

R.E.A.L. SCIENCE ODYSSEY LIFE LEVEL ONE PREVIEW

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R.E.A.L. Science Odyssey

Life (level one)

PREVIEW

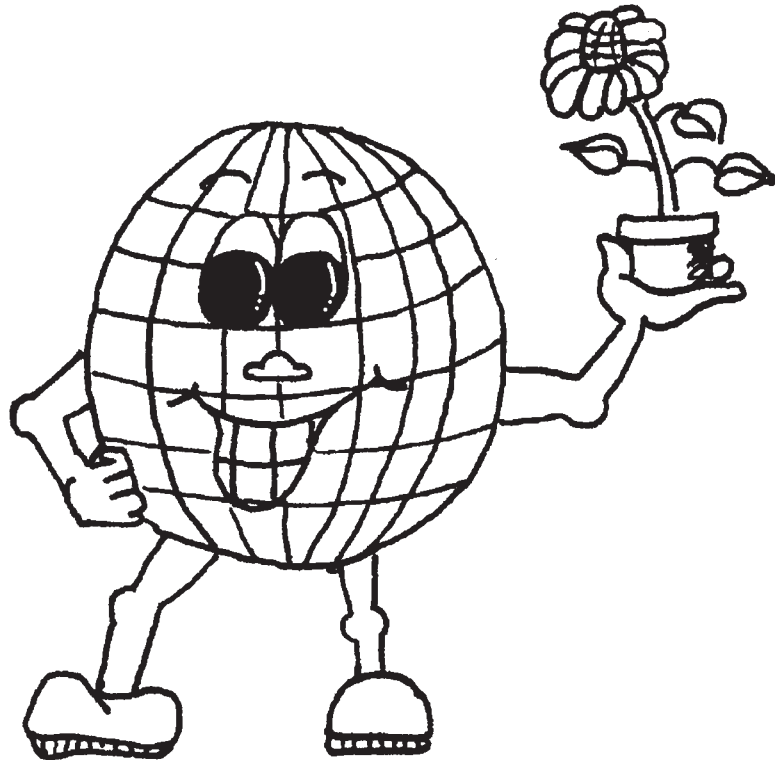


Life Science Curriculum

For Grades 1 – 4

Pandia Press
R.E.A.L. Science Odyssey

- Read
- Explore
- Absorb
- Learn



Life (level one)
PREVIEW

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by Terri Williams
www.PandiaPress.com

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WHAT'S IN THIS BOOK?



•Denotes the "For My Notebook" page

*Denotes a lab or activity

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AN INTRODUCTION TO R.E.A.L. Science

This book was intended to be used from start to finish, much like a math book, and as such, vocabulary and concepts build on one another. You may find words and concepts in here that you feel the need to "review and practice." Feel free to do that if you wish but understand that vocabulary words are repeated throughout the story sections so your children will hear the same words many times. This is intended to help them learn without having to drill. Having said that, review can be good and anytime you can use a concept to refer to something you see in real life, your child will benefit greatly. Eating fish for dinner (fish sticks excluded)? How about showing your child the gills under those gill flaps? Taking a walk in the country? Point out the different footprints you see in the mud. Are they bird, reptile or amphibian? Next time you eat an egg talk about the cell that it is. Use real words for body parts. Babies grow up in a uterus, not a tummy. Science is only a foreign language if it isn't used in real life.

Used two or three times a week this book is a complete, rigorous, vocabulary rich life science curriculum that needs no supplementation. It is not a collection of labs to do randomly and with no flow from one to the other nor is it an overwhelmingly long progressions of trivial facts to be memorized and forgotten (like we grew up with). This book was designed with the non-science parent in mind, so you could pick it up and follow along with no need for further organizing or research. This is the story of life, beginning with the child's own body for reference. This book is a minds-on and hands-on program. If you hate to touch "bugs," wouldn't think about letting your child handle worms and have no intention of getting gooey and dirty, RUN NOW! Science is about experimentation, but there are read and report science curricula for the faint of heart. Are you still here? If so, roll up those sleeves and get ready to turn every household container into a critter keeper.

For every notebook page in this book, children will do 1-4 activities that build upon and reinforce what they have heard. Labs also teach new material so it is important to try to do all of the labs included. In addition, we have included journaling ideas plus book and website suggestions for a complete indoor and outdoor experience and to dig into whatever your child finds most fascinating. You will notice that many labs are infused with grammar age appropriate math. Science is very mathematical with measuring, graphing and calculating. If your child struggles with the math or with writing the results, don't let the lab papers overwhelm the lesson. The idea is to enjoy science. Much of the learning comes from doing and discussing. Read the questions to the prewriting child and have him dictate the answers back to you or if you both find them tedious, skip them altogether.

A few words about big words. You know the ones I mean: monocot, chloroplast, echinoderm - EEEK! It's enough to make a person drop their science book and run in fear. Now, let me share a few more with you. How about Tyrannosaurus Rex, Triceratops and Velociraptor? All very long words that we have learned right along with our 3 and 4 year olds. Show no fear in the face of these latin based words and you too will be referring to arachnids at your next park day!

