COOPERATION
Week 3

Cooperation

Working well together.

The Three Gets

Cooperation Systems of the Body Week 1

1. Get up 45 minutes before your children get up.
2. Get dressed with make-up on.
3. Get dinner started.

Objectives

Cooperation Systems of the Body Week 3

General Objectives

- To learn about the muscle and endocrine systems
- To see cooperation among systems of the human body
- To introduce the human anatomy
- To emphasize God's design in the human body
- To learn how to research about the body

Specific Objectives

- To learn about the muscles and their names
- To make a model of arm muscles and test reflexes
- To learn difference in voluntary and involuntary
- To examine muscle fibers in chicken and steak
- To learn difference between endocrine and exocrine
- To learn the location and function of each gland
- To study about dwarfs and giants
- To learn the difference between hypo and hyper
- To test for sugar in the urine
- To learn about muscular and endocrine diseases
- To continue writing novel on traveling through the body
- To add muscles and endocrine system to body roll-out

8 Weeks Focus

Cooperation Systems of the Body Week 1

- **Activities**
- **Body roll-out**
- **Book**
- **Research**
- **Cooperation→Design**

Alert!

Cooperation Systems of the Body Week 3

- Urine test for sugar for Friday (Week 3)
- Locate source for pig or cow heart to dissect (Sheep's heart - Tobin's Lab) (Week 6)
- Locate source for pig or cow lungs to investigate (Week 7)

Weekly Supplies

Cooperation Systems of the Body Week 3

- Clear contact paper and Velcro
- Paper, pencil, compass, markers for circle graph 2 (p.23) + 27 (p.27)
- Mirror for face muscle exercises 8 (p.25)
- Construction paper for Body roll-out chart
- Paper clip and paring knife for muscle twitching 21 (p.26)
- Chicken, glass or microscope slides, magnifying glass, blue and red food color, alcohol, ice pick or darning needle 16 (p.26)
- Ice cubes for freezing effect on handwriting 27 (p.27)
- Steak and knife 17 (p.26)
- 3 rubber bands, 3 cardboard rolls, paper clip, long balloons for functioning arm 19 (p.26)
- Index cards, markers for gland names 1 (p.81) + 4 (p.82)
- Calculator to figure hormone amounts in blood 27 (p.27)
- Scale and tape measure for body size comparisons 13 (p.83)
- Plastic cup, urine sugar test strips 27 (p.86)

Bible Verse

Cooperation Systems of the Body Week 3

The story of a strong man with muscles…the story of Samson.

Judges 13-16

Focus Books

Cooperation Systems of the Body Week 3

A *Blood and Guts: A Working Guide to Your Own Insides* by Linda Allison (A must!)

* *The Human Body* by Bruun and Bruun (excellent!)

M *Understanding Your Body* by Rebecca Treays and Christyan Fox (3-4 grade)

Understanding Your Muscles and Bones Rebecca Treays and Christyan Fox

Y *Jack and the Beanstalk*

Your Body by Stephanie Turnbull and Adam Larkum

Flip-Flap Body Book by Alastair Smith, Judy Tatchell, Maria Wheatley, and Ruth Russel

Inspector Bodyguard: Patrols the Land of U by Vicki Cobb

You Can't Make a Move Without Your Muscles, by Paul Showers

Websites

Cooperation Systems of the Body Week 3

- http://kidshealth.org/parent/general/body_basics/endocrine.html (Diagram of endocrine sys.)
- http://www.innerbody.com/image/musfov.html
  (Great interactive view of muscles)
- http://kidshealth.org/kid/htbw/_bfs_ESactivity.html
  (Take test to "Name that Gland")
- http://kidshealth.org/kid/htbw/endocrine.html
  (Easy overview of endocrine system)
- http://www.becomehealthynow.com/article/bodyendocrine/734/#cortisol (Great website for all body)

Writing Assignment

Cooperation Systems of the Body Week 3

Y-M-O 23 (p.9) Write and illustrate a book about traveling through the body.

