DIGESTION/NUTRITION/Safety
Parts 1 & 2

A Theme Unit to Support the

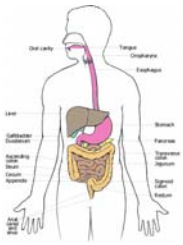
Science

Management

And

Resource

Tool



Spirit Compatible Instruction

Cooperative Learning

Multiple Intelligences

Cross-Curricular

Hands-On

Multi-grade lesson plans (K-8) and practical resources for the one-room or small-school teacher

By Kim Kaiser and Rebecca K. Fraker

This science unit expands the outline found in the

NORTH AMERICAN DIVISION

Management and Resource Tool

S.M.A.R.T. Update
2008

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Excerpts from the NAD

Science Management and Resource Tool

S.M.A.R.T. Cycle Chart

	L = Lower grade cycle		*U = Upper grade cycle*	
One grade classroom – teach same cycle yearly	Grade 1 – Cycle 1L Grade 2 – Cycle 2L Grade 3 – Cycle 3L Grade 4 – Cycle 4L		Grade 5 – Cycle 1U Grade 6 – Cycle 2U Grade 7 – Cycle 3U Grade 8 – Cycle 4U	
Two grade classroom – rotate cycles for two years	Grades 1 & 2 Cycles 1L & 2L	Grades 3 & 4 Cycles 3L & 4L	Grades 5 & 6 Cycles 1U & 2U	Grades 7 & 8 Cycles 3U & 4U
Four-grade classrooms- rotate cycles for four years	Grades 1 – 4 Cycles 1L - 4L		Grades 5 - 8 Cycles 1U – 4U	

Yearly Scheduling Chart

Grade	One Grade	2009-2016	Two Grades	2009 2013	2010 2014	2011 2015	2012 2016	Four Grades	2009 2013	2010 2014	1011 2015	2012 2016
1		1L		1L	2L	1L	2L		3L	4L	1L	2L
2		2L		1L	2L	1L	2L		3L	4L	1L	2L
3		3L		3L	4L	3L	4L		3L	4L	1L	2L
4		4L		3L	4L	3L	4L		3L	4L	1L	2L
5		1U		1U	2U	1U	2U		3U	4U	1U	2U
6		2U		1U	2U	1U	2U		3U	4U	1U	2U
7		3U		3U	4U	3U	4U		3U	4U	1U	2U
8		4U		3U	4U	3U	4U		3U	4U	1U	2U

Years listed above indicate the ending year of each school year, e.g., the 2008-2009 school year is listed as 2009.

For your convenience, the S.M.A.R.T. 4-year rotation is the same as Bible, 1-4.

SCIENCE CURRICULUM MAP: GRADES 1-4

	Cycle 1 Lower	Cycle 2 Lower	Cycle 3 Lower	Cycle 4 Lower
1st Qtr Life Science	Living Things Characteristics Classification Animals Fish Birds Reptiles/Amphibians Mammals Ecology Environmental Issues Natural Resources Careers and Service	Human Body Organization Sense Organs Teeth, Skeletal/Muscular System Respiratory/Circulatory System Immune System Digestive/Excretory System Careers and Service	Cells Animals Growth/Development/Behavior Organisms Invertebrates/Worms Insects/Arthropods Arachnids Careers and Service	Plants Classification Structure/Function/Importance Growth/Life Cycle Photosynthesis Reproduction Ecology General Information/Food Chain Communities/Population Careers and Service
2nd Qtr Health	Mental/Emotional Health Decision Making Self-Concept Emotions Stress Family/Social Health Family Structure Communication Careers and Service	Nutrition Nutrients Food Pyramid Dietary Guidelines Education Safety/First Aid Public Safety Recreational Safety Careers and Service	Drugs Decision Making Effects Medicines Health Principles Biblical Principles Natural Laws Careers and Service	Consumer Health Health Care Preventative/Curative Community Health Education/Resources Communicable Diseases/ Immune System Disease Transmission Careers and Service
3rd Qtr Physical Science	Heat Energy/Waves Sound Light Careers and Service	Magnetism Electricity General Information Static Electricity Current Electricity Careers and Service	Force Friction/Gravity/Mass/Weight Motion Careers and Service	Chemistry Matter Atomic Structure Mixtures/Compounds Basic Energy Simple & Compound Machines Careers and Service
4th Qtr Earth and Space Science	Meteorology General Information Weather Elements Seasons Climate Atmosphere Water (Hydrologic) Cycle Careers and Service	Geology Earth's Features Genesis Flood Earthquakes/Volcanoes Minerals/Rocks Erosion Soil Pollution Careers and Service	Origin of the Universe Astronomy History Space Exploration Solar System General Information Sun/Stars Moon Asteroids, Meteoroids & Comets The Universe Constellations Careers and Service	Creation & Evolution Geology Fossils Dinosaurs Ecology Natural Resources Environmental Issues Careers and Service

SCIENCE CURRICULUM MAP: GRADES 5-8

	Cycle 1 Upper	Cycle 2 Upper	Cycle 3 Upper	Cycle 4 Upper
1st Qtr Life Science	Science Inquiry Living Things Characteristics Classification Animals Fish Birds Reptiles/Amphibians Mammals Animal Behavior Careers and Service	Science Inquiry Cells Cell Theory & Characteristics Structure Processes Human Body Organization Sense Organs Skeletal, and Muscular Systems Integumentary System Respiratory & Circulatory Systems Nervous System Careers and Service	Science Inquiry Simple Animals Invertebrates Sponges, Cnidarins & Worms Mollusks & Echinoderms Arthropods General Characteristics Insects & Arachnids Centipedes/Millipedes & Crustaceans Monerans (Bacteria) Protista Fungi Viruses Genetics Nucleus & Genetic Engineering Heredity Careers and Service	Science Inquiry Plants Classification Structure & Function Processes Reproduction Responses Ecology General Information Adaptation Food Chains Careers and Service
2nd Qtr Health	Personal Mental Health Personality Self-Concept Emotional Health Conflict Management Development Conception to Birth Puberty Reproductive System Sexual Behavior Careers and Service	Human Body Digestive System Excretory System Nutrition Nutrients Food Pyramid & Dietary Guidelines Eating Disorders Mentally/Physically Challenged Safety/First Aid Careers and Service	Drugs General Information Effects Decision Making Human Sexuality Sexual Feelings God's Plan & Sexual Issues Sexual Behavior Careers and Service	Preventative/Curative Health Care Community Health Education & Resources Teen Health Risks Risk Factors & Challenges Diseases Communicable Diseases Immune System Disease Transmission STDs & HIV/AIDS Careers and Service
3rd Qtr Physical Science	Heat Energy/Waves General Information Electromagnetic Spectrum Sound Light General Information Colors Mirrors/Lenses/Lasers Careers and Service	Magnetism Electricity Static & Current Electricity Safety, Generation & Measurement Applications Circuits, Cells/Batteries & Electronics Careers and Service	Force Basic Force Gravity Mass/Weight Elastic, Nuclear & Electric/Magnetic Friction Motion Basic Motion Laws of Motion Careers and Service	Chemistry Matter Atomic Structure Atomic Nucleus Mixtures Compounds Chemical Reactions Acids/Bases Potential/Kinetic Energy Work/Power, Machines & Mechanical Advantage Careers and Service
4th Qtr Earth and Space Science	Meteorology Weather & Climate Weather Elements Climate Atmosphere Global Warming Water (Hydrologic) Cycle Oceanography Environments Resources Tides/Currents/Waves Careers and Service	Geology Earth's Features Genesis Flood & Ice Age Tectonics Earthquakes & Volcanoes Minerals/Rocks Erosion & Weathering Careers and Service	Origin of the Universe Space Exploration Solar System General Information Planets Moon Asteroids, Meteoroids & Comets Sun The Universe Stars Galaxies and Constellations Careers and Service	Creation Evolution Earth's Age Geologic Column, Fossils & Dinosaurs Ecology Natural Resources Environmental Issues Careers and Service

STRAND 3: LIFE SCIENCE

Cycle: 2 Lower

SUB-TOPIC: Structure and Function in Living Systems
Focus: Human Body: Digestive/Excretory Systems
Pacing: 2 days

ESSENTIAL LEARNING ELEMENTS:

1. **Identify the parts of the digestive system (1st, 2nd)**
2. **Describe the process of digestion (1st, 2nd)**
3. **Describe the digestive system and digestion (3rd, 4th)**
4. **Explain the importance of the excretory system (2nd)**

LEARNING POINTS:

Digestive System
1. Identify the organs of the digestive system
2. Explain the steps of digestion

Excretory System
1. Identify the organs of the excretory system

SPIRITUAL APPLICATIONS:

1. *Ministry of Healing* – p. 238
2. *Counsels on Health* – p. 160

RESOURCES:

Scott Foresman Science, '03
– Gr. 1, Science Reference Section
– Gr. 2, Unit D, Ch. 2
– Gr. 3, Unit D, Ch. 1
– Gr. 4, Unit D, Ch. 1

ASSESSMENT/INSTRUCTIONAL IDEAS:

1. Graph or draw the four main steps in digestion.
2. Write a story as if you are a piece of food traveling through the digestive system.
3. Measure and record your daily fluid intake.
4. Make a drawing of the digestive system.
5. Dissect a kidney.

STRAND 3: LIFE SCIENCE

Cycle: 2 Lower

SUB-TOPIC: Careers and Service

Pacing: 1 day

ESSENTIAL LEARNING ELEMENTS:

Investigate careers and service opportunities related to life science

LEARNING POINTS:

1. List life science careers
2. Provide opportunity for exposure to careers in the life sciences

SPIRITUAL APPLICATIONS:

Education – p. 43

RESOURCES:

Scott Foresman Science, '03
There are no specific references for these objectives. See *Discover God's Creation, p. 278.*

ASSESSMENT/INSTRUCTIONAL IDEAS:

1. Invite guest speakers of various biological careers.
2. Host a Career day.

STRAND 5: HEALTH

Cycle: 2 Lower

SUB-TOPIC: Health Information, Products and Service
Focus: Nutrition: Nutrients **Pacing: 2 days**

ESSENTIAL LEARNING ELEMENTS:

Explain how proper nutrition is related to good health (K, 1st, 2nd)

LEARNING POINTS:

1. Define food
2. Explain how the body uses food
3. Identify classes of nutrients
4. Explain how the body utilizes basic nutrients

SPIRITUAL APPLICATIONS:

1. Genesis 1:29
2. *Counsels on Diet and Foods* – p. 92, 310, 313

RESOURCES:

Scott Foresman Science, '03
– Gr. 1, Unit D, Ch. 3
– Gr. 2, Unit D, Ch. 2
– Gr. 3, Unit D, Ch. 2
– Gr. 4, Unit D, Ch. 1

ASSESSMENT/INSTRUCTIONAL IDEAS:

1. Design a bulletin board with pictures or drawings of deficiency in nutrients, vitamins, and minerals.
2. Look at labels and find how many nutrients are contained in food products.
3. Make a mobile of nutrients.
4. Eat a soda cracker and discuss how it changes as it is chewed.

STRAND 5: HEALTH

Cycle: 2 Lower

SUB-TOPIC: Health Information, Products and Service
Focus: Nutrition: Food Pyramid **Pacing: 2 days**

ESSENTIAL LEARNING ELEMENTS:

Explain how proper nutrition is related to good health (K, 1st, 2nd)

LEARNING POINTS:

1. Describe the food pyramid
2. Categorize foods in the food pyramid
3. Define nutrition
4. Explain how the food pyramid can be used as a guide in choosing a healthy diet
5. Understand the principles of vegetarianism
6. Understand the importance of a balanced diet
7. Identify foods that make up balanced meals
8. Distinguish between healthy and unhealthy snacks

SPIRITUAL APPLICATIONS:

1. Revelation 22:2
2. Colossians 3
3. *Testimonies, Vol. 7* – p. 128
4. *Medical Ministry* – p. 260

RESOURCES:

Scott Foresman Science, '03
– Gr. 1, Unit D, Ch. 3
– Gr. 2, Unit D, Ch. 2
– Gr. 3, Unit D, Ch. 2
– Gr. 4, Unit D, Ch. 2

ASSESSMENT/INSTRUCTIONAL IDEAS:

1. Sort a given collection of foods by food groups.
2. Plan a menu of a balanced diet.
3. Chart your daily meals for a week.
4. Make a food pyramid from students' lunches and discuss.

STRAND 5: HEALTH

Cycle: 2 Lower

SUB-TOPIC: Health Promotion and Disease Prevention
Focus: Nutrition: Dietary Guidelines **Pacing: 1 day**

ESSENTIAL LEARNING ELEMENTS:

Identify risk factors to health and how these risks may be reduced (4th)

LEARNING POINTS:

1. Explain the importance of a regular eating schedule
2. Explain the impact of junk food on health
3. Understand the principles of a vegetarian diet

SPIRITUAL APPLICATIONS:

1. Matthew 6:11
2. Leviticus 11
3. *Counsels on Diet and Foods* – p. 271-272
4. Evaluate lifestyle choices based on Biblical principles.
5. Recognize that human existence depends on God's natural laws for health.