GETTING STARTED

1. If you are a computer person, pull out the website list (pgs. 17-18) and leave it by your computer so you can look things up as your child shows interest.
2. If you are a book person, pull out the library book list (pgs. 13-16) and go over it a few weeks before you do any given section. Leave it in your library book bag or by your computer so you can check on the availability of the books.

3. If you are a nervous "Did I teach my child enough stuff" type of person, go over the "What's the Big Idea" pages in this book. It will tell you what sorts of things your child should come out of this course knowing. Use it with a grain of salt. Remember, the key here is exposure and fun.

4. Look ahead to what material you will need for the upcoming week or year if you're an uber-planner! It could be an egg, a piece of tagboard or an earthworm. All required materials are listed on pages 9-10 for easy reference. Be prepared. A few items need to be ordered as much as 3 weeks in advance.

5. Read the "For My Notebook" section to yourself once so you know how to pronounce the new words in it. Pronunciation of all words that I think you might not know are included right there so you can read them as you go but you may need to look up something I haven't thought of. I'm sorry I don't know you that well.

6. Curl up under that weeping willow or in front of the fire and read the "For My Notebook" page to your child, even if they can read by themselves. There is one for each major topic. Pause to do whatever it tells you to—looking at a fish, finding a spider etc. The notebook pages are written to your child and should be saved in his own notebook. They are purposely short so you can go right from the notebook page to the first activity if you would like.

7. In a couple days do the second activity, or do the story page on day one and each activity on a separate day for 3 shorter doses of science each week.

8. Follow up with a day of nature journaling, reading from the extra reading list or drawing. Drawing is an important skill for many scientists, in the field or lab.

9. Have fun. And did I mention you should have fun?

SOME UNIQUE HELPERS IN THIS BOOK

ON THE STORY PAGE:

1. All student pages have a boxed outline around the material presented. That way it is easy to identify what is for the child and what is for the teacher.

2. You'll find all new vocabulary words underlined

3. All vocabulary that has appeared previously will be in italics. These will also have a reference at the bottom of the page to tell you which notebook page to go to in order to read about them again. You'll notice most of the new vocabulary doesn't have a classic dictionary definition. Instead the explanation is usually given in context so it is "felt" and not memorized.

4. All vocabulary is also listed in alphabetical order at the back of the book. This way, if you want a "dictionary definition" you can find it there.

ON THE INSTRUCTIONS PAGE:

1. The instruction page is really for the parent/teacher but the procedure is written as if for the student. I have no way of knowing how capable your child is so I leave it up to you to decide which steps you want your child to participate in (disclaimer).

2. Each instruction page includes a prompt to read aloud to your child. This is for the parent who wants it. If you hate those prompts, don't sweat it. I'll never know if you read them to your child or not.

WHAT'S THE BIG IDEA?

Whenever you study a subject you have main ideas to learn and little details that are a nice bonus. It's true that science has a lot of new vocabulary and information. If you are using a classical education approach to teaching you will cover every subject three times throughout your child's education. Because of this, don't sweat the small stuff. There are many challenging words in here that are used because they are the right words and after hearing them over and over they will "sink in." They are not here for your child to memorize the first time around.

This outline gives you the big idea that your child should get from each section and the small stuff that is an added bonus. If you and your child are timid scientists, just have fun as you try to learn the big ideas. If you and your child have a strong science background, work on learning the small stuff as well as the big ideas. Use these difficult words and science concepts gently, not with force and your child will enjoy his science experience.

BI = BIG IDEA

SS = SMALL STUFF

WHAT IS LIFE:

BI = Living things are made of cells

You can tell living things from nonliving things by what they can do

SS = Living things all 1. Take in energy 2. Get rid of waste 3. Move 4. Grow 5. Reproduce
6. Have circulation 7. Have respiration 8. Respond to their environment 9. Are made of cells

LIVING THINGS ARE MADE OF CELLS:

BI = Living things are made of cells.

Cells come in many different sizes and shapes but are usually too small to see.

SS = Plant cells are usually rectangular and animals cells are typically rounded.

Plant cells have chloroplast that make the plant green and make food for the plant.

The nucleus is the control center of the cell.

SKELETAL AND MUSCULAR SYSTEMS:

BI = Bones support you and make up the skeletal system.

Muscles move you and make up the muscular system.

Muscles can only pull, not push. Therefore they work in pairs to pull back and forth.

SS = Some of the major bones are the skull, ribs, humerus, femur, vertebrae, pelvis and patella.

CIRCULATORY SYSTEM:

BI = Your circulatory system is made of your heart, arteries and veins.

Your heart is a muscle that forces blood to every part of your body.

Blood carries food, water and oxygen to the cells.

The harder you exercise, the harder your heart works.

Blood is a mixture of 4 different things.

