is a limited topic.

2. Available from the IMC.

3. One copy per student (adjust for alternate reading material).

4. It may be necessary to substitute with available reading materials.

5. Any single celled animal will do but paramecium seems to work better.

NUTRITION

B. Activities

1. It may be necessary to explain to students that "diet" is what you eat. Also you may want to provide a form for students to record their diets.

2. Each station should have the same foods. (I suggest stations
3. because it is easy to stock with lab materials.) You will need:
4. iodine
   test tubes and holders
5. acetone
   water
   Benedict's solution
   unglazed brown paper squares
   40% NaOH solution
   1% $CuSO_4 \cdot 5H_2O$
   hot water bath (use electric hot plate)

Be sure you point out the dangers to students!

6. How Your Body Uses Food available from the National Dairy Council.

7. From: Interaction of Man and the Biosphere, pp. 100-102 (Measuring Energy in Food). Large coffee cans work well here. Shop teachers can cut the cans to look like figure 5-3.

DIGESTION

B. Activities

1. From Interaction of Man and the Biosphere, pp.60-61 (dialysis tubing can be purchased from Frederick Produce as sausage casing).

2. From Interaction of Man and the Biosphere, pp.61-63.

3. From Interaction of Man and the Biosphere, pp.64-66.

4. Substitute if necessary.

5. Substitute if necessary.

6.
7. } In student packet
8.

9. This is prepared on three levels.
   Level I is simple recall.

   Level II is classifying facts to support the concepts.

   Level III is most abstract in that it requires the student to use levels I and II.

10. Compiled by you to cover important topics and concepts.

THE SKELETON

B. Activities

1. Thanks to Bea Stup!

2. Any other health book discussing posture may be used. If you substitute, please adapt activity.

3. Substitute if necessary.

4. Caution students about dangers.

5. Once again substitute if necessary.

6. Butcher shops and supermarkets will prepare these for you at a nominal fee.

7. Substitute if necessary.

8. In student packet.

9. Provide students with several skeletons or models including the human.

10. --

11. In student packet.

12. Let students use their imagination.

13. --

Extra Credit:

Thanks to John Ferguson!

Audio Visual Materials:

Available from the County Instructional Materials Center:

Films:

F776	About the Human Body
F85	Eat for Health
F78	Good Eating Habits
F752	The Human Machine
F88	Teeth are to Keep

Filmstrips:

FS612	The Bones and Muscles
FS612	Digestion
FS612	Digestion of Foods
FS612	The Digestive System
FS610.9	Disease and Diet
FS500	Finding out about Your Body
FS500	Finding out How Foods are Used in Your Body
FS641	Food for Health
FS612	Foods and Nutrition
FS612	Human Factories
FS641	Kinds of Food
FS612	Posture and Exercise
FS613	Proper Food
FS612	Teeth
FS612	The Teeth
FS612	You and Your Food
FS612	You the Living Machine

Transparencies:

Tr 612	Anatomy of the Human Body

Note: The film "How a Hamburger Turns Into You" is available from the IMC. If you choose to use it, it should be previewed and then introduced carefully. The content of the film is good but somewhat difficult for the majority of your students.

Some good resource sources:

National Dairy Council
American Dental Association

Evaluation Form for Teachers

1. Name of the mini course _____

2. Was this unit appropriate to the level of your students?

3. Explain how this mini course was used with your students. (Individual, small group, or total class)

4. Identify the plus factors for this course.

5. List the changes that you would recommend for improvement.

7. Did you use any other valuable resources in teaching this unit? If so, please list.

PLEASE RETURN TO SCIENCE SUPERVISOR'S OFFICE AS SOON AS YOU COMPLETE THE COURSE.

ADDITIONAL SCIENCE MINI-COURSES

LIFE SCIENCE	Prepared by
A Study for the Birds	Terrence Best
Creepy Critters (Snakes)	Terrence Best
How's Your Plumbing?	Paul Cook
Guess Who's Been Here for Dinner	Paul Cook
Plants - The "Other" Living Things	Sharon Sheffield
Let's Look at You - The Human Organism	Sharon Sheffield
Classification: Why is There a Need?	Melvin Whitfield
Protist: The "Unseen" Kingdom	Melvin Whitfield

EARTH SCIENCE	
Coastline Development	Nelson Ford
Ocean Currents	John Fradiska
Features of the Ocean Floor (Ocean Floor Topography)	John Fradiska
Space and Its Problems	John Geist
Invertebrate Fossils: Clues to the Distant Past	John Geist
An Attempt towards Independent Study in Astronomy	John Geist

PHYSICAL SCIENCE	
Household Chemistry	[illegible] Foltz
Notions on Motions	[illegible]
Environmental Chemistry	[illegible]