RESOURCES:

Scott Foresman Science,'03
– Gr. 1, Unit D, Ch. 3
– Gr. 2, Unit D, Ch. 2
– Gr. 3, Unit D, Ch. 2
– Gr. 4, Unit D, Ch. 2

ASSESSMENT/INSTRUCTIONAL IDEAS:

1. Research the original diet given to Adam and Eve.
2. Study the nutrients of "junk foods" and compare with natural healthy foods.
3. Discuss how overeating can cause stomach irritations.
4. Complete "Testing Foods for Fat" (see *Scott Foresman Science, '03,* Gr. 3, p. D44-45).

STRAND 5: HEALTH

Cycle: 2 Lower

SUB-TOPIC: Health Advocacy
Focus: Education **Pacing: 2 days**

ESSENTIAL LEARNING ELEMENTS:

Develop an awareness of physically and mentally challenged persons (K, 1st, 2nd, 3rd, 4th)

LEARNING POINTS:

1. Understand and accept peers with disabilities
2. Establish a foundation for positive relationships with all classmates
3. Demonstrate friendship and acceptance to the handicapped and elderly

SPIRITUAL APPLICATIONS:

1. Galatians 4:13-15
2. Numbers 5:15
3. Acts 9:36-39

RESOURCES:

1. Christian Record (www. Christianrecord.org)
2. www.specialolympics.org

ASSESSMENT/INSTRUCTIONAL IDEAS:

1 Invite a physically challenged person to speak o the class
2 Roll play physical and mental challenges

STRAND 5: HEALTH

Cycle: 2 Upper

SUB-TOPIC: Structure and Function in Living Systems
Focus: Human Body: Digestive System **Pacing: 2 days**

ESSENTIAL LEARNING ELEMENTS:

Describe and explain the structure and functions of the human body (6th)

LEARNING POINTS:

1. Identify the parts of the digestive system
2. Describe the basic function of the digestive system
3. Describe the role of the mouth in digestion
4. Describe the function of saliva
5. Explain peristalsis
6. Describe the stomach's role in digestion
7. Explain the small intestine's role in digestion
8. Compare and contrast intestinal juice, pancreatic juice, and bile
9. Identify the main function of the large intestine
10. Explain the importance of fiber
11. Describe functions of the liver
12. Explain the role of the pancreas in digestion
13. Explain the importance of insulin

SPIRITUAL APPLICATIONS:

Discuss how spiritual food is digested.

RESOURCES/INSTRUCTIONAL IDEAS:

1. *Discover God's Creation* – Ch. 16, p. 283-303
2. *AIMS, Jaw Breakers and Heart Thumpers* – p. 23-25
3. Fill two glasses with warm water. Add a large spoonful of oil to both. Add a little dish soap to one. Stir both. Compare what happens in both and describe how emulsification changes the surface area of drops.
4. Complete "Try This 16-2A" and "Try This 16-2B", *Discover God's Creation,* p. 287.

NAD ESSENTIAL UPDATE:

- Enzymes as Tools
- How Much Can You Eat?
- DE: The Digestive System
- AIMS: By Golly, By Gum

STRAND 5: HEALTH

Cycle: 2 Upper

SUB-TOPIC: Structure and Function in Living Systems
FOCUS: Human Body: Excretory System **Pacing: 1 day**

ESSENTIAL LEARNING ELEMENTS:

Describe and explain the structure and functions of the human body (6^{th})

LEARNING POINTS:

1. Explain the importance of the excretory system
2. Identify the parts of the excretory systems
3. Describe functions of each part of the excretory system

SPIRITUAL APPLICATIONS:

Mark 7:18-23

RESOURCES/INSTRUCTIONAL IDEAS:

1. *Discover God's Creation* – Ch. 13, p. 235-237
2. Find ways to filter a sample of muddy water. Write the procedure as an analogy of how nephrons filter in the kidneys.

NAD ESSENTIAL UPDATE:

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STRAND 5: HEALTH

Cycle: 2 Upper

SUB-TOPIC: Health Promotion and Disease Prevention
Focus: Nutrition: Nutrients **Pacing: 2 days**

ESSENTIAL LEARNING ELEMENTS:

Identify risk factors to health and how these risks may be reduced (6th)

LEARNING POINTS:

1. Identify basic nutrients
2. Describe the importance of each nutrient
3. Explain what is meant by RDA

SPIRITUAL APPLICATIONS:

John 6:35

RESOURCES & INSTRUCTIONAL IDEAS:

1. *Discover God's Creation* – Ch. 17, p. 305-309
2. Search for the perfect food, which contains all the essential amino acids. (None exist)

NAD ESSENTIAL UPDATE:

- AIMS: Fat-Finding Mission
- CG, G4: Starch Search

3 of 8

STRAND 5: HEALTH

Cycle: 2 Upper

SUB-TOPIC: Health Promotion and Disease Prevention
Focus: Nutrition: Food Pyramid & Dietary Guidelines
Pacing: 3 days

ESSENTIAL LEARNING ELEMENTS:

Identify risk factors to health and how these risks may be reduced (6th)

LEARNING POINTS:

Food Pyramid

1. Explain the food pyramid
2. Identify food groups necessary for a balanced diet
3. Identify food group sources
4. Explain how each food group benefits the body

Dietary Guidelines

1. Identify the seven dietary guidelines
2. Explain why following the dietary guidelines are important to your health
3. Explain how food labels help you make good food choices

SPIRITUAL APPLICATIONS:

1. Matthew 4:2-4
2. Develop a food pyramid for spiritual food. Include movies, compact disks, games, books, etc.

RESOURCES & INSTRUCTIONAL IDEAS:

1. *Discover God's Creation* – Ch. 17, p. 310-319
2. *AIMS, Jaw Breakers and Heart Thumpers* – p. 17-22, 49-95
3. Arrange a group of puzzle pieces into a pyramid that reflects the proper ratios of food groups that should be consumed.
4. Record information from labels in a grocery store and find foods that fulfill the requirements in the dietary guidelines.
5. Analyze and/or evaluate various nutritional plans for humans.

NAD ESSENTIAL UPDATE:

- Hey, Read the Label!
- Nutritional Budgeting
- The Food Pyramid (Update)
- AIMS: Blue-Ribbon Lunch
- DE: Nutrition Labels: Our Guides to Healthy Eating
- EB: Food Guide Pyramid
- GO: Vegetarian food pyramid

STRAND 5: HEALTH

Cycle: 2 Upper

SUB-TOPIC: Reducing Health Risks
Focus: Eating Disorders **Pacing: 3 days**

EESSENTIAL LEARNING ELEMENTS:

Define eating disorders and how they affect health (5th, 6th)

LEARNING POINTS:

Body Composition & Weight

1. Compare and contrast fat and lean tissue
2. Define body composition
3. Explain what is meant by desirable weight

Calories/Metabolism

1. Define calorie
2. Explain the relationship between calories and metabolic rate
3. Explain how weight can be managed

Eating Disorders

1. Identify common eating disorders

SPIRITUAL APPLICATIONS:

Discuss why "fatness" is a good thing in the Bible. Isaiah 55:1-2

RESOURCES & INSTRUCTIONAL IDEAS:

1. *Discover God's Creation* – Ch. 17, p. 320-329
2. Search for calorie charts that show how many calories are burned for several activities. Name some food products that have the same calorie values.

NAD ESSENTIAL UPDATE:

- DE: Managing Your Health: Weight Control
- GO: Anorexia

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STRAND 5: HEALTH

Cycle: 2 Upper

SUB-TOPIC: Health Advocacy
Focus: Mentally/Physically Challenged **Pacing: 2 days**

ESSENTIAL LEARNING ELEMENTS:

Develop an awareness of physically and mentally challenged persons (5th, 6th, 7th, 8th)

LEARNING POINTS:

1. Understand and accept peers with disabilities*
2. Gain an appreciation for the range of individual human difference*
3. Establish a foundation for positive relationships with all classmates*

*Adapted from Teacher's Guide to *What's Wrong with Timmy* by Maria Shriver and Sandra Speidel

SPIRITUAL APPLICATIONS:

1. Matthew 25:40
2. Discuss the mistaken idea that disease and disability are always the result of personal sin (John 9:1-5)

RESOURCES & INSTRUCTIONAL IDEAS:

1. Christian Record (www.christianrecord.org)
2. www.specialolympics.org
3. *The Summer of the Swans* by Betsy Byars, Puffin Books, 1970
4. *God Leads the Handicapped, Too,* by Dwain L. Ford, www.circle.adventist.org
5. Visit a home for the mentally or physically challenged
6. Invite a health professional who deals with the mentally or physically challenged to visit your classroom

NAD ESSENTIAL UPDATE:

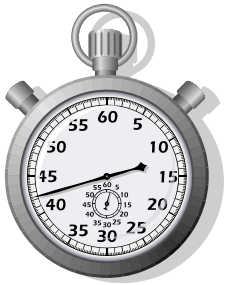
NOTE: It is assumed that the textbook Discover God's Creation is available as a resource. One copy for each pair of students may be adequate.
Have upper grade students begin collecting cereal box nutrition labels for Day 5.

Day 1 Parts and Function of the Digestive System

Objectives: ***Lower grades*****:** identify the organs of the digestive system; explain the steps of digestion.
Upper grades**: I**dentify the parts of the digestive system; describe the basic function of the digestive system; describe the role of the mouth in digestion; explain the function of saliva; explain peristalsis; describe the role of the stomach in digestion.

Materials Needed

Lower grades**:** copies of the diagram of the digestive system, one per student or pair of students; copy of the lyrics to the "Digestion Song"; a variety of recycled containers, tubes and/or grocery bags which can be used to construct a model of the digestive system OR clay OR follow the directions described in the book *Make it Work! Body,* simplifying them to make them more manageable for lower grade students. (Another idea would be to make a giant walk through a model of the system using, for example, an appliance box for the mouth and crawl-through tubes for the intestines).
Upper grades**:** soda crackers, one per student; paper towels, clear plastic cups, plastic spoon, stopwatch, sugar cubes and water for each small group of students; copies of the "Digestion and Nutrition Dictionary," one per student.
Both: fruit, grass, milk, wood; 6 meter garden hose, masking tape, towel (if there is water in the hose); apple, food coloring, paper plate, knife, teaspoon.



Introduction/Review

Display the fruit, grass, milk and wood, and ask the students how the items are similar. (They are all food items: fruit for birds, grass for cows, milk for calves and wood for termites). Ask (or explain) the purpose of digestion (to break food items down into parts small enough to be absorbed and used internally by the animal). Show the picture on page 282 of *Discover God's Creation* and read the explanation on page 283.

Procedures

Several powerpoints available show the organs on lower and upper levels

Conduct the demonstration described on page 284 TE of *Discover God's Creation*. If a hose is unavailable use a length of string or rope to show the length of the digestive system. Conduct the demonstration on page 286 TE of *Discover God's Creation*.
Have **upper grade students** read *Discover God's Creation* pages 284-290 in pairs or small groups and conduct Try This: 16-A and 16-B. Have students enter bold words in their "Digestion and Nutrition Dictionary."

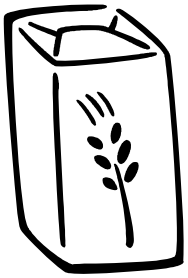
Meanwhile, have **lower grade students** brainstorm a list of organs they believe to be part of the digestive system. Correct any misconceptions. Show students the accompanying diagram of the digestive system and have them locate each of the parts on the list. If there are any parts which they have not identified, point them out and ask if they know what they are. Begin to teach the accompanying *Digestion* Song. Provide students with a variety of recycled containers including some which are tube-like (paper towel tubes, garden hoses or plastic grocery bags which could be rolled and tied end to end to represent the intestines) or clay so that they can begin to construct a model of the digestive system. Have students work in pairs or small cooperative groups to begin constructing the model.