SS = Arteries carry blood away from your heart. Veins carry blood back to your heart.

White blood cells fight bacteria. Red blood cells carry oxygen. Plasma carries food.

Platelets seal up cuts to stop the bleeding.

RESPIRATORY SYSTEM:

BI = You breathe oxygen into your lungs.

This oxygen goes into your blood and then to every part of your body.

The harder you exercise the more oxygen you need so the faster you breathe.

SS = Air goes into your trachea and then to your lungs.

Carbon dioxide is traded for the oxygen in your lungs. You breathe out carbon dioxide.

DIGESTIVE SYSTEM:

- BI = Your teeth, *esophagus*, *stomach* and *intestines* make up your digestive system.
Your digestive system is much longer than you are tall. It is twisted and coiled to fit into your body.
Your digestive system takes the food you eat, saves the nutrients and water that your body needs and sends the rest back out of your body.
- SS = The digestive system uses special chemicals to help dissolve food.
Your body needs a variety of nutrients so eating a balanced diet is important for staying healthy.

NERVOUS SYSTEM:

- BI = Your brain, *spinal cord* and *nerves* make up your nervous system.
Your nervous system's job is to take in information and to tell your body what to do about the information.
Your five senses gather information. With your five senses you see, hear, smell, taste and feel the world around you.
- SS = People rely on some senses more than others. All animals have different senses that they favor.

GROWTH AND GENETICS:

- BI = Your body grows in stages.
Special messages in your cells determine how you will look and grow.
You inherit characteristics from your parents.
Except for identical twins, no two people are exactly alike.
- SS = Genes carry the messages you inherit from your parents.
You get a mix of genes from your mom and dad so you may show characteristics from each.
Everybody has a different set of fingerprints. No two people's are alike.

FIVE KINGDOMS:

- BI = Living things are grouped based on their characteristics.
Grouping living things helps us name, understand and communicate about them.
- SS = There are five kingdoms or groups of living things. Two are the plant and animal kingdoms.
Every living thing (discovered) has a scientific name which tells us its species.

CNIDARIA:

- BI = Some simple animals have no organs and look like plants.
- SS = Cnidarians are simple animals much like a hollow sack with stinging tentacles.
Corals, sea jellies and sea anemones are cnidarians.
Sea jellies go through metamorphosis and change from polyp form to medusa form.

WORMS:

- BI = Worms are long like a string and have no legs.
Earthworms are very helpful to people.
- SS = Worms can be flat, round or segmented.
Worms have organs inside.
Earthworms can tell many things about their environments.

MOLLUSKS:

BI = Soft bodied animals like snails and octopi are grouped together.

Some of these soft bodied animals have shells.

SS = Soft bodied animals are called mollusks. Most have a shell either inside or outside.

Mollusks include snails, slugs, octopi, squids, clams and oysters.

Mollusks have complex organs like people do.

ECHINODERM:

BI = Sand dollars, sea stars and sea urchins have spiny skin and are grouped together.

Spiny skinned animals have bodies that can be divided into 5 parts

SS = Spiny skinned animals are called echinoderms.

ARTHROPOD:

BI = Insects, spiders and lobsters all have jointed legs and divided bodies.

Insects have 6 legs and 3 body parts and most insects have wings. Spiders have 8

legs, 2 body parts and no wings. Lobsters and isopods have more than 8 legs.

Insects and other animals go through metamorphosis.

SS = Arthropods all have jointed legs, segmented bodies and an exoskeleton.

The major groups of arthropods are insects, arachnids and crustaceans.

Stages of complete metamorphosis are: egg, larvae, pupae, adult.

Spiders, ticks and scorpions are all arachnids.

Crustaceans have gills and most live in water.

CHORDATA:

BI = Invertebrates have no backbones. Vertebrates have backbones.

Animals with backbones are fish, amphibians, reptiles, birds and mammals.

SS = Backbones are called vertebrae. Vertebrae protect your spinal cord.

FISH:

BI = Fish have fins and scales, lay eggs and breathe through gills.

Fish are cold blooded.

SS = Cold blooded animals have the same temperature as the surrounding air or water.

Fish float at different depths by adjusting the amount of air in their swim bladders.

AMPHIBIANS:

BI = Frogs, toads and salamanders are amphibians.

Frogs and toads go through incomplete metamorphosis.

Amphibians are cold blooded and lay eggs. When they are young they have fins and

gills but when they are grown they have legs and lungs.

Amphibians must stay near water.

SS = Amphibians must stay near water because they will dry out. Their skin is porous

because they breathe through it.

Amphibian eggs must be laid in water because they have no shell.

REPTILES:

BI = Lizards, snakes, turtles and alligators are reptiles.

Reptiles have scales and lungs, are cold blooded and most lay eggs.

SS = Reptile eggs have a leathery shell so they can be laid away from water.

Reptiles can live far from water because their skin isn't porous.