- This week begin writing.
- Finish writing your intro about how voyagers get in the human body AND finish writing one adventure the body adventurers have in the body.
- Illustrate what you have written.

Writing Tips

Cooperation Systems of the Body Week 3

- Share your 10 ideas on the e-loop.
- Game plan:
  - If you write 2 adventures per week, by Week 6 you will have six adventures and a closing, because Week 6 you will only write one adventure plus closing.
  - Option: Write only one adventure per week and end up with four adventures and a closing by Week 6.
  - Week 7 is for editing, cleaning up, re-drawing, designing the cover and title page, printing, binding.
  - Week 8 is for practicing reading the adventure novel like poetry reading in a coffee house to a large group. This will be our show-and-tell about body.

Muscle Phrases

Cooperation Systems of the Body Week 3

- "Muscle Bound" – so muscular that the individual can hardly move
- "Put a little muscle into it" – try harder
- "Muscle head" – no brain/no thinking
- "Muscle car" – large engine/light body
- "Muscle his way into the group" – not invited, just moved in on his own
- "Let me see your muscle" – contract upper arm to show of large biceps

Timeline Characters

Cooperation Systems of the Body Week 3

Paul the Apostle
David and Goliath
Samson
Hercules
Jack and the Beanstalk
Arnold Schwarzenegger

Importance of Compartments

Cooperation Systems of the Body Week 3

Compartments are boxes where related information goes…

Without compartments, you have no place to put information to retrieve it

Vocabulary

Cooperation Systems of the Body Week 3

Muscles

Head/ Neck:
- Temporalis
- Masseter
- Tongue
- Sternocleidomastoid (neck)

Torso:
- Deltoids (shoulder)
- Trapezius
- Latissimus dorsi
- Gluteus maximus ("spanking muscle")
- Pectorals (chest)
- Abdominal

Limbs:
- Biceps (anterior upper arm)
- Triceps (posterior upper arm)
- Quadriceps (front thigh)
- Sartorius (upper leg- longest muscle in body)
- Biceps Femoris – (back of thigh "hamstring")
- Tibialis anterior
- Gastrocnemius (calf)

Heart

Diaphragm

Vocabulary (cont'd 2)

Cooperation Systems of the Body Week 3

Muscle Movement

Muscle

Voluntary (conscious)

Involuntary (unconscious)

Contract = Flex (tighten muscle)

Relax (opposite of tighten)

Reflex (involuntary muscle movement)

Types of Muscles

Cardiac

Smooth

Skeletal

Muscle Parts

Fibril

Fiber

Muscle Problems

Pull (stretched too far)

Tear (stretched to tear)

Cramp (will not relax)

Charley horse (leg cramp)

Spasm (uncontrolled, abnormal muscle contractions)

Muscular dystrophy

Atrophy

Tendons

Achilles tendon

Vocabulary (cont'd 3)

Cooperation Systems of the Body Week 3

General

Gland

Endocrine glands (ductless)

Exocrine glands (duct)

Hormone ("excite")

Excite

Inhibit

Hyper- (too much)

Hypo- (too little)

Endocrine Glands

Hypothalamus

Pituitary Gland

- Anterior (front)
- Posterior (back)

Thyroid Gland

Adrenal Gland

Parathyroid Gland

Pancreas

Ovaries/Testes

Vocabulary (cont'd 4)

Cooperation Systems of the Body Week 3

Endocrine Hormones

Human growth hormone

Thyroxin

Adrenalin

Insulin

Estrogen

Testosterone

Endocrine Problems

Hypoglycemia

Diabetes

Goiter

Giant

Dwarf

Metabolism

How Deep to Learn

Cooperation Systems of the Body Week 3

All this information will be revisited in high school biology OR college botany

We are playing with the information OR familiarizing children with information

Not necessary to learn all names… those are given for parents to understand the concepts and make the divisions/classifications clearly IF THEY WANT TO AND IF THEIR CHILD CAN UNDERSTAND

Activities

Cooperation Systems of the Body Week 3

Monday: Muscles

Research parts of muscles and muscle cells.