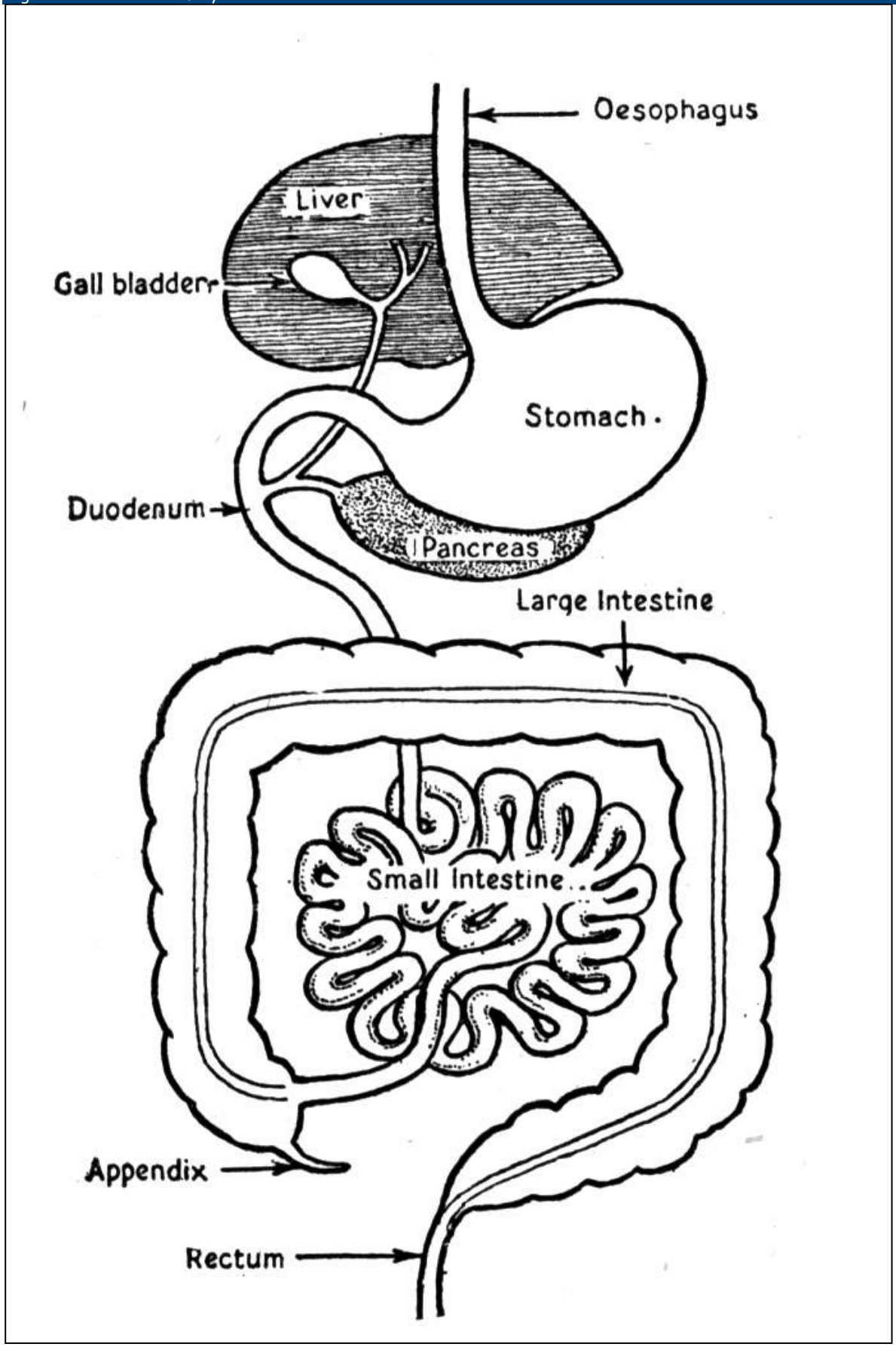
Evaluation

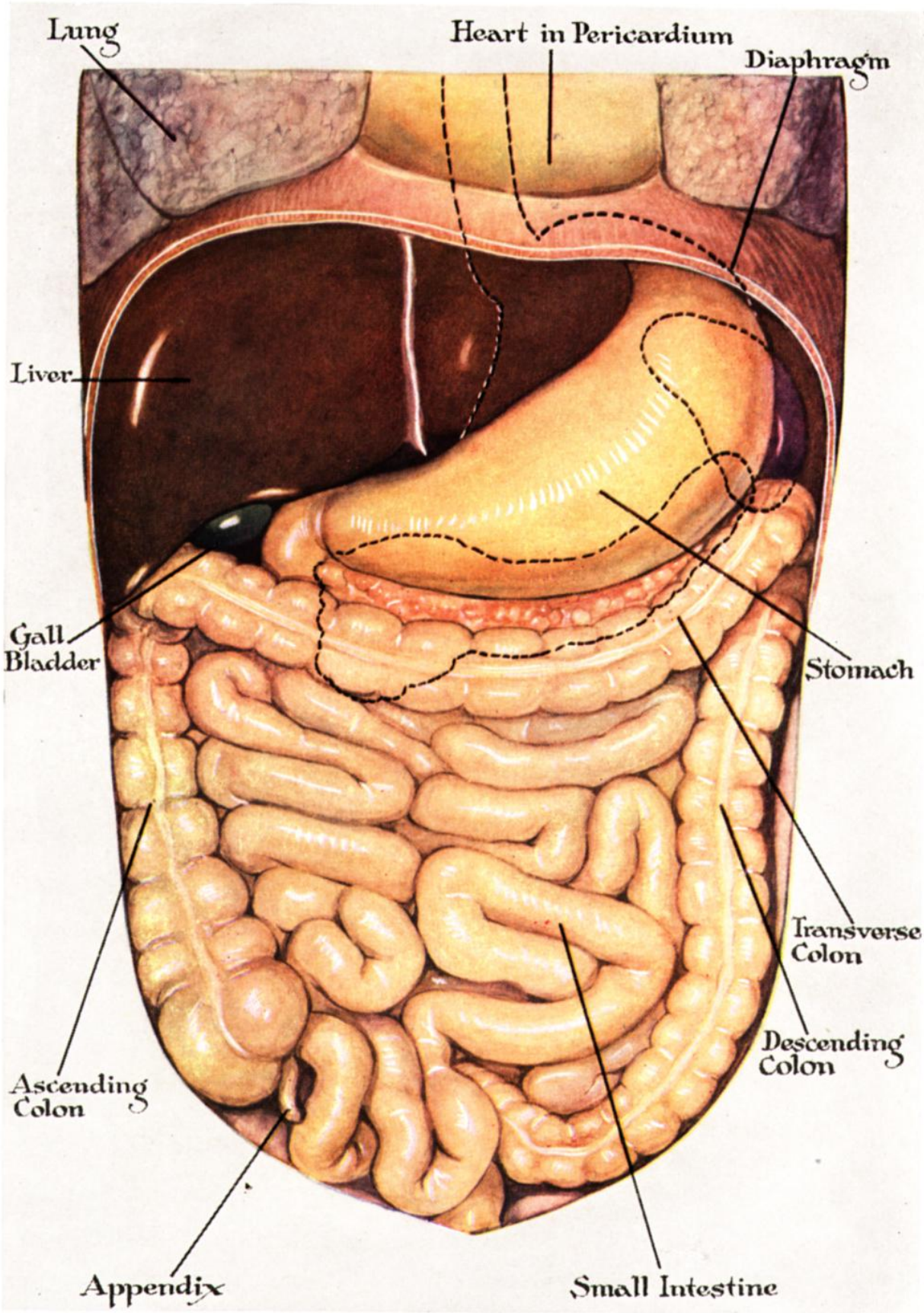
Evaluate lower grade students informally based on observation. Evaluate upper grade students based on their completed assignments.

Homework

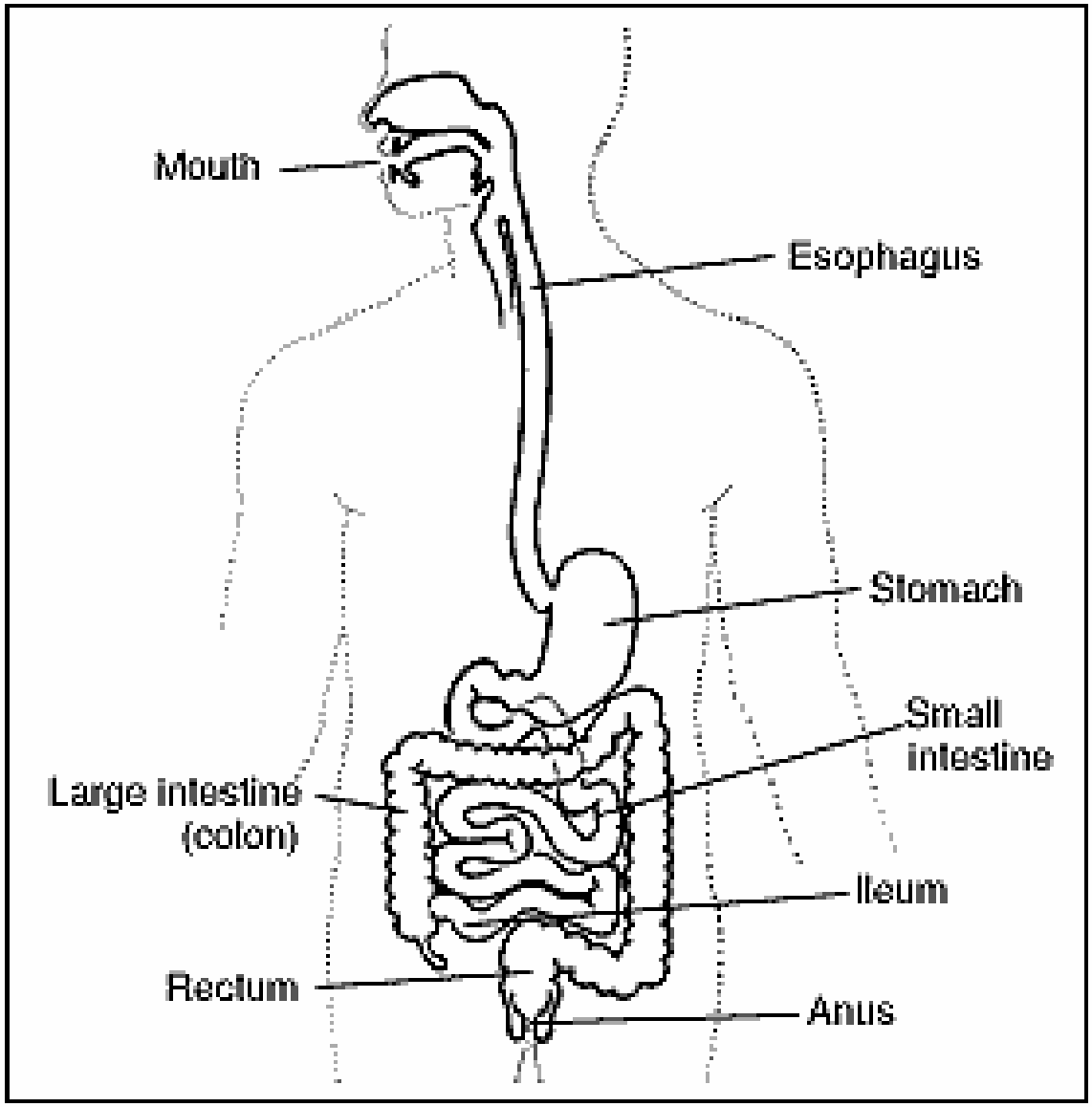
Consider assigning the "Review It" Questions as homework for upper grade students.
Remind upper grade students to begin collecting cereal box nutrition labels for day 5.



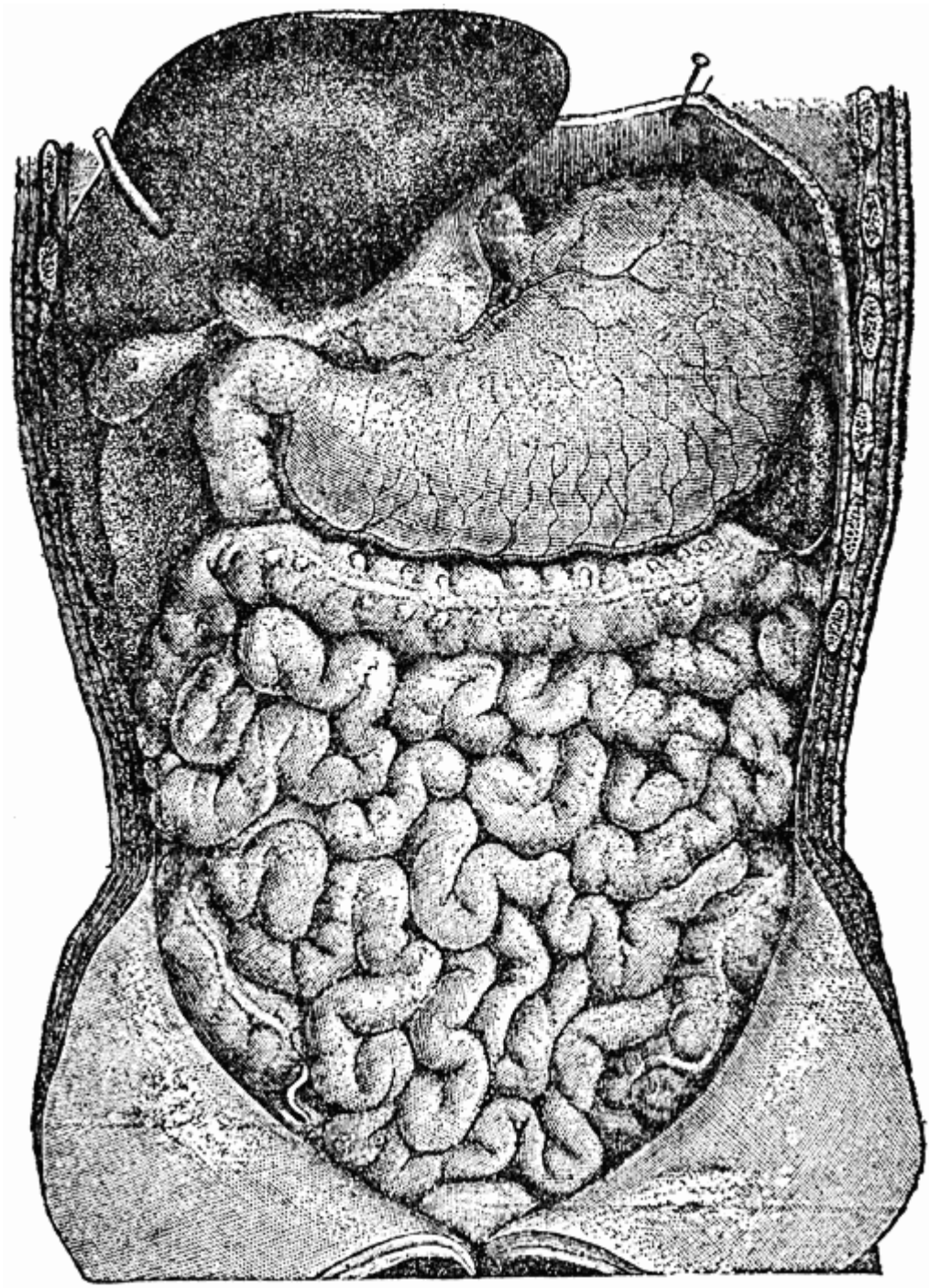

Oesophagus
Liver
Gall bladder
Stomach
Duodenum
Pancreas
Large Intestine
Small Intestine
Appendix
Rectum


Lung
Heart in Pericardium
Diaphragm
Liver
Gall Bladder
Stomach
Transverse Colon
Descending Colon
Ascending Colon
Appendix
Small Intestine

Graph of Digestive System



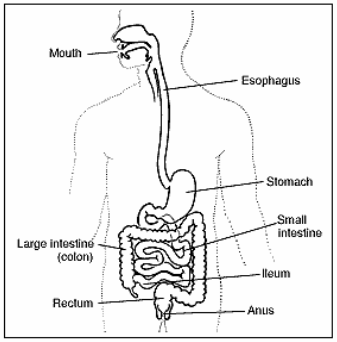
Can you find the organs on these? There are extras shown here that have not been mentioned.