BIRDS:

- BI = Only birds and mammals are warm blooded.
Birds have beaks, feathers and wings and lay eggs with hard shells.
Birds' feet, beaks and body shapes tell a lot about how the bird lives and where.
- SS = Feathers are for flying and also help the bird stay the proper temperature.
Birds keep their feathers waterproof by spreading special oils on them.

MAMMALS:

- BI = Mammals nurse their young, don't lay eggs (except for 3 exceptions), have hair or fur and are warm blooded.
People are mammals.
Mammals have ways to stay warm in winter and cool in summer.
Good common names of animals help us to identify them.
- SS = "Mamma" is latin for "breast." Mammals have breasts for nursing their young.
Polar bears, whales and other marine mammals have thick blubber to keep themselves warm.

PLANT KINGDOM:

FLOWERS:

- BI = Flowers attract animals to pollinate them.
Seeds are made when flowers are pollinated.
- SS = The female part of the flower is the pistil. The male part is the stamen. The petals attract pollinators and the sepals protect the flower before it opens.
Flower parts (petals, stamens etc.) vary greatly in number and size.

SEEDS:

- BI = Seeds grow into plants.
Some seeds split into two parts, some stay as one.
The seed is a tiny baby plant and a lot of stored food to start it growing.
Seeds have interesting ways to spread around so they find space and water to grow.
- SS = Monocots have one seed part, dicots have two. Each seed part is a cotyledon.
Each seed has a seed coat, an embryo and one or two cotyledons.
Seeds must soak up water before they can sprout.
Seeds spread to new places by wind, water, sticking and being eaten as part of a fruit or berry and then get dropped in a new place.

LEAVES:

- BI = Leaves contain chloroplasts which make the plant green.
Chloroplast take sunlight and make energy
Plants that don't get light cannot grow very well.
Leaves look solid green but are really just dots of green chloroplasts.
- SS = Without plants there would be no life. Animals need plants in order to survive.
Without sun, chloroplasts turn yellow.

STEMS AND ROOTS:

- BI = Roots suck water up from the ground and hold the plant up.
Stems have tubes that carry food and water through the plant.
- SS = Water can only enter a plant through the roots.

MATERIAL LIST

Material is listed by unit in the order in which it is first needed. + means it will be needed for later units also. The amounts listed are totals for the entire course. Most items are common household items. * means it requires some explanation. Ordering hints or explanations are given on page 10.