2 (p.23) Draw circle graph. Show % body weight=muscles.

3 (p.23) Learn the major muscles of the body.

4 (p.23) Research bones each major muscles covers.

5 (p.24) Match types of muscles to organs they make up.

7 (p.25) Identify muscles by name as you exercise them.

8 (p.25) Use the muscles in your face by making faces.

9 (p.25) Research if smile/frown requires more muscles.

11 (P.25) List things impossible to do w/o hand/finger muscles

13 (p.25) Call out a muscle. Kids respond with function.

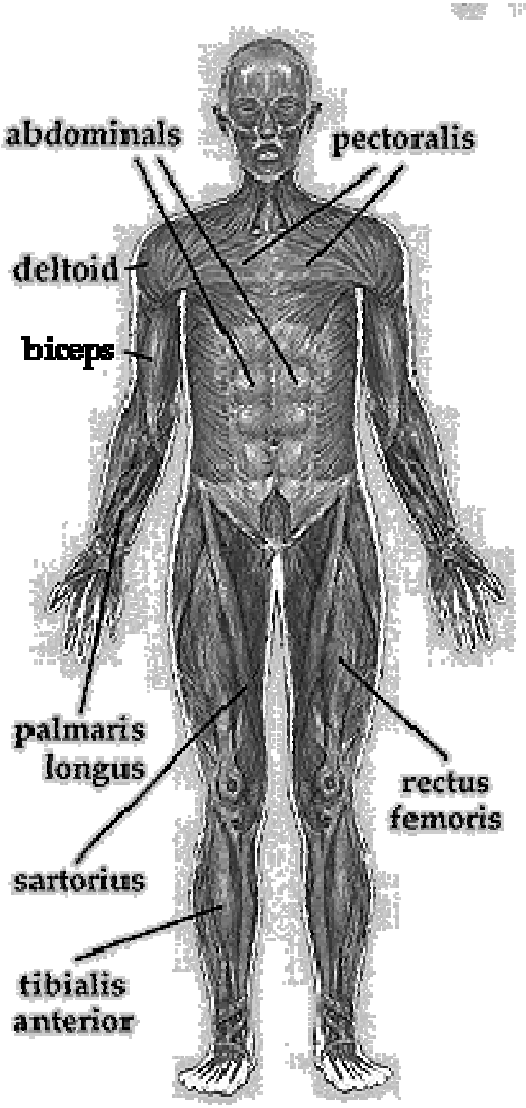
Muscle Parts

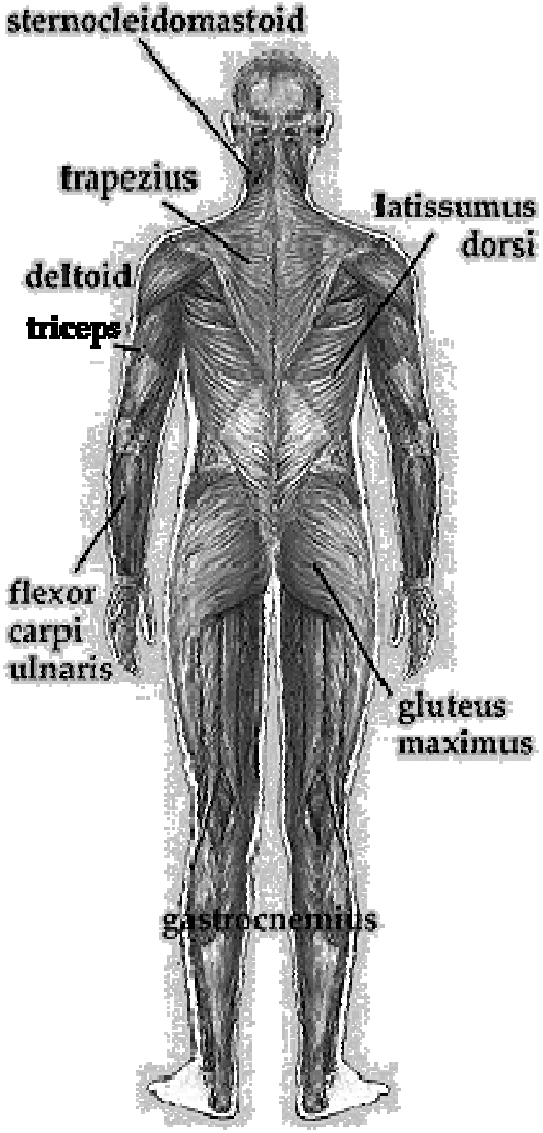
Cooperation Systems of the Body Week 3

- Fibril – individual cells
- Fiber – long strands of cells
- Muscle – bundles of muscle fibers

Muscles of the Body

Cooperation Systems of the Body Week 3





Major Muscles

Cooperation Systems of the Body Week 3

- Sternocleidomastoid (neck muscle)
- Deltoids (shoulder muscles)
- Pectorals (chest muscles)
- Heart (heart is a muscle)
- Biceps (anterior upper arm)
- Triceps (posterior upper arm)
- Abdominals (stomach muscles)
- Gluteus maximus ("spanking muscle")
- Quadriceps (front thigh)
- Sartorius (upper leg- longest muscle in body)
- Biceps Femoris (back of thigh "hamstring")
- Gastrocnemius (calf muscle)
- Tongue (most damaging of all of the muscles)

Activities (cont'd 2)

Cooperation Systems of the Body Week 3

Tuesday: Muscles

21 (p.26) Experiment w/ pairing knife and paper clip to show how your muscles are always contracting.

20 (p.26) Learn about involuntary muscles.

Distinguish between voluntary and involuntary muscles.

Define reflex and test yours and your brother's.

Research the 3 types of muscles and where they are.

Draw muscles on your body roll-out.