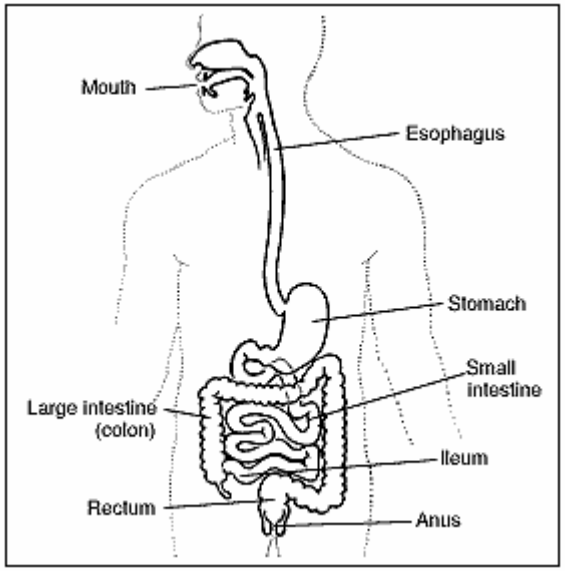
Digestion Song

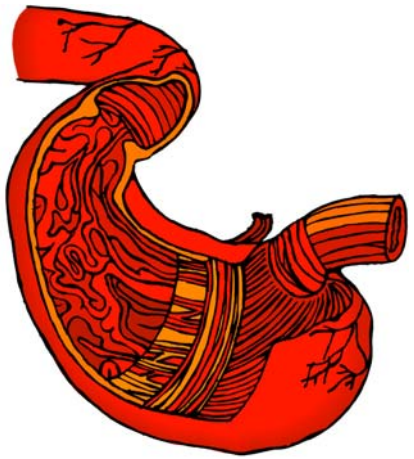
(To the tune of "Did You Ever See a Lassie")

Do you know about digestion, digestion, digestion?
Do you know about digestion? It starts with a bite.
Food goes in the mouth and saliva starts flowing,
The teeth grind it all up so it can get going.
Do you know about digestion? It starts with a bite.



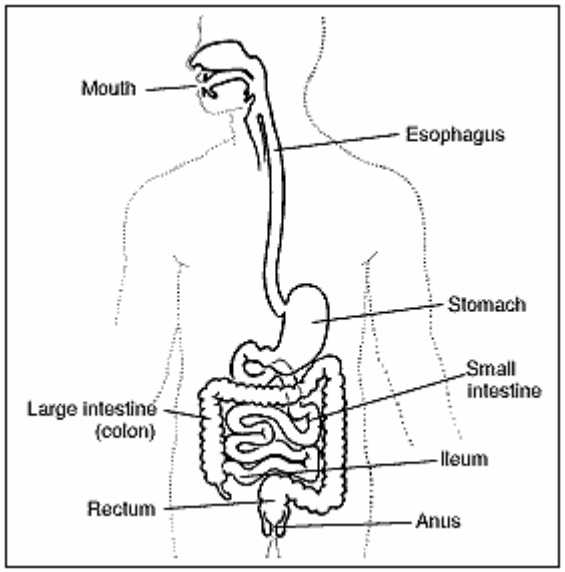
From mouth to esophagus, not a sarcophagus,
From the mouth to the esophagus- food's on its way.
Now on to the stomach where acid's manufactured,
And muscles squeeze food 'til it's totally fractured.
Do you know about digestion? The food's on its way.

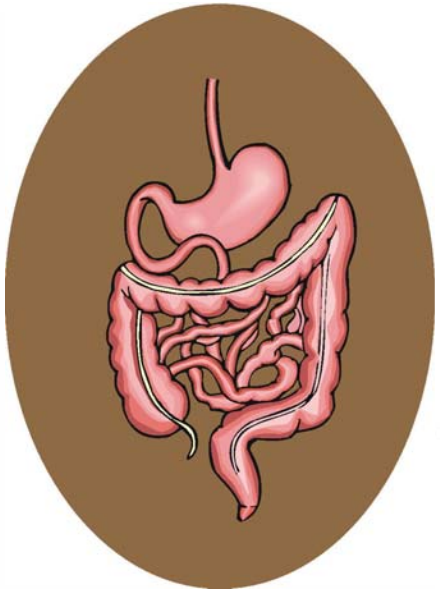


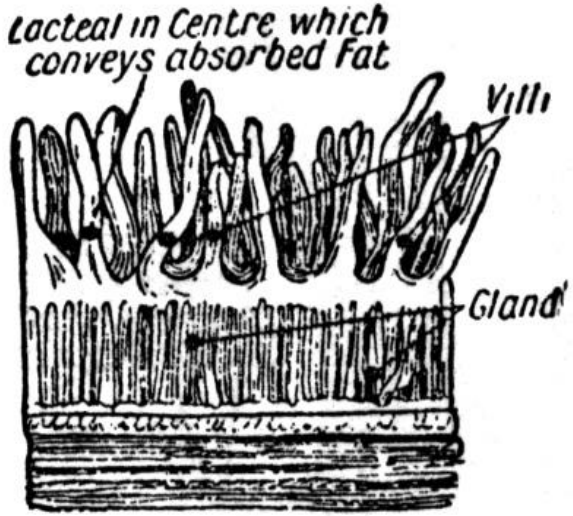


Stomach

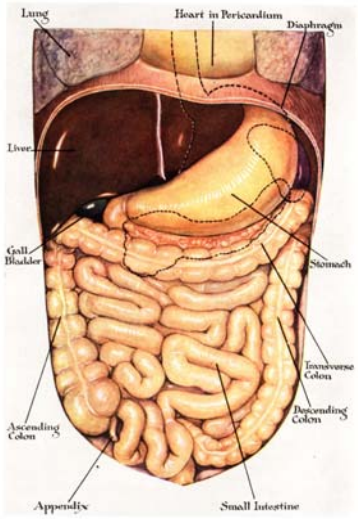
The longest but small intestine comes next on the journey.
This next digestive organ is small but not short!
It has little "fingers" to help with absorption.
Villi is the name for these small projections.
Do you know about digestion? It's more than just sport.

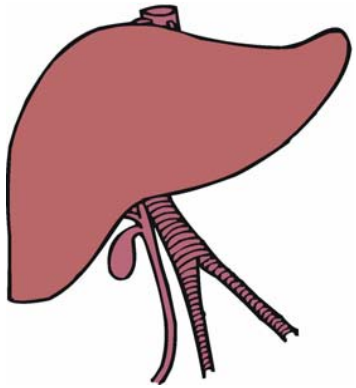


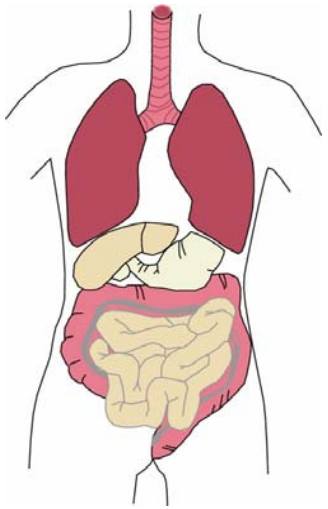




Two other organs help the small intestine-
The pancreas and liver some juices deliver.
The pancreas makes enzymes and liver makes bile.
Without them digestion would not be in style.
Do you know about digestion? It's very worthwhile.







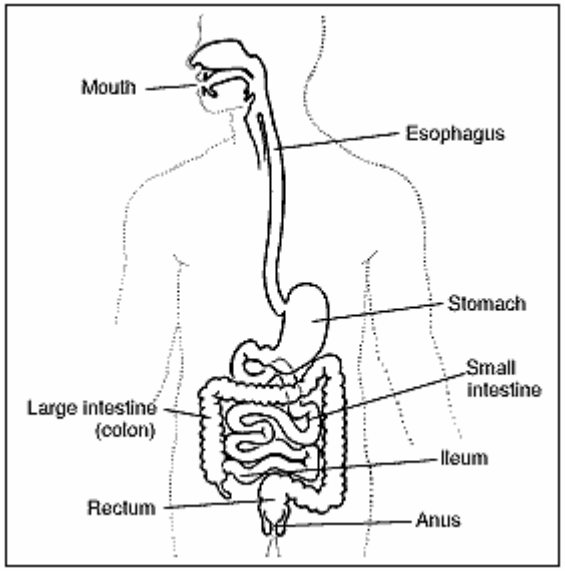
Next comes the large intestine- it's shorter but fatter.

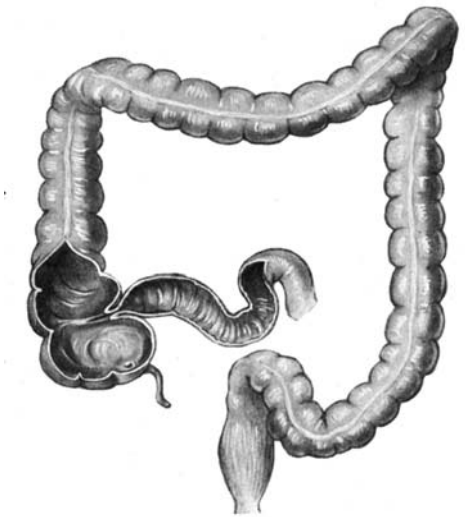
Not good for conversation- contains fecal matter.

Water's removed as it moves down the tube.

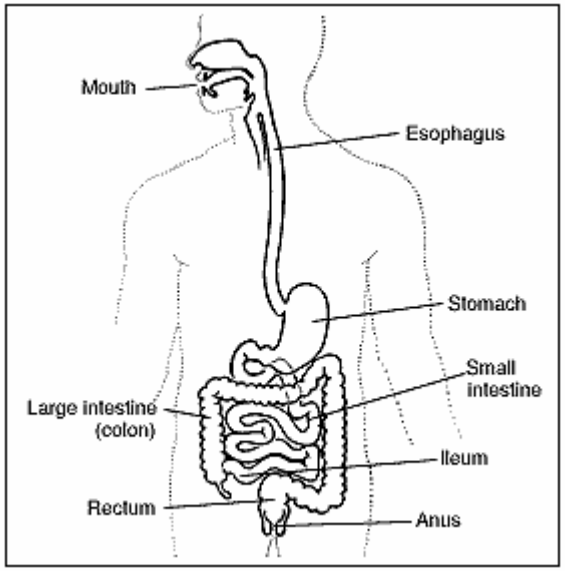
Fiber is helpful- found in veggies and fruit.

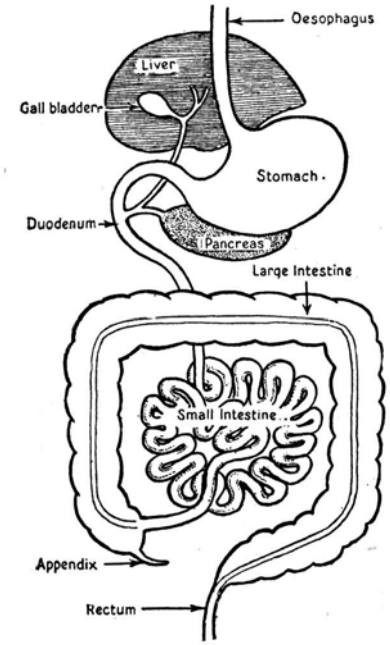
Do you know about digestion? Not a laughing matter.





We're almost to the end now, so don't get too funny.
If all is in order, it won't be too runny.
Feces are collected down in the rectum
Until out the anus the muscles will push 'em.
Do you know about digestion? God made it just right!