| <u>REUSABLE EQUIPMENT / MATERIAL</u> | | | | | |
|--------------------------------------|--|-----------------|--------------------|--|----------------|
| UNIT | | AMOUNT | | | |
| 1+ | Plant with many healthy leaves | 1 | 21 | Metal pie pan | 1 |
| 1 | Rock to observe (optional) | 1 | 22 | Cookie sheet | 1 |
| 1 | Wild area to study (field, forest etc.) | | 22 | Waterproof marker | 1 |
| 1 | String | 4 meters | 23+ | Zoo or wildlife center to study | |
| 1+ | Meter/yard stick combination | 1 | 23 | * Binoculars (optional) | 1 |
| 1+ | Clipboard | 1 | 24 | Samples of animals studied: shells, rubber or plastic critters, live insects or worms in vials, pictures, dried coral or sea star... | |
| 1+ | Large clear jar with lid (32 oz. or more) | 1 - 4 | 25 | Tweezers (optional) | 1 |
| 1+ | Hand lens (Magnifying glass) | 1 | 26 | Computer with internet access (optional) | |
| 1 | * Field guides to local insects, animal tracks plants (optional) | | 26 | Sunday cartoon section of the newspaper | 1 |
| 2+ | Small plates | 3 | 28 | Identical, upright plants in small pots | 2 |
| 2+ | Small round bowl (to hold 2 cups) | 2 | 28 | Clear drinking glasses | 3 |
| 2 | Small square pan (to hold 2 cups) | 1 | 28 | Clock | 1 |
| 3+ | * Glue gel (like Elmer's School glue gel) | 1 | <u>PERISHABLES</u> | | |
| 3+ | Hole punch | 1 | 2 | Chicken egg | 1 |
| 3+ | Scissors | 1 | 2 | Light colored gelatin (lemon) | 6 oz. box |
| 3+ | Colored pencils, crayons, markers | | 2 | Green grapes | 20 |
| 3+ | Stapler | | 2 | Strawberries or orange slices | 2 |
| 4 | White or gold pen (to mark on black) | 1 | 3+ | 12" x 12" colored cardstock | 8 |
| 4+ | Ruler with centimeters and inches | 1 | 3 | 12" x 18" construction or other heavy paper | 1 |
| 5 | Tennis ball | 1 | 3+ | Yarn- any color | about 12 yards |
| 5+ | Watch with second hand | 1 | 4 | 8 1/2" x 11" black construction paper | 1 |
| 5+ | Spoons (at least one metal) | 2 | 4 | 8 1/2" x 11" tagboard or thick paper | 1 |
| 6 | Long tube (wrapping paper, vacuum cleaner...) | 1 | 4+ | Metal fastener (brad) | 2 |
| 6 | Small colored counters- blue and red | 10 each | 4 | Thin string or thick thread | 28" long |
| 7+ | 3" x 5" index cards (white) | 7 or more | 4+ | Tape | |
| 8+ | Small jars with lids (see-through) | 3 | 5 | Light corn syrup | 1/2 cup |
| 8 | Dry erase marker | 1 | 5 | Red Hot candies | 1/2 cup |
| 11+ | Various art supplies- stamps, stickers etc. | | 5+ | Dry large lima beans | 6 |
| 13+ | Flashlight | 1 | 5 | Dry lentils or split yellow peas | 1 Tbl |
| 13 | Red cellophane (optional) | approx. 4" x 4" | 6+ | 8 1/2" x 11" white paper | 6 |
| 13 | Pitchfork (to dig up worms) | 1 | 8 | Paper towels | 15 |
| 13+ | Mister with water | 1 | 8 | Items to test senses- may include: coins, cotton swab, paper clips, vinegar, garlic, chocolate chips, banana, orange, bells | |
| 13+ | Tray with sides (9" x 9" pan, food storage container etc.) | 1 | 8+ | Paper sacks (4 lunch size) (1 large) | 4 |
| 13 | Sandpaper- rough | approx. 9" x 9" | 12 | Styrofoam cups (stacking) | 4 |
| 14+ | * Gram scale or triple beam balance | 1 | 13+ | Sand | about 2 cups |
| 15+ | Kitchen knife | 1 | 13+ | Soil | about 2 cups |
| 16+ | * Butterfly house (bought or made) | 1 | 13 | Oatmeal (dry) | about 1 cup |
| 18 | Small piece of rotting log for critter keeper | | 13+ | Aluminum foil | about 14" |
| 18 | Chalkboard or whiteboard (or butcher paper) | 1 | 13 | Vinegar | 1/4 tsp. |
| 18 | Heating pad or hot water bottle | 1 | 14 | Snail food (lettuce, cabbage, ivy, cucumber) | |
| 18+ | Zipper type plastic bag- (1-1 gallon) (2 small) | | 15 | Banana (unpeeled) | 1 |
| 20 | Fish net - small for netting goldfish | 1 | 18 | Ice | |
| 20+ | * Thermometer- science type | 2 | 19 | Card stock or construction paper 18" x 12" | 1 |
| 20 | Thermometer - sterile, human type | 1 | 19 | Magazines with animal pictures (vertebrate and invertebrate) - cuttable | 1 - 4 |
| 20+ | * Glass eyedropper | 1 | | | |
| 21 | Metal Slinky toy | 1 | | | |

| UNIT | PERISHABLES (CONT.) | AMOUNT | | |
|------|---|-----------------|--|------------------------------|
| 21 | Salt | 1 Tbl. | 28 | Food coloring- red and blue |
| 21 | Manila file folders | 2 | 28 | Salad dressing |
| 23 | Vegetable oil | 2 Tbl. | 28 | Salad fixings of your choice |
| 24 | Shortening or lard | 1/2 cup | | |
| 24 | Butcher paper | approx. 3' x 6' | | CRITTERS |
| 25 | Flower (gladiolus is best) | 1 | UNIT | AMOUNT |
| 26 | Corn seeds | 11 | 13+ *Earthworms (dug up or bought) | 6 |
| 26 | Dried kidney beans | 11 | 14+ *Garden snails | 5 |
| 26 | Socks- big, old | 2 | 16+ * Butterfly larvae (gathered or bought) | 5 |
| 26 | Cranberry and other fruit (to show seeds) | 26 | 17+ * Spider to observe (real or photos) | 1 |
| | Seed selection- maple, dandelion, elm | | 18+ * Isopods (roly-polies, pill bugs) | 10 |
| 28 | Stalk of celery with leaves on top | 1 | 20 Fish - goldfish works well | 1 |
| 28 | White carnation | 1 | Please Note: All experiments are designed to teach about the animals without harming them. | |