6 (p.25) Research the myth of Achilles.

27 (p.27) Change the temperature of your hand to see how temperature affects muscle contractions.

Test if legs or arms are stronger by walking on hands.

Voluntary vs. Involuntary

Cooperation Systems of the Body Week 3

VOLUNTARY

- Contract when you want them to.
- Your brain sends a message down the spinal cord to the nerves that tell your muscle what to do.
- Ex: tongue, bicep, gastrocnemius, hamstring

INVOLUNTARY

- Contract without you telling them to.
- Your brain automatically tells the muscle to work.
- Ex: stomach; heart, lungs, bladder, intestines
- Reflex is a kind of involuntary muscle action.

Types of Muscles

Cooperation Systems of the Body Week 3

- Cardiac – heart muscle; spontaneously active contracting/relaxing; involuntary
- Smooth – involuntary muscles lining stomach, intestines, uterus, bladder, large blood vessels; slow, sustained contraction
- Skeletal (Striped) – voluntary muscles that move your bones; made of straight pieces of thick and thin muscle fibers lying side by side.

Tendons

Cooperation Systems of the Body Week 3

- Attaches/hooks muscle to bones.
- Made of strong, fibrous material.
- Often bones will break before tendons tear.
- When you wiggle your fingers you can see the tendons in your hand moving.

Activities (cont'd 3)

Cooperation Systems of the Body Week 3

Wednesday: Muscle Movement and Disease

16 (p.26) Look at muscle of a chicken under a magnifying glass and identify the fibrils OR…

17 (p.26) Examine muscle fibers in steak piece.

Research muscle movement.

19 (p.26) Make a model of an arm to see how muscles contract when you move your arm.

Research how to build muscle size in your own body.