Day 2 The Organs of the Digestive System

Objectives

Lower grades: identify the organs of the digestive system; explain the steps of digestion; explain how the body uses food

Upper grades: explain the role of the small intestine in digestion; compare and contrast intestinal juice, pancreatic juice and bile; identify the main function of the large intestine; explain the importance of fiber; describe the functions of the liver; explain the role of the pancreas in digestion; explain the importance of insulin.

Materials Needed:

Lower grades: materials for creating digestive system model;

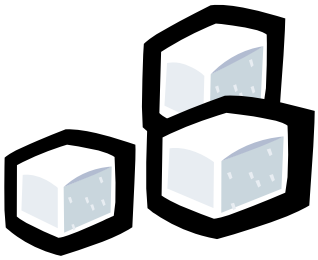
Upper grades:

Both: coffee filter, ½ cup glass of water, 1 tsp each of sugar and cocoa; if available (public library is a good source) Bill Nye, the Science Guy: Digestion video or Magic School Bus video.

Introduction/Review

Using a cooperative structure, review previously taught terms and concepts. Have students sing the "Digestion Song."

Demonstrate the absorption process for food with the following activity:



Using a coffee filter, form a funnel shape. Place the funnel in a clear glass. Mix together the following solution - ¼ glass of water, one tsp. sugar, one tsp. cocoa. Stir together with a spoon until they are thoroughly mixed. Pour the mixture into the glass with the coffee filter. Be sure to hold the filter in place with your fingers. Watch the mixture drop through to the bottom of the glass. The result that the students should see is that the filter holds back the particles of cocoa. Only the liquid and the sugar which has been dissolved in it can pass through the coffee filter. Explain that this is the same function that occurs in the intestines- nutrients pass through the walls of the small intestine and into the bloodstream where they are delivered to the cells.

Procedure

Have upper grade students read pages 291-298 in *Discover God's Creation* and complete whatever portion of the Chapter 16 "Wrap-Up" seems appropriate.

Meanwhile have lower grade students complete their digestive system models and add new words to their "Digestion and Nutrition Dictionary". At a convenient time (perhaps during lunch ☺) show the digestion video by Bill Nye, the Science Guy.

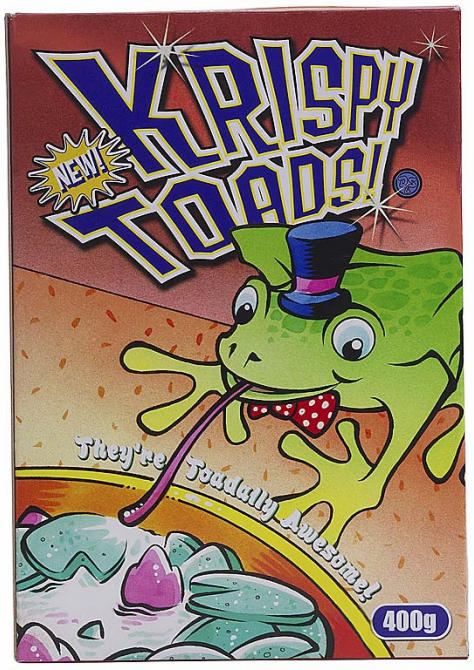
Evaluation

Evaluate lower grade students by having them label and explain the function of each of the organs in their digestive system model. Use the accompanying rubric.

Evaluate upper grade students based on their completed assignments.

Homework

Remind upper grade students to begin collecting cereal box nutrition labels for day 5.



Name _____ 1-4

Rubric for Digestive System Model

Criteria	Score
The model contains at least the following organs: mouth and teeth, esophagus, stomach, small intestine, large intestine, anus.	
The student can identify each organ by name.	
The student can identify the primary function of each organ.	
The model is carefully and neatly constructed.	
The student was a good steward of time while working on the model.	
The students helped to create a positive environment.	

Scoring Guide:

0= student did not attempt the task 1= student did little to meet the expectation.

2= student met basic expectations 3= student met expectations

4= student exceeded expectations

Name _____ 1-4

Rubric for Digestive System Model

Criteria	Score
The model contains at least the following organs: mouth and teeth, esophagus, stomach, small intestine, large intestine, anus.	
The student can identify each organ by name.	
The student can identify the primary function of each organ.	
The model is carefully and neatly constructed.	
The student was a good steward of time while working on the model.	
The students helped to create a positive environment.	

Scoring Guide:

0= student did not attempt the task 1= student did little to meet the expectation.

2= student met basic expectations 3= student met expectations

4= student exceeded expectations

Day 3 The Excretory System

Objectives

Lower grades: explain the importance of the excretory system.

Upper grades: explain the importance of the excretory system; identify the parts of the excretory system; describe functions of the excretory system.

Materials Needed

Lower grades: copies of urinary tract diagram, one per student

Upper grades: for urinary tract model (*Make It Work: Body*)- blue and red wire, sponge or foam, pipe cleaners, cardboard; for demonstration (*Make It Work: Body*)- pieces of styrofoam, three strips of wood, a plastic bottle, food coloring, sand or soil, a measuring cup, a glass tumbler, fine netting, tape.

Review/Introduction

Using a cooperative structure, review previously taught terms and concepts. Sing the "Digestion Song".

Have students list types of trash and waste found at home and then list how each item is removed. Discuss what would happen if the waste was not removed from their houses (homes would become cluttered, it would be difficult to move about, it would stink, disease would spread). Explain that since our bodies produce waste, there must be some system of removing the waste or our bodies would not be able to continue to function properly, and that God has provided a plan for accomplishing this task. Ask students to identify systems they have already studied which remove waste (digestive, respiratory and integumentary (skin) systems). Explain that today they will be learning about another system which has as its primary function the removal of waste--the excretory system. This system uses organs from other systems such as the lungs and the skin but adds the kidneys.

Procedure:

Have upper grade students read pages 235-237 in *Discover God's Creation* and answer the "Review It" questions in writing. Assign students to either make the model of the urinary tract or conduct the demonstration of it as described in *Make It Work: Body*.

Meanwhile, show **lower grade students** the diagram of the urinary tract and explain the parts and their function. Have them color the parts according to the directions accompanying the diagram. In pairs have them rehearse the names of the parts and

organs in the system. If students act embarrassed or get silly, remind them that God made everything just right and there is nothing about our bodies to be embarrassed about as long as we use them in the right ways. Discuss the importance of drinking adequate water in order for the urinary system to function properly. Provide students with the accompanying record-keeping sheet and encourage them to try to reach a goal of eight glasses of water per day. Have students add new words to their "Digestion and Nutrition Dictionary."

Evaluation

Evaluate lower students based on their ability to label, verbally or in writing, the parts of the urinary tract and to identify their functions.

Evaluate upper grade students based on their completed assignments.

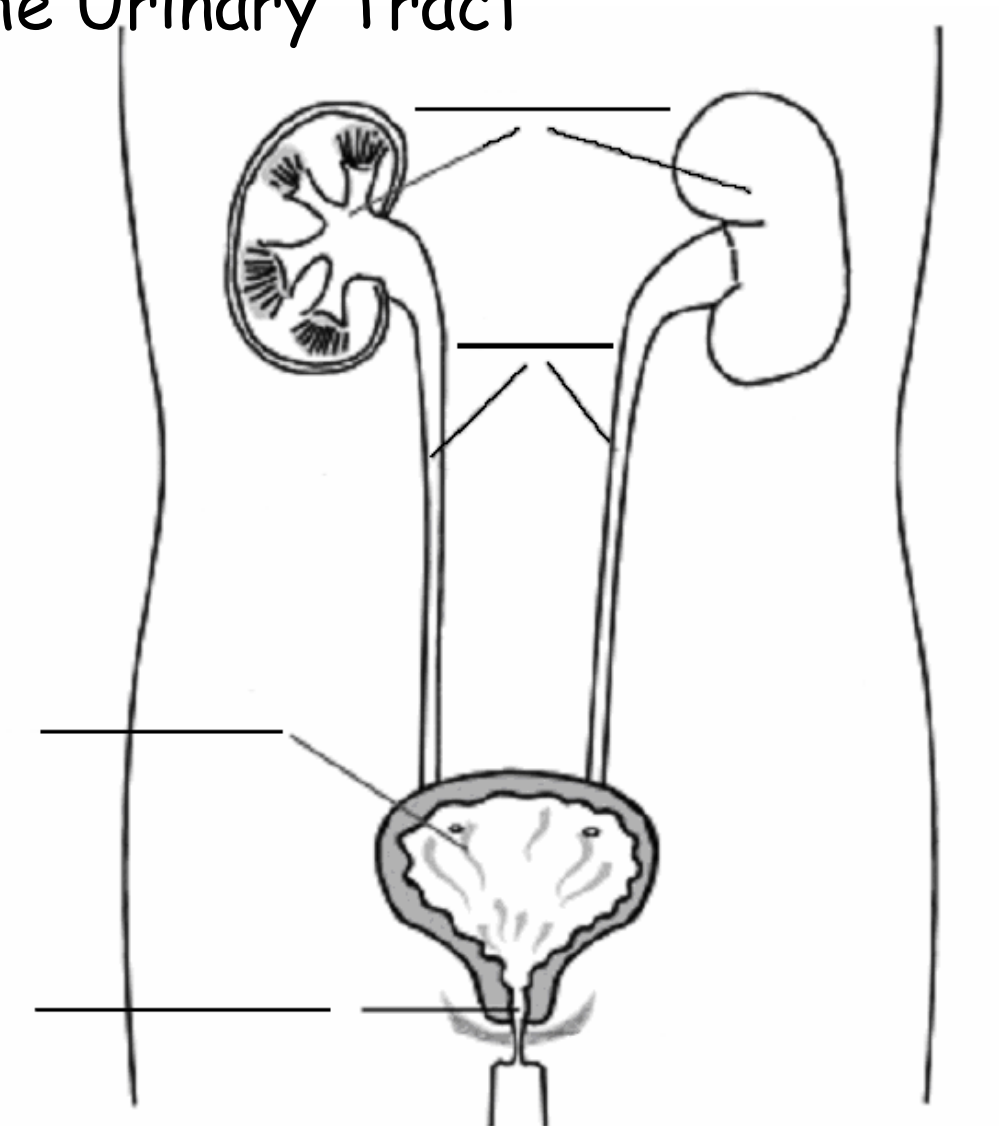
Homework

Have upper grade students complete the model or preparations for the demonstration and be prepared to share it in class on day 4.

Remind upper grade students to begin collecting cereal box nutrition labels for day 5.

Name: _____

The Urinary Tract



Label the KIDNEYS and color them PINK.

Label the URETER and color it BLUE.

Label the BLADDER and color it YELLOW.

Label the URETHRA and color it ORANGE.

Name: _____

Systems of the Body

Match the correct body system to the definition:

Definition	System
The lungs and breathing tubes. It's how you take in O_2 (oxygen) and get rid of CO_2 (carbon dioxide).	
When you run, it's not just a case of moving your arms and legs. It's everything working together.	
It's your bones and joints. Without bones you'd be a shapeless heap. Your joints allow movement.	
Blood, heart and blood vessels. Blood carries food and O_2 round the body and carries waste away.	
A set of glands make up hormones. These chemicals help to control activities going on in your body.	
The lungs, kidneys and intestine. They get rid of or excrete the waste from your body	
The brain, spinal cord and a network of nerves. It controls and co-ordinates movement.	
The muscles pull on bones and make them move.	
The stomach and gut, where the food you eat gets broken down. You use digested food as fuel.	

Muscular system
Skeletal system
Digestive system
Excretory system
Circulatory system
Hormonal system
Body system
Nervous system
Respiratory system

KEY  Systems of the Body

Match the correct body system to the definition:

Definition	System
The lungs and breathing tubes. It's how you take in O_2 and get rid of CO_2.	Respiratory system
When you run, it's not just a case of moving your arms and legs. It's everything working together.	Body system
It's your bones and joints. Without bones you'd be a shapeless heap. Your joints allow movement.	Skeletal system
Blood, heart and blood vessels. Blood carries food and O_2 round the body and carries waste away.	Circulatory system
A set of glands make up hormones. These chemicals help to control activities going on in your body.	Hormonal system
The lungs, kidneys and intestine. They get rid of or excrete the waste from your body	Excretory system
The brain, spinal cord and a network of nerves. It controls and co-ordinates movement.	Nervous system
The muscles pull on bones and make them move.	Muscular system
The stomach and gut, where the food you eat gets broken down. You use digested food as fuel.	Digestive system

Muscular system
Skeletal system
Digestive system
Excretory system
Circulatory system
Hormonal system
Body system
Nervous system
Respiratory system

Name _____

My Water Intake

Graph your water intake for one week.

10							
9							
8							
7							
6							
5							
4							
3							
2							
1							
Dates------							

Day 4 Nutrients

Objectives

Lower grades: define food; identify classes of nutrients; explain how the body utilizes basic nutrients

Upper grades: identify the basic nutrients; describe the importance of each nutrient; explain what is meant by RDA (Recommended Daily Allowance); identify the food groups necessary for a balanced diet; identify sources for each food group; explain how each food group benefits the body

Nutrition Information.

Nutrition is a study of the nutrients found in the foods in our diet.
The functions of nutrients include:

- **To help the body grow and repair.**
- **To provide energy in order to carry out physical activity.**
- **To keep the body warm.**
- **To help carry out other essential processes such as digestion.**

Macronutrients.