SPECIFIC EQUIPMENT: HINTS AND ORDERING

1. **Field guides to insects, plants, birds etc.:** A list of good field guides is provided at the bottom of the list of reading suggestions on page 15.
2. **Glue gel:** We call this "blue glue" because it is blue. It is the "Elmer's washable school glue gel." It sticks better than a glue stick and isn't as messy as white glue. It is available at almost any office or school supply store.
3. **Gram scale or triple beam balance:** Either of these will weigh items in grams. Gram scales are easier to use. Triple beam balances are frequently used in many laboratories so it may be worth purchasing one and learning how to use it. Gram scales are available at many drug stores. Either can be purchased from Nasco (see below).
4. **Butterfly house:** can be made from a box with netting over one side. Look for specific instructions on the internet. Plan about 3 weeks ahead if you want to buy one. You can purchase one from Classical Home Education and it will come with a certificate to get 5 butterfly larvae. You just send in the certificate (and a few dollars for shipping) about a week before you are ready to start your butterfly unit.
5. **Thermometer:** A good science thermometer goes down on its own like a room thermometer. Remember a human thermometer must be shaken down. You will need a thermometer that isn't a permanent part of a decoration and that has the temperatures marked right on it. Some food thermometers are built right but don't go very low as they are used for hot cooking. You need one to go down to 30° F or 0°C. If all else fails, order one from Nasco.
6. **Glass eyedropper:** This should be easy but it isn't always. Drug stores usually offer big, bulky plastic ones but these won't do what you need. Find a nice, small, old-style, glass thermometer. I found one at an old-style pharmacy. Otherwise, order one from a science catalogue.
7. **Binoculars:** 7 X 35 is a nice choice to get for birdwatching. I would avoid the \$10 ones as you won't see much but you don't have to spend \$100 on a set for your kids either. Whatever you get, look through them first. The optics can vary from one pair to another. Look in the sports or electronics department.
8. **Garden snails:** There is a care sheets provided (pg. 11) that gives hints on finding and housing snails.
9. **Earthworms, butterfly larvae, spiders (optional) and isopods (pill bugs):** Finding and housing them is explained in the labs where they are first needed.

SOURCES FOR SCIENCE MATERIALS

Nasco (vast array of science materials from frogs to magnets)

901 Janesville Ave., Fort Atkinson, WI 53538-0901 Phone: 1-800-558-9595 www.eNASCO.com

Classical Home Education (offers butterfly houses with a certificate for larvae as well as science kits and books)

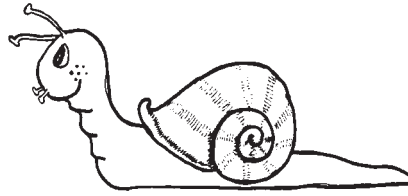
3785 NE 18th Ave., Ocala, FL 34479 Phone: 325-286-5389 www.ClassicalHomeEd.com

Insect Lore (fun equipment for learning about and raising critters – crabs to ants)

P.O. Box 1535, Shafter, CA 93263 Phone: 1-800-LIVE BUG www.insectlore.com

Critter Care Sheet

COLLECTING AND HOUSING GARDEN SNAILS



FINDING: Garden snails are easiest to find in lush gardens, woodlands or parks right after a rain (or watering). They also are easiest to find at night. If you don't have a garden, or know anybody with a snail problem (lucky you!) try a park or nursery where they grow plants.

HOUSING: Snails can be kept in a solid walled critter keeper, large jar or small aquarium. Snails climb well so make sure the lid is on and make sure it has plenty of breathing holes. Put a little soil in the bottom, and add a nice piece of rotting log. Keep the soil moist, but not wet by misting daily. Add a small dish of water to keep the air humid.

FEEDING: If you can, add leaves that you found the snail on. Also feed lettuce and cucumber. Avoid any leaves that have been sprayed with chemicals.

ADDITIONAL READING SUGGESTIONS



highly recommended

* more fun than science

Some great, grammar stage books you could use for several sections of this book are given below with abbreviations. They are listed under each topics with the appropriate page numbers for that topic.

Color Anatomy (CA) - Christine Becker. A very good, grammar stage, human anatomy coloring book

Unit 2: THE CELL

CA - Christine Becker pg. 6

#*Greg's Microscope* - Millicent E. Selsam

Unit 3: THE HUMAN BODY

#*What's Inside You* - Susan Meredith (*Usborne Starting Point Science*)

#*Science and Your Body* - Rebecca Heddle (*Usborne Science Activities*)

SOMEBODY: Five Human Anatomy Games - Fun games to help teach anatomy

The Magic School Bus Inside the Human Body - Joanna Cole

Me and My Amazing Body - Joan Sweeney

Your Insides - Joanna Cole

Unit 4: THE SKELETAL AND MUSCULAR SYSTEMS

CA - pgs. 21 - 28

The Skeleton Inside You - Philip Balestrino

Unit 5: CIRCULATORY SYSTEM

CA - pgs. 29 - 33

Your Blood and Its Cargo - Sigmund Kalina

A Drop of Blood - Paul Showers

Unit 6: RESPIRATORY SYSTEM

CA - pgs. 34 - 37

Unit 7: DIGESTIVE SYSTEM / NUTRITION

CA - pgs. 38 - 46

Good Enough To Eat - Lizzy Rockwell

Eat Healthy Feel Great - William Sears, M.D, et. al.