25 (p.27) Do chair pushups.

Research what causes muscle pain after exercise.

28 (p.28) Try different kinds of stretches to relax sore muscles.

10 (p.25) Younger, draw variety of facial expressions.

Research muscle diseases.

Muscle Movements in Pairs

Cooperation Systems of the Body Week 3

- **Muscle fibers can only pull...they cannot push.**
- **They must work in pairs.**
- **When two muscle groups work together, one muscle contracts while the other relaxes.**

Contraction = Flex		Relax
Bicep	→	tricep

Muscle Exercise Pain

Cooperation Systems of the Body Week 3

- When you exercise, your muscles use up stored energy.
- You breathe harder to take in more oxygen to burn more energy.
- As your body uses energy there is a by-product given off…lactic acid.
- The more the exercise, the more lactic acid that builds-up making it harder for your muscles to contract; they start to ache.
- Your body carries away the lactic acid after a few days, but sometimes it helps to warm down after exercise or to rub the lactic acid out.

Muscle Diseases

Cooperation Systems of the Body Week 3

Major

- Fibromyalgia (chronic widespread pain)
- Muscular Dystrophy (group of genetic, hereditary muscle diseases that cause progressive muscle weakness)
- Atrophy (decrease in muscle mass due to lack of use)

Minor

- Pull
- Tear
- Spasm
- Cramp
- Charlie Horse

How to Build Muscles

Cooperation Systems of the Body Week 3

- **Muscles grow by:**
  - **Gender – boys are stronger than girls; but girls are more flexible having more movement of muscles and joints**
  - **Exercise – muscle size and strength increases**
  - **Maturity – strength increases with age**
  - **Diet – muscles need protein from meat, fish, and vegetables; joints need fish or flaxseed oil**

Activities (cont'd 4)

Cooperation Systems of the Body Week 3

Thursday: Endocrine Function and Exocrine

Explain the endocrine system using juices.

1 (p.81) Separate glands into exocrine and endocrine.
2 (p.81) Calculate how much hormone is needed to produce a response in blood.
3 (p.81) Learn each gland and the hormone it produces.
4 (p.82) Hand a child a card with a gland on it; have them point to where it is on the body.
5 (p.83) Dramatize the effect a gland has on the body.
6 (p.83) Notice how your body reacts after spine-tingling story OR…
8 (p.83) Tell about waking up frightened from dream, OR…
10 (p.83) Chase your brother; see if adrenaline incr.
11 (p.83) Explain why athletes can run faster during a race than during practice.

Glands Make Hormones

Cooperation Systems of the Body Week 3

- Glands produce hormones
- Hormones are chemical messages (not electrical messages) which are sent to control organs
- Two types of glands:
  - Exocrine glands
  - Endocrine glands

Endocrine vs Exocrine

Cooperation Systems of the Body Week 3

Gland Type	Distribution method	Produces	
Endocrine Gland	Via bloodstream	Hormones	
Exocrine Gland	Via ducts/tubes	Sweat, oil, saliva, mucus, digestive juices	

EXOcrine "Juices"