The word macro-nutrient is used to explain nutrients that the body needs in large amounts. Proteins, carbohydrates and fats are macronutrients.

Proteins.

Protein is needed for the growth and repair of body tissues such as the blood cells and muscles. Babies and children grow rapidly and the protein needs of a child are high. Protein rich foods come from both animal and vegetable sources.

Protein complementation.

Proteins are made up of smaller units called amino acids. There are many different types of amino acids. Animal protein sources contain all the amino acids needed to build tissue. These are referred to as HBVs (high biological value)

Vegetable protein sources, such as cereals and pulses, contain some but not all of the amino acids. These are LBVs (low biological value). Therefore a vegetarian would have to eat a combination of LBVs to get the amino acids the body needs. But that is very easy!

For example: Beans on rice, a peanut butter sandwich.

Carbohydrates.

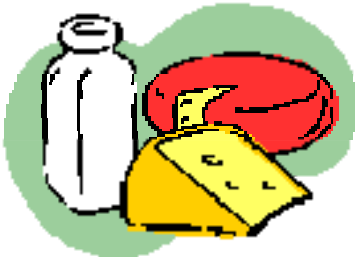
Carbohydrate foods provide the body with energy. Types of carbohydrate are:

- Sugars which are found in fruits, cakes, biscuits and soft drinks.
- Starches, such as potatoes, bread, pasta and rice.

Dietary fiber.

Dietary fiber is a form of carbohydrate which is not used for energy. It is also called non-starch polysaccharide (NSP) or cellulose. It is found in raw plant material, in the outer coating of cereals and in the structure of fruit and vegetables. The body can not digest dietary fiber, so it passes through the body absorbing water and increasing in bulk. This helps to stimulate the digestive system to work properly and to avoid constipation.

Fats.



Fats are the most concentrated form of energy. They are found in food products such as butter, oil and cream. Fats are also present inn other foods such as cheese, cakes, chocolate and fried foods. Fats are a useful source of energy but too much can be harmful. Cholesterol is associated with fat and this is linked with health problems such as coronary heart disease and high blood pressure. Fat has the following functions in the body:

- It provides a concentrated source of energy.
- It provides us with vitamins A and D.
- It is stored in the tissues and keeps us warm.

Micronutrients.

Micronutrients are the vitamins and minerals that are needed in much smaller quantities. This does not mean they are any less important to the body. Vitamins and minerals carry out a number of essential functions in the body. They often work with other nutrients to carry out the functions in the body.

Dietary reference values (DRVs)

The amount of nutrients needed by babies and young children in their diet are calculated by DRVs. There are a range of different DRV measures such as reference nutrient intake (RNI) and estimated average requirement (EAR).

- The RNI of protein for a 4-6 month old is 12.7g per day.
- The RNI of protein for a 7-9 month old is 13.7g per day.
- The RNI of protein for a 10-12 month old is 14.9g per day.
- The RNI of protein for a 1-3 year old is 15.5 per day.

The energy value of food.

All macronutrients, protein, fats and carbohydrates provide the body with some energy. Fats provide twice as much energy as carbohydrates and proteins, so fat is the most concentrated source of energy. All these nutrients are broken down and used by the body to provide energy for:

- Activities
- Keeping our body temperature maintained.
- Other body processes such as growth and repair, breathing and other body systems such as circulation.

Children vary in the amount of energy they need because:

- Some children are more active than others
- Boys have a higher basal metabolic rate than girls. This means they use up energy at a faster rate than girls.
- Age, size or height will affect the amount of energy needed by the body.

Measuring energy in food.

The energy in food is measured in kilocalories (kcal) or kilojoules (kJ).
1 kilocalorie =4.2 kilojoules.
Kilocalories can be converted to kilojoules by multiplying by 4.2. food labels on baby and toddler food products usually give the energy value of the product in both kilocalories and kilojoules.

Energy balance.

If young children eat more kilocalories than they use up in energy, they will put on additional weight. There are many overweight young children today because they have a diet that is high in energy-dense foods such as chips and sweets, and high-fat fast foods. To maintain an energy balance during childhood, it is necessary to balance the kilocalories taken in as food with the energy used in activities. When there is an energy imbalance, the body will become over weight or under weight.

Materials Needed

Lower grades: copy of the updated food pyramid poster which can be obtained or printed at www.mypyramid.gov; lesson plan one for appropriate age group obtained at the same website; (note that website lesson plans do not address objectives in the same order as established by the SMART but in general the objectives are well met, though it will be necessary to include the role of vegetarianism in the discussions); copies of the My Pyramid Worksheet, one per student.

Upper grades: juice samples- Hi-C fruit drink, orange juice, pickle juice, pineapple juice, sauerkraut juice, tomato juice; iodine solution, 2 medicine droppers, 7 clear plastic cups, starch solution, test-tube rack, 6 test tubes; small brown paper bag, fatty food samples (banana, wheat bread, cheese, chocolate, corn chips, mayonnaise, peanut butter, potato), scissors.

Both: potted plant

Introduction/Review

Use a cooperative structure to review previously taught terms and concepts.

Read (or paraphrase) the introduction on page 305 of TE *Discover God's Creation*. Display the potted plant and ask students to identify what it needs to live and be healthy (water, carbon dioxide, minerals and sunlight). Ask them where and how it obtains these items (water--from the ground through the roots; carbon dioxide--from the air through the leaves; minerals-from the soil through the roots; sunlight--from the sun through the leaves). Explain that, while the plant gets the nutrients it needs from the air, soil and sunlight, we get the nutrients we need from the food we eat. (adapted from TE *Discover God's Creation*, page 305.

Procedures

Give the upper grade students the accompanying quiz explaining that it will not be graded but is just to give them a sense of how much they know already about nutrition. Have them complete it and keep it until the end of class when correct answers will be provided. Tell them to read pages 306-313 and conduct "Class Activity 17-1" found on page 309 and "Class Activity 17-2" found on page 314, recording their data and answers to questions.

Meanwhile, use the first day's lesson of the My Pyramid lesson plans provided by the U.S. government with lower grade students. Two levels are provided; so choose the one best suited to your group.

At the end of the class go over the nutrition quiz with upper grade students, revealing the correct answers.

Evaluation

Have lower grade students complete the worksheet "Eat Smart with My Pyramid for Kids," and use this to help evaluate their understanding of the food groups.

Evaluate upper grade students based on their completed assignments.

Homework

Have lower grade students complete a My Pyramid Worksheet.
Remind upper grade students to begin collecting cereal box nutrition labels for day 5.

Name _____ Date: _____

Nutrition Quiz

Circle T or F to indicate true or false as your answer to the following questions.

T or F 1. Minerals and vitamins are more important than nutrients such as fat and protein.

T or F 2. Fat provides the body with more energy than any other nutrient.

T or F 3. Breads, cereals, and potatoes are excellent sources of protein.

T or F 4. The food you eat is broken down into sugar in the body.

T or F 5. It is a good idea to take multivitamins to make up for vitamins missing in your diet.

T or F 6. Only the water you get when drinking water can be used by the body.

T or F 7. Vegetarian foods contain no fat.

T or F 8. Protein is preferred by the body for energy.

T or F 9. Most students your age get the RDA of each nutrient they need.

T or F 10. All nutrients provide the body with some energy.

Day 5 Food Pyramid

Objectives

Lower grades: describe the food pyramid; categorize foods in the food pyramid; define nutrition; understand the importance of nutrition to health; explain how the food pyramid can be used as a guide in choosing a healthy diet.

Upper grades: identify the seven dietary guidelines; explain why following the dietary guidelines is important to one's health;

Materials Needed

Lower grades: copies of lesson 2 and related materials provided by My Pyramid.

Upper grades: copies of AIMS materials.

Both: driver's manual

Review/ Introduction

Use a cooperative structure to review previously taught terms and concepts.

Show the driver's manual to the students and ask why manuals such as this are produced (to be sure people know the rules). Ask if passing a test on the manual enables someone to get his or her driver's license (yes, if old enough and in good health). Does passing a test on the manual make someone a safe driver (not necessarily- only if the person obeys the rules). Explain that there are 7 guidelines for a healthy diet which upper grade students will be reading about today. Ask if knowing these guidelines will make a person healthy (not necessarily- only if they follow the rules can they be expected to benefit from them).

Procedure

Have upper grade students read pages 315-317 in *Discover God's Creation*. Have students create a presentation on the seven dietary guidelines. Some possible presentations might include a song, poem, chant, or poster. These should be on display for tomorrow's lesson.

Meanwhile use lesson 2 provided by www.mypyramid.gov for the age level most appropriate to your group. Have students add new words to their "Digestion and Nutrition Dictionary."

Evaluation

Evaluate lower and upper grade students based on their completed assignments.

Homework

Have lower grade students complete a copy of the My Pyramid Worksheet.











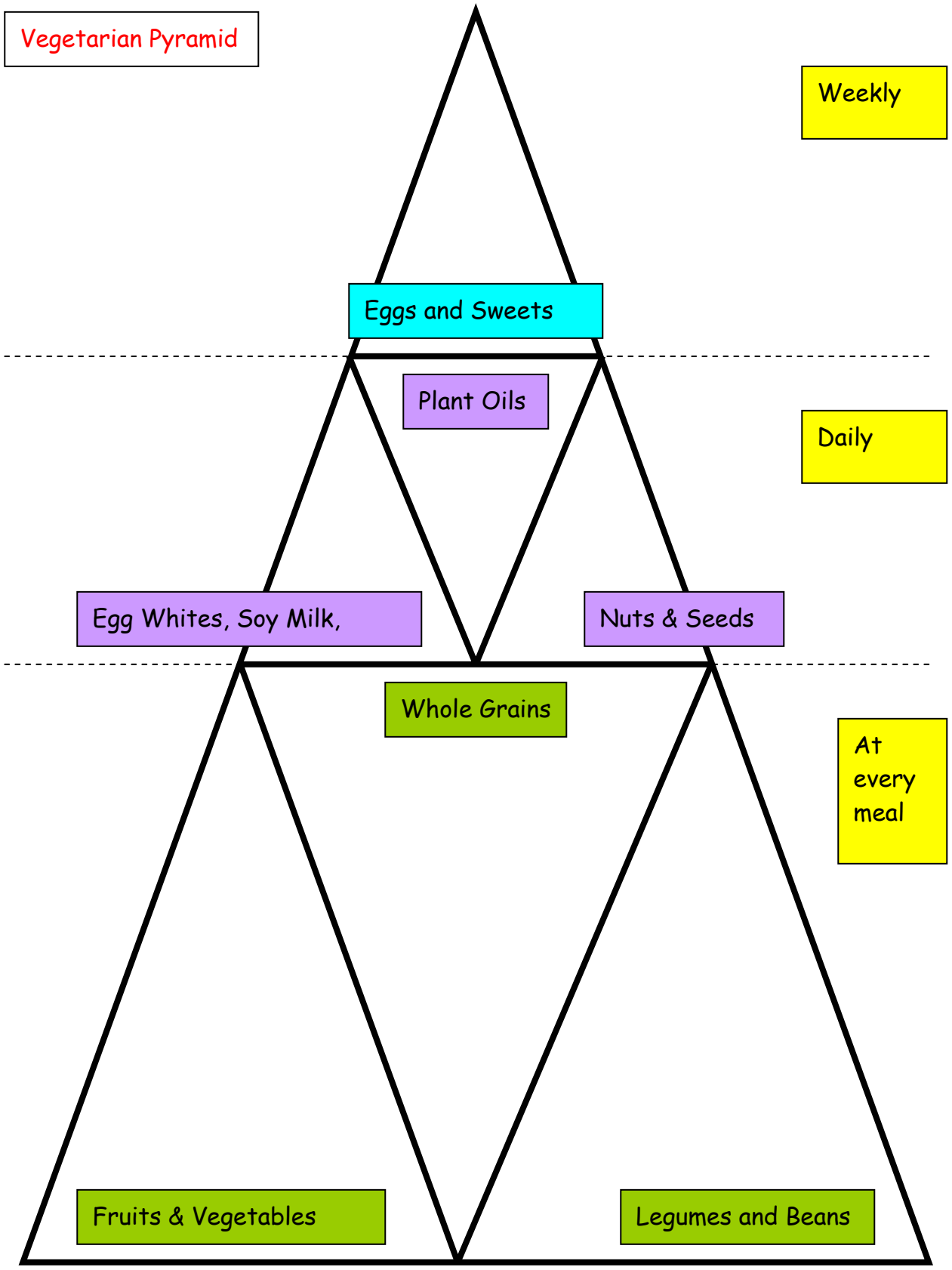






NOTE

It may be helpful to take time at the **beginning** of day 6 to explain the activity "Sweet Retreat" to older students.


Vegetarian Pyramid
Weekly
Eggs and Sweets
Plant Oils
Daily
Egg Whites, Soy Milk,
Nuts & Seeds
Whole Grains
At every meal
Fruits & Vegetables
Legumes and Beans
Lots of clean water, exercise, and faith in God.