Unit 8: NERVOUS SYSTEM

CA - pgs. 12 - 20

The Magic School Bus Explore the Senses - Joanna Cole

My Five Senses - Alike

Unit 9: GROWTH AND GENETICS

When an Animal Grows - Millicent Selsam (about non-human animal growth)

Me and My Family Tree - Paul Showers

Unit 10: CLASSIFYING LIFE

Usborne Illustrated Encyclopedia of the Natural World

QUICKPIX Not Just An Animal Game - Aristoplay

#*Benny's Animals and How He Put Them in Order* - Millicent E. Selsam

Animals of the Sea - Millicent Selsam

Unit 12: CNIDARIA

Usborne Illustrated Encyclopedia of the Natural World

Jellyfish - Leighton Taylor

Unit 13: WORMS

Usborne Illustrated Encyclopedia of the Natural World

Worm Day - Harriet Ziefert

Earthworms - Dorothy Childs Hogner

Unit 14: MOLLUSCA

Usborne Illustrated Encyclopedia of the Natural World

#*Are You a Snail* - Judy Allen

Unit 15: ECHINODERMATA

Usborne Illustrated Encyclopedia of the Natural World

ARTHROPODA:

Unit 16: Insects:

Usborne Illustrated Encyclopedia of the Natural World

Usborne Complete First Book of Nature

The Magic School Bus Gets Ants in Its Pants - Joanna Cole

The Magic School Bus Inside a Beehive - Joanna Cole

Zoobooks: Butterflies - The Knowledge Company (distributor)

Butterflies - Karen Shapiro (Scholastic "Hello Reader!" book)

#*The Butterfly House* - Eve Bunting

#*Waiting for Wings* - Lois Ehlert

Are You a Butterfly? - Judy Allen

Are You a Ladybug? - Judy Allen

Are You an Ant? - Judy Allen

**Crickwing* - Janell Cannon

Ma Jiang and the Orange Ants - Barbara Ann Porter

#*Terry and the Caterpillars* - Millicent Selsam

Unit 17: Arachnids:

Usborne Illustrated Encyclopedia of the Natural World

Are You a Spider? - Judy Allen

**Charlotte's Web* - E. B. White

Unit 18: Crustaceans:

Usborne Illustrated Encyclopedia of the Natural World

A House for Hermit Crab - Eric Carle

Pagoo - Holling C. Holling

**Kermit The Hermit* - Bill Peet

CHORDATA

Unit 20: Fish:

Usborne Illustrated Encyclopedia of the Natural World

Usborne Complete First Book of Nature

#*Plenty of Fish* - Millicent Selsam

**Swimmy* - Leo Lionni

Unit 21: Amphibians:

Usborne Illustrated Encyclopedia of the Natural World

#*Song of La Selva* - Joan Banks

**Frog and Toad Are Friends* - Arnold Lobel

**Frog and Toad Together* - Arnold Lobel

**Frog and Toad* - Arnold Lobel

Unit 22 Reptiles:

Usborne Illustrated Encyclopedia of the Natural World

Imagine You Are a Crocodile - Karen Wallace

The Moon of the Alligators - Jean Craighead George

**Verdi* - Janell Cannon

Unit 23: Birds:

Usborne Illustrated Encyclopedia of the Natural World

Usborne Complete First Book of Nature

#*Tony's Birds* - Millicent Selsam

See How They Grow - Owl - Kim Taylor

**Make Way for Ducklings* - Robert McCloskey

Unit 24: Mammals:

Usborne Illustrated Encyclopedia of the Natural World
Usborne Complete First Book of Nature
#Nature Detective - Millicent Selsam
**Stellaluna* - Janell Cannon

THE PLANT KINGDOM

Usborne Illustrated Encyclopedia of the Natural World
Usborne Complete First Book of Nature
**Franklin Plants a Tree* - Paulette Bourgeois

Unit 25: FLOWERS

Usborne Illustrated Encyclopedia of the Natural World
Usborne Complete First Book of Nature
The Reason For a Flower - Ruth Heller

Unit 26: SEEDS

Usborne Illustrated Encyclopedia of the Natural World
#Seeds and More Seeds - Millicent Selsam
The Tiny Seed - Eric Carle
**The Carrot Seed* - Ruth Kraus

Unit 27: LEAVES

Usborne Illustrated Encyclopedia of the Natural World

Unit 28: STEMS AND ROOTS

Usborne Illustrated Encyclopedia of the Natural World

OTHER LIFE SCIENCE TOPICS:

EVOLUTION / NATURAL SELECTION

Usborne Illustrated Encyclopedia of the Natural World
The Story of Life on Earth - Margaret Munro
Evolution - Joanna Cole
Evolution- The Beast in You (an activity book) - Marc McCutcheon

PREHISTORIC LIFE

Usborne Illustrated Encyclopedia of the Natural World
The Story of Life on Earth - Margaret Munro
Wild and Woolly Mammoths - Alike
Dinosaur Bones - Alike
Digging Up Dinosaurs - Alike
My Visit To The Dinosaurs - Alike
Patrick's Dinosaurs - Carol Carrick
What Happened To Patrick's Dinosaurs? - Carol Carrick

REPRODUCTION

Color Anatomy - Christine Becker pgs. 56 - 61
The Human Body: A First Discovery Book Scholastic
Everybody Has a Bellybutton - Laurence Pringle
How You Were Born - Joanna Cole
Before You Were Born - Ann Douglas