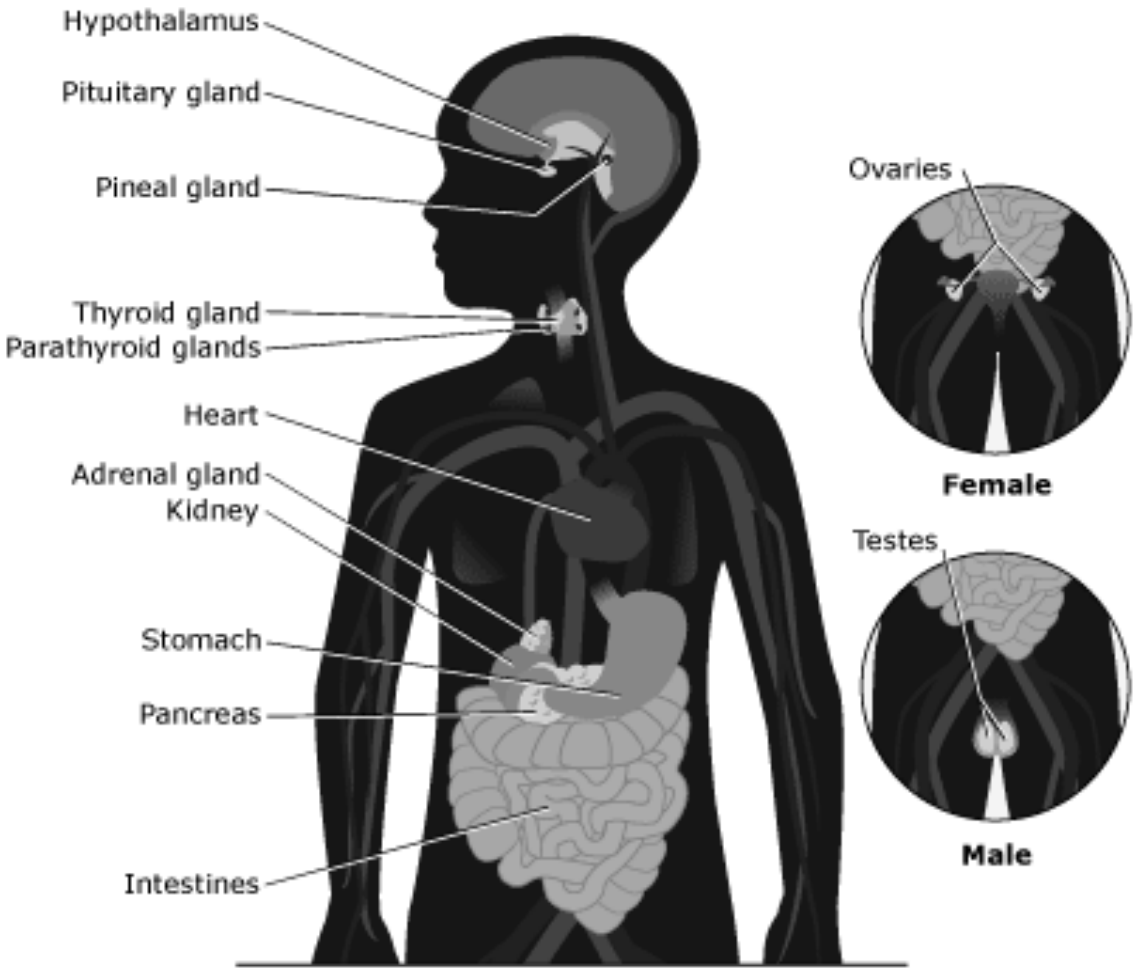
Cooperation Systems of the Body Week 3

Other organs secrete juices, but they are not part of Endocrine System, because they do not carry messages…they just DO a function

- Pancreas makes insulin
- Liver makes bile
- Stomach makes gastric juice
- Sex glands
  - Ovaries produce estrogen and progesterone
  - Testes produce testosterone
- Sweat glands make swear
- Salivary glands make saliva
- Tear glands make tears

Endocrine System

Cooperation Systems of the Body Week 3



From Wikipedia

Endocrine System

Cooperation Systems of the Body Week 3

Gland	Where It Is	What It Produces	What It Does
Hypo-thalamus	Base of brain	Hormones to Pituitary	Maintains body status quo (Controls hunger, sex drive, thirst, sleep, menstrual cycle) Regulates the Pituitary Gland
Pituitary	Base of brain	Human growth hormone Adrenocorticotrophic Total 6 hormones	Growth Controls other glands Master hormone maker
Adrenals	Above kidneys	Adrenaline	Readies you for fight/flight
Thyroid	Neck	Thyroxin	Affects growth/metabolism cells
Para-thyroids	Behind Thyroid lobes	Parathyroid hormone	Regulates calcium + phosphorus
Thymus	Under sternum		Influences lymph system in child
Pineal	Base of brain		Inhibits sex drive until puberty