Vegetarian Pyramid

Weekly

Eggs and Sweets

Plant Oils

Daily

Egg Whites, Soy Milk,

Nuts & Seeds

Whole Grains

At every meal

Fruits & Vegetables

Legumes and Beans

Lots of clean water, exercise, and faith in God.

Day 6 A Balanced Diet

Objectives

Lower grades: understand the importance of a balanced diet; identify foods that make up balanced meals; distinguish between healthy and unhealthy snacks.
Upper grades: explain how food labels help one make good food choices.

Materials Needed

Lower grades: copies of lesson 3 of My Pyramid and related materials;
Both: a variety of tube products wrapped in paper so that the labels cannot be seen (denture cream, first-aid cream, hair cream, hand cream, toothpaste, tube and tile caulk)

Review/Introduction

Use a cooperative structure to review previously taught terms and concepts.

Display the tube products and, without being allowed to smell them, ask students to guess their use. When the purpose of each has been guessed, remove the papers to reveal the actual product. Discuss the importance of labels on products and relate to the value of food labels.

Procedure

Have upper grade students read pages 318-319 in *Discover God's Creation* and complete whatever portions of Chapter 17 Review you deem appropriate for your students. If you have not already done so, explain to them how to complete the Sweet Retreat activity purchased (on-line and downloadable for $2) from www.AIMS.com.

Meanwhile, conduct lesson 3 provided by www.mypyramid.gov at the level most appropriate to your group.

Evaluation

Evaluate students based on their completed assignments.

Homework

Have lower grade students complete a copy of the My Pyramid Worksheet.

Day 7 Eating Right for Optimal Weight

Objectives

Lower grades: explain the importance of a regular eating schedule; explain the impact of junk food on health.

Upper grades: compare and contrast fat and lean tissue; define body composition; explain what is meant by desirable weight.

Materials Needed

Lower grades: magazines with food pictures for cutting; poster board or large sheets of paper, scissors, glue sticks; copies of a MyPyramid worksheet, one per student.

Both: a variety of stuffed animals;

Review/Introduction

Use a cooperative structure to review previously taught terms and concepts.

Display the stuffed animals and ask which is best (answers should vary). Discuss the fact that each is different and special in its own way. Explain that just as there is variety in the stuffed animals, there is variety in people--they are not made the same and should not be expected to look the same. What society determines to be beautiful is artificial and constantly changing. (Adapted from *Discover God's Creation*, TE p. 320)

Procedure

Have upper grade students read pages 320-321 in *Discover God's Creation*. Have them complete the Thinking Skills activity on page 326. If time permits, require students to do one of the Research projects on page 327.

Meanwhile, engage lower grade students in a discussion about the importance of eating on a regular schedule and of the consequences of eating junk food. Provide students with magazines and assign them to cut out pictures of food and then sort them into three piles--healthy food, junk food, not sure. After they have had some time for cutting out the pictures, call them together and help them sort the pictures of foods which they were unsure how to classify. Have them create posters displaying healthy and "junk" foods.

Evaluation
Evaluate students based on their completed assignments.

Homework
Have lower grade students complete a copy of the My Pyramid Worksheet.
Copy the information from the back of a Sun Chips bag and regular potato chips. Have students compare both kinds of potato chips. Is one more healthy than the other?

Day 8 Vegetarian Diet and Proper Nutrition

Objectives
Lower grades: explain how proper nutrition is related to good health; understand the principles of a vegetarian diet.
Upper grades: define calorie; explain the relationship between calories and metabolic rate; explain how weight can be managed; identify common eating disorders; explain the dangers of eating disorders.

Materials Needed
Lower grades: copies of worksheets, one per student or pair of students.
Upper grades: resources of research
Both: food samples or pictures of them (candy bar, celery, cereal, French fries, orange juice, soft drink, steak, vegemeat)

Review/Introduction
Using a cooperative structure, review previously taught skills and concepts.
Explain that a calorie is a unit for measuring the amount of energy produced by a food. Have volunteers each hold one of the food items or pictures. Have the remaining class members sequence them in order from least calories per serving to most calories per serving. (If class size does not permit students to hold the foods or pictures, simply have students move the foods rather than have the students holding the foods.)





Procedure

Have upper grade students read *Discover God's Creation,* pages 322-325 and then choose one of the research projects listed on page 327 of the textbook to complete.

Meanwhile, play the "devil's advocate" with lower grade students, telling them that you have been thinking about it and have decided that you are going to eat Fruit Loops every day for breakfast, potato chips and soda for lunch and ice cream for supper. Ask them what they think about this plan. From the discussion help them to see the connection between good dietary choices and good health. Help younger students to know that you have "seen the light" and will make good choices. Ask them what foods they think were eaten when God first created Adam and Eve and gave them a perfect world and perfect foods (fruits, nuts and grains). Ask students to explain why they didn't eat chicken or deer in the garden (because it was never God's plan that animals should die, and these foods were not the ones which were best for the bodies God created). Discuss why these foods were permitted after the flood (vegetation was destroyed by the flood). Have students complete the accompanying Venn diagram comparing and contrasting the human diet before sin and after sin entered. Though many first grade students may complete this with a partner, a modified worksheet is provided for those first grade students who may benefit from it.

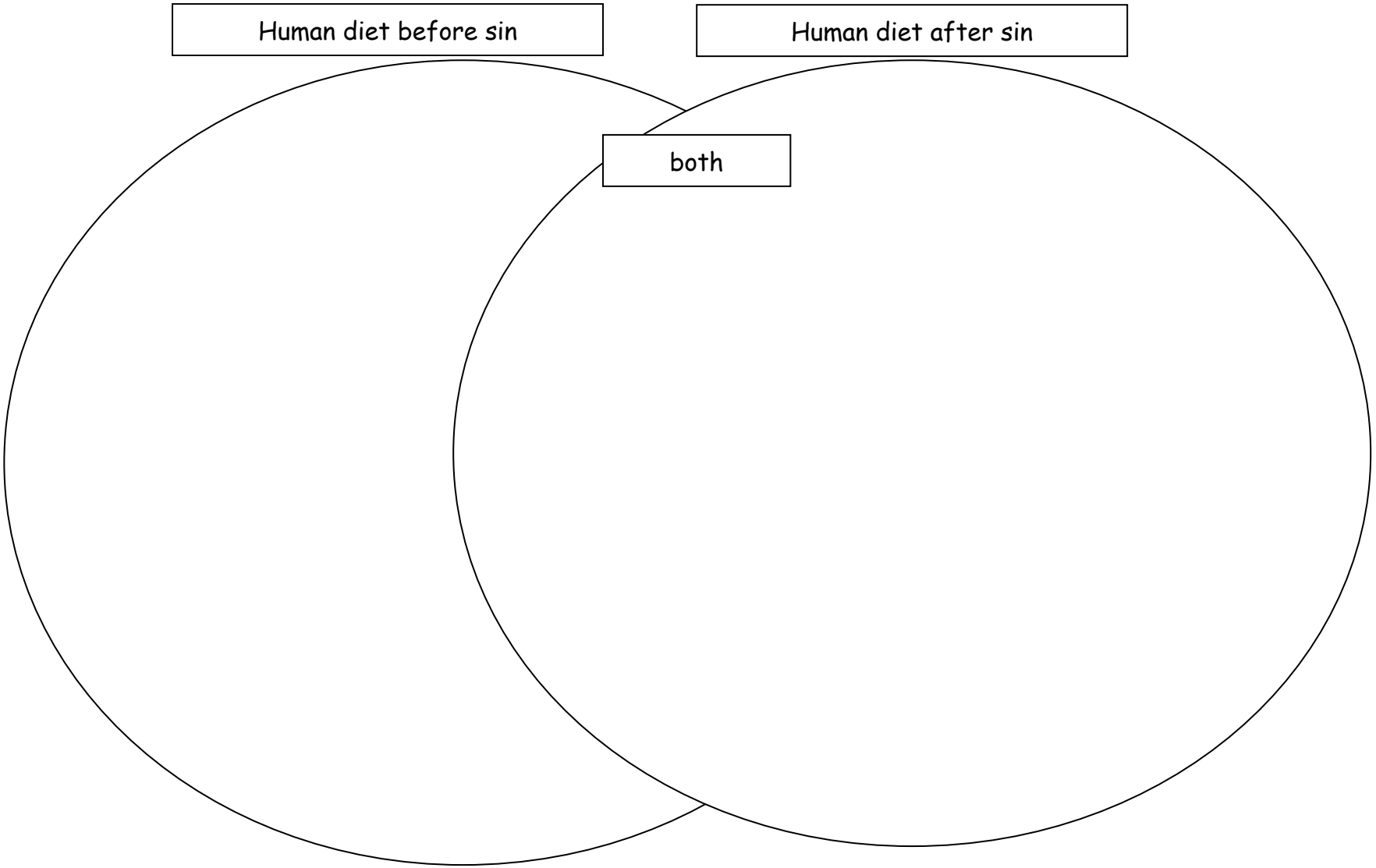
Evaluation

Evaluate students based on their completed assignments.

Homework

Have students (determine whether to involve all students or only lower grade students) bring in a favorite vegetarian recipe from home. Have some or all upper grade students work to compile the recipes into a cookbook and publish it. In fulfillment of Christian service requirements, consider having students sell the book to raise money for ADRA or another organization involved with hunger relief.

Name_____ Venn Diagram Diet of Man

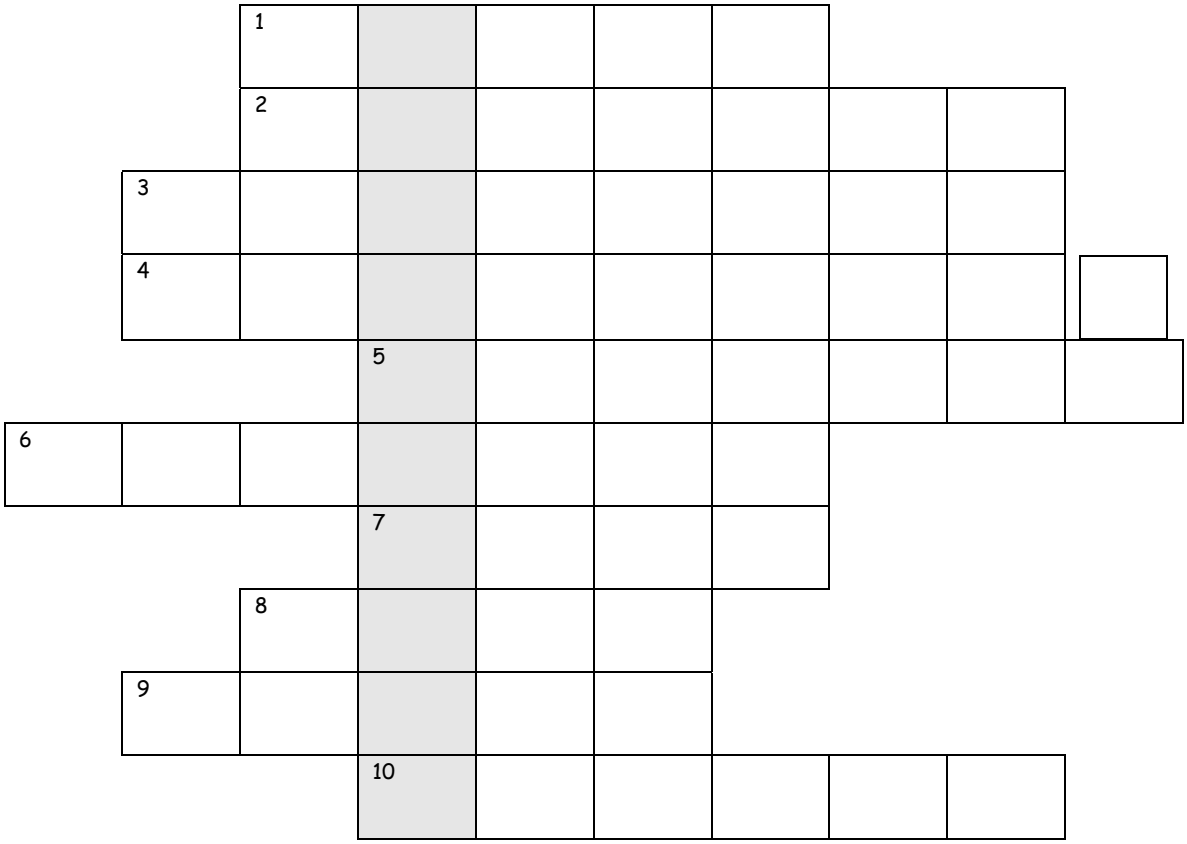


Name _____ **Chart of Foods Before and After Eden**

Foods in the Garden of Eden:	Foods after sin entered the world:

Food and Digestion Crossword

Name: _____



1. Our bodies cannot digest this (5)
2. Chemicals that speed up chemical reactions (7)
3. An important part of a balanced diet. They are only needed in small amounts (8)
4. The process by which feces are removed from our bodies (9)
5. The organ connected to the mouth by the esophagus (7)
6. The food group needed for growth and repair (7)
7. A mineral required to make red blood cells (4)
8. The last organ in the digestive system (4)
9. They break down food mechanically (5)
10. This mixes in with food and helps it to move through the esophagus (6)

THE KEY WORD IS _____

Food and Digestion Crossword Key

	1 F	I	B	E	R			
	2 E	N	Z	Y	M	E	S	
3 V	I	T	A	M	I	N	S	
4 B	R	E	A	K	D	O	W	N
		5 S	T	O	M	A	C	H
6 P	R	O	T	E	I	N		
			7 I	R	O	N		
	8 A	N	U	S				
9 T	E	E	T	H				
		10 S	A	L	I	V	A	

1. Our bodies cannot digest this (5)
2. Chemicals that speed up chemical reactions (7)
3. An important part of a balanced diet. They are only needed in small amounts (8)
4. The process by which feces are removed from our bodies (8)
5. The organ connected to the mouth by the esophagus (7)
6. The food group needed for growth and repair (7)
7. A mineral required to make red blood cells (4)
8. The last organ in the digestive system (4)
9. They break down food mechanically (5)
10. This mixes in with food and helps it to move through the esophagus (6)

THE KEY WORD IS <u>INTESTINES</u>

Math Project

Nutritional Budgeting

Objectives: To assist students in learning how to develop a weekly menu, stay within a budget of one-hundred forty dollars (feeding a family of four), and applying the menu to the Food Guide Pyramid. Students will also begin to understand how to stretch meals.