Hormone Paths

Cooperation Systems of the Body Week 3

1. Hypothalamus → hormone →
2. Pituitary → 6 hormones → blood
3. To organs like:
   - Mother's ovaries to start egg release
   - Thyroid → hormone → incr. body temp.
   - Mother's mammary glands → milk
   - Adrenal → hormone → metabolism
   - Bloodstream → hormone → retain water

Activities (cont'd 5)

Cooperation Systems of the Body Week 3

Friday: Endocrine Problems

Add the Endocrine glands to your body roll-out.

13 (p.83) Measure and weigh other children your age to see the results of different amounts of growth hormone.

17 (p.85) Read about David and Goliath.

21 (p.85) Talk about how you would want people to treat you if you were a dwarf, OR…

23 (p.85) Imagine being 3 feet tall and the changes you would need to make, OR…

24 (p.85) Build a house for yourself as if you were 1 inch tall.

25 (p.85) Learn about hyperthyroidism and hypothyroidism and other problems of the endocrine system.

27 (p.86) Test amount of sugar in your urine.

Contrast Ideas for Understanding

Cooperation Systems of the Body Week 3

- Place confusing ideas side by side to highlight differences.
- Place opposite ideas side by side to highlight differences.

Dwarf vs. Giant

Cooperation Systems of the Body Week 3

- **Dwarfism**
  - Hypopituitarism
  - Hypo = "too little"
  - Too little of growth hormone produced by Pituitary Gland.
  - More common than gigantism.
- **Gigantism**
  - Hyperpituitarism
  - Hyper = "too much"
  - Too much of growth hormone produced by Pituitary Gland.
  - "Over"-growth usually in head, hands, and legs.

Could Confuse…

Cooperation Systems of the Body Week 3

Midget and Dwarf

- Midget is unusually short person because of genetics (inherited trait)
- Dwarf is unusually short person because of not enough growth hormone (malfunction of pituitary)

God's Design

Cooperation Systems of the Body Week 3

BALANCE

- Human body functions are perfectly balanced.
- Automatic shut off hormone production
- An imbalance (too much or too little of a hormone) brings disease.

MULTIPLE STEPS

- Glands produce hormones (message carriers) for specific purpose.
- Even in bloodstream, hormone finds its target.
- Target may be another gland in a chain reaction.
- Target has specific RIGHT response.

Permission Slip

Permission Coupon

Free pass to skip one activity or other assignment

(Feel free to copy as often as needed)

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Field Trips

Cooperation Systems of the Body Week 3

To the gym to work out

OR

to the park/playground to exercise

Suggestions for Dad

Cooperation Systems of the Body Week 3

- Demonstrate chair push ups and other exercises.
- Help the kids put muscles and glands on their body roll-outs. (Guide but do not do the work for them.)
- Quiz them on their muscle and gland knowledge
- Discuss sexual maturity with your boy(s)
- Discuss God's plan for the family. "And I will make thy seed to multiply as the stars of heaven."

Focus of the Week

Cooperation Systems of the Body Week 3

- Practicing cooperation
- Learning about the muscle and endocrine systems
- Recognizing cooperation among systems of the human body
- Recognizing God's design in the human body
- Learning how to research about the body
- Learning about the muscles and their names
- Making a model of arm muscles and test reflexes
- Learning the difference in voluntary and involuntary
- Examining muscle fibers in chicken and steak
- Learning the difference between endocrine and exocrine
- Studying endocrine system/learning how hormones work
- Learning about muscular and endocrine diseases
- Discussing being a giant or a dwarf
- Continuing writing novel on traveling through the body
- Adding muscles and endocrine system to body roll-out

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Thanks,

Wade and Jessica Hulcy