Suggested Grade Level: 6-12

Materials Needed: Food Guide Pyramid, grocery store flyers, paper, pencils

Project Description:

Students will work cooperatively in groups of three or four.

Each group will be assigned a specific type of family for whom they will be responsible (example - 2 parents, 1 teen boy, 1 infant) . Each group should decide whether the family will be vegetarian or not.

Suggestions for families:

2 adults, two toddlers

2 adults, one teenage boy, one infant

1 adult, one teenage boy, one teenage girl, one toddler

1 adult with a special diet (diabetic), another adult, one teenage girl, one toddler.

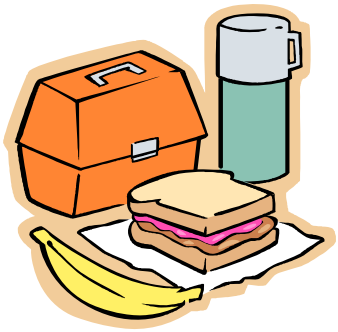
Each group will be required to stay within a budget of $140 for one week's food items. (Give each group grocery store flyers with food items and prices on them) Point out to them that if they want something like cereal in the morning they will need cereal AND milk and perhaps sugar. Peanut butter toast takes peanut butter AND bread.

Assume that the family has the basic condiments such as salt, ketchup, mayonnaise, mustard, or any sauces special to the family. Use the meal planning sheets to help.

Menus should meet the daily nutritional requirements identified in the Food Guide Pyramid.

Menus should meet the needs of individual family members (formula, baby food, etc.).

Menus should include breakfast, lunch, dinner, and snacks for seven full days.


If this proves too difficult, reduce the number of days and multiply by $20 a day.

Assessment Ideas:

All meals should be taken out of budgeted money, show three meals a day plus snacks, meet the needs of all family members, and follow the food guide pyramid for balance and preference.

Students will show their weekly shopping list, with prices of the food, to the class, staying within the budgeted amount of $140.

End with a comparison among the groups. Which families had difficulties stretching their food budget? How were some of the problems solved? (stews and soups, planned leftovers, coupons, sales) How could a person supplement a food budget? (gardening, trading)

MEAL PLANNING FOR ONE DAY

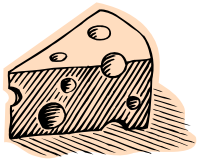
MENU

BREAKFAST	LUNCH/DINNER	DINNER/SUPPER	SNACKS

SHOPPING LIST & PRICES:

Teaching Through Physical Activities

Activity: Locomotion to Nutrition (Low Fat/High Fat Foods)



Academic content: Health and Nutrition

Purpose of Activity: Eating foods low in fat is an important concept. Start them hopping on the path to a low fat diet and help them live longer and healthier lives.
Suggested Grade Level: 2nd and Up

Materials Needed: Pictures of food dishes mounted on heavy poster board (about 5" X 5" in size), cones for general space

Physical activity: Locomotor patterns such as running, hopping, skipping, jumping, walking, one-legged hopping.

Description of Idea

Place pictures of different food dishes in a circle around the playing area. Make sure they are on fairly heavy paper so they don't blow around. The students stand in the center of the space with their backs to each other. At the signal, students "hop" to the nearest food. Each student (or set of students) picks up the picture, and taking turns, announces whether it is a low or high fat food. On your signal they put the picture down and go back to the center with another type of locomotion.

After each student is back in the center, another signal is given for a different type of locomotion. Students must now go to a different picture, where the same procedure is followed. Continue as long as possible using different forms of locomotion.

This is a great way for you to check for nutritional understanding of your students.

Activity: Dribbling for Nutrition

Academic content: Health and Nutrition

Purpose of Activity: To practice reading food labels and determining the correct number of carbohydrates in a single serving. To improve dribbling skills.

Prerequisites: Instruction and practice in dribbling. General understanding of nutrition labels.

Suggested Grade Level: 3-5

Materials Needed: The teacher should collect enough nutrition labels for each student in the class. Have a wide variety of foods including soda pop, two kinds of candy bars, vegetables, fruit, and cereals. Food labels should show different numbers of carbohydrates.

Make a master list of all nutrition labels and the number of carbohydrate grams per serving. Balls of various sizes so each student may choose. Cones or other objects to place nutrition labels under. Upbeat music.

Physical activity: Dribbling

Activity:

The students will review the general form of a nutrition label off of any food. A short discussion of the importance of carbohydrates in the diet needs to be reviewed. Each student will choose the size ball that they are comfortable with and the teacher will give each student a card with a number of carbohydrates from each label.

On the "go" signal, the music begins, and all students must dribble to the different cones and look under them until they find the nutrition label that has their designated number of carbohydrate or fat grams.

Upon finding the right label they dribble to the teacher, show him the label, and name the food, and the designated number of carbohydrate grams. Then the labels should be placed in order from low carb to high carb.

Assessment Ideas:

Teacher observation of correct body position for dribbling. Verbal and visual demonstration by the student of the carbohydrate and fat gram content on their food label, and recognition of the best source of carbohydrates for immediate energy production.

Activity: Candy Bar Fractions

Academic content: Math, P.E., Health

Purpose of Activity: To give students a clearer understanding of the relationship between caloric expenditure and exercise. Also, to give students a real world use for fractions as they relate to daily life.

Prerequisites: Knowledge of how to program a pedometer which gives a calorie expenditure. Basic understanding of fractions and division. Experience participating in aerobic activities. Knowledge of how to read the nutrition label.

Suggested Grade Level: 4-5

Materials Needed: Candy bars which are scored to easily divide into fractional parts, Pedometers which calculate caloric expenditure.

Physical activity: cardiovascular fitness

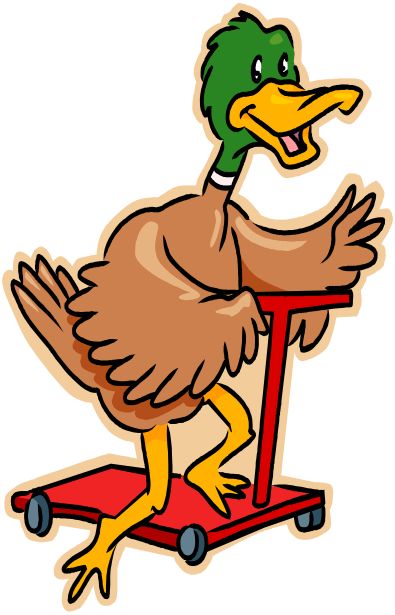
Activity Procedure:

After an introduction/review of fractions, students are each given a candy bar or other segmented food which can be easily divided into parts. Each student studies the nutrition label and determines how many calories are in each scored part. The students then research how many calories they can burn in a PE class of using different activities like aerobics, jumping rope, riding a scooter, shooting baskets or walking. The students participate in a class using one of the activities (or students may choose) wearing the pedometers.

At the end of class, each student records his or her caloric expenditure. Students may then eat only as many fractional pieces of the candy/food which would be equivalent to the calories burned.

Variations:

Any food which is scored could be substituted for candy. Diabetic children can use crackers. Calculators may be used. Any fat-burning activity could be used, so the lesson is very adaptable.



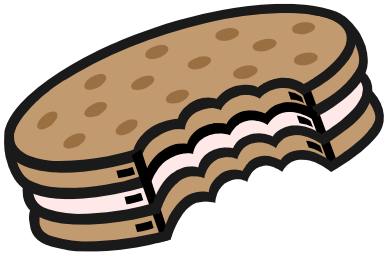
Assessment Ideas:

Have children write about the experience. Most are surprised at how much exercise is needed to burn even a portion of a candy bar. Students can write up the activity as a lab-type report and record personal data. Papers can be written from a variety of perspectives, depending upon the level of the students. Action plans for healthy eating can also be written to assess student understanding of the caloric content of foods.

Activity: Oh That Gross Digestive System!

Purpose of Event: The purpose of this activity to give students an understanding of the main components of the digestive system and how the system takes the food we eat and converts it into energy.

Suggested Grade Level: 3-5



Materials Needed: A clear plastic sandwich bag for every student, an Arrowroot cookie for every student, at least one crawling tunnel, a parachute, a 20-foot-long thin rope, a 10 foot long thick rope, 10 cones. An individual- sized trampoline is nice but not necessary.

Activity:

To introduce the activity, ask the students what they know about the digestive system. Make sure that you explain that the digestive system contains organs and tissues that work together to turn the food we eat into energy.

Explain the digestive process by giving each student a plastic sandwich bag and an Arrowroot cookie. The plastic bag represents the stomach, and the cookie is the food that you eat.

Place the cookie into the bag. Add about 2 oz. of water to the bag. This water symbolizes the gastric juices in the stomach. Very quickly the cookie will begin to break down into very small pieces. This shows food breaking down in the stomach.

Introduce the stages of digesting food from the mouth to the bloodstream and out the other end. The first step is the chewing which you can recreate by jumping on the trampoline, jump roping, or simply jumping up and down. It is very important that the students understand what each section of the course signifies. You may have the students shout out what is taking place.

Now that students (representing the food) have been chewed and formed a bolus, they will crawl through the crawling tunnel (esophagus) through contractions called peristalsis.

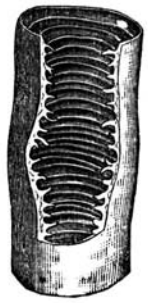
Next, half of the students will crawl under the parachute (stomach) while the other half shakes it digesting the food. After thirty seconds, switch roles so that all of the food can be properly digested.

The food will then travel to the small intestine, which is the 20 foot long skinny rope. Place the rope on the ground in a tight curved pathway. At various points along this rope create a large circle and place the five cones representing the nutrients being absorbed into the bloodstream. The students will march through the small intestine following the rope pathway.

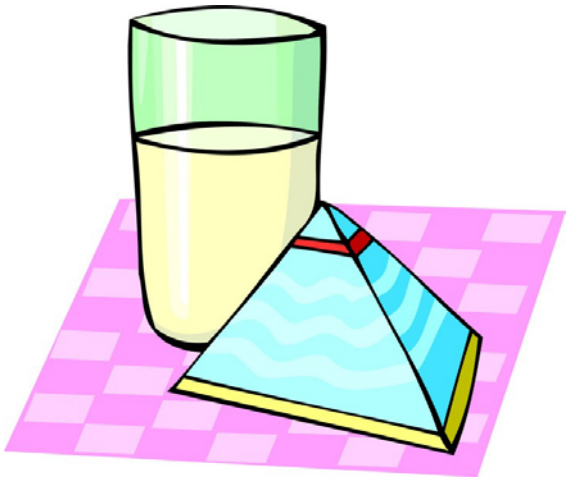
Choose about half of the students to be nutrients. On your signal they are to leave the small intestine and jog around the circle of cones. This is where the food passes through the walls of the intestines and into the bloodstream.

The remaining students then move on to the large intestine represented by the 10-foot-long thicker rope. The rope is on the ground surrounding the small intestines in a shape similar to the real thing. This part of the food was not needed in the body and will be removed as waste. Your students will really have a great time jumping out at the end of the large intestine as you know what!

Assessment Ideas:



Assess by asking questions as the students go along: What is this tunnel called in the body? (esophagus). When all students have gone through, do a Follow-the-leader activity where students take turns leading and explaining the steps to digestion as they go through.



Resources for Digestion and Nutrition

Some resources which are of value in teaching this unit include the following:

Jaw Breakers and Heart Thumpers published by AIMS Education Foundation is a collection of activities integrating math and science. It is designed for grades 3-5 and is relatively inexpensive. To order call 1.888.733.2467 or go to www.aimsedu.org.

Other AIMS materials which are downloadable and printable for a very reasonable cost include:

- Pyramid of Choices (included in *Jaw Breakers and Heart Thumpers)*
- Blue-Ribbon Lunch
- Vitamin Rainbow
- Grains Reign
- Produce Picks
- Casing the System
- Sweet Retreat

Nutrition lesson plans are available on line at www.mypyramid.gov/. Hard copies of the materials can be ordered through the same site and include a CD with a food pyramid game for students as well as other resources (food pyramid poster and another CD with songs, etc.).