FIELD GUIDE SUGGESTIONS:

INSECTS

Insects (Peterson Field Guide Series) - Donald J. Borror / Richard E. White

BIRDS

Field Guide to the Birds of North America (National Geographic Society) - Shirley L. Scott
- (editor)
Stokes Field Guide to Birds (by region) - Donald and Lillian Stokes
Field Guide to Western (or Eastern) Birds (Peterson Field Guide Series) - Roger Tory Peterson
Birds of North America (Golden Guide) - Chandler S. Robbins et al

REPTILES AND AMPHIBIANS

A Field Guide to Western (or Eastern) Reptiles and Amphibians (Peterson Field Guide Series)

- Robert C. Stebbins

MAMMALS

A Field Guide to the Mammals of America North and Mexico (Peterson Field Guide Series)

- William H. Burt / Richard P. Grossenheider

CARE OF UNUSUAL "PETS"

#Pets in a Jar - Seymour Simon

Animal Care From Protozoa to Small Mammals - F. Barbara Orlans

Creepy Crawlies and the Scientific Method - Sally Kneidel

WEBSITE SUGGESTIONS

WHAT IS LIFE?

What is "living"?

www.hitchams.suffolk.sch.uk/key/plantand.htm

THE HUMAN BODY

All body systems

www.innerbody.com/htm/body.html

SKELETAL AND MUSCULAR SYSTEMS

Info on bones

http://vilenski.org/science/humanbody/hb_html/skeleton.html

CIRCULATORY SYSTEM

<http://sln.fi.edu/biosci/biosci.html>

RESPIRATORY SYSTEM

Great info

www.sk.lung.ca/content.cfm/kids

<http://yucky.kids.discovery.com/noflash/body/pg000138.html>

DIGESTIVE SYSTEM

Fun nutrition site

www.nutritionexplorations.org/kids/main.asp

NERVOUS SYSTEM

Senses- info, labs etc.

<http://faculty.washington.edu/chudler/chsense.html>

Nervous system info

<http://faculty.washington.edu/chudler/neurok.html>

GENETICS AND GROWTH

Explains genetics and DNA

www.genetics.gsk.com/kids/index_kids.htm

CNIDARIA

Click to see sea jellies

www.mbayaq.org/efc/living_species/default.asp?hOri=1&group=2

Coral reef coloring

www.surfnetkids.com/cgi-local/go.cgi?

www.reefrelief.org/kids/

Reef info, map etc.

www.enchantedlearning.com/biomes/coralreef/coralreef.shtml

WORMS

Earthworm Adventures

www.urbanext.uiuc.edu/worms/index.html

Worm and composting info

<http://yucky.kids.discovery.com/noflash/worm/pg000102.html>

Links for more worm info

www.hitchams.suffolk.sch.uk/key/worms.htm

MOLLUSCA

Without shells

www.hitchams.suffolk.sch.uk/key/slugs,.htm

With shells

www.hitchams.suffolk.sch.uk/key/snails&.htm

ARTHROPODA

Classification, projects

<http://members.aol.com/YESedu/welcome.html>

Art project

www.hhmi.org/coolscience/butterfly/index.html

Lesson plans, insect housing

<http://insected.arizona.edu/uli.htm>

Facts, crafts, insect housing

www.uky.edu/Agriculture/Entomology/ythfacts/entyouth.htm

Butterfly metam. video

www.yesnet.yk.ca/schools/jackhulland/projects/butterflies/index.html

Spider info, poems, lessons (WARNING: [graphic bite photos](#))

<http://arthur.kl2.il.us/arthurgs/spidlink.htm>

Crustaceans

www.hitchams.suffolk.sch.uk/key/shrimps&.htm

Click on the crabs to view and see information

www.mbayaq.org/efc/living_species/default.asp?hOri=1&group=2

ECHINODERMATA

Great echino info

www.enchantedlearning.com/subjects/invertebrates/echinoderm/

CHORDATA

Vertebrate puzzles

<http://nationalzoo.si.edu/audiences/kids/>

Fish:

Fish classification/activities

www.geocities.com/sseagraves/fishclassification.htm

Amphibians:

Frogs

allaboutfrogs.org/frogInd.shtml

Reptiles:

Sea turtle rehab., info

www.seaturtlehospital.org/index.htm

Birds:

Info, coloring, activities etc.

www.enchantedlearning.com/subjects/birds/

Activities, diversity, anatomy etc.

www.nhm.org/birds/home.html

Live webcams of nesting raptors (nesting season)

www.psnh.com/osprey/default.asp

Mammals:

Activities, diversity, anatomy etc.

www.nhm.org/mammals/home.html

Record breakers- fattest, smallest

www.abdn.ac.uk/mammal/records.shtml

Whale info, activities etc.

www.zoomschool.com/subjects/whales/

Links to whale lessons/activities

www.surfnetkids.com/whales.htm

THE PLANT KINGDOM

Summary of the plant parts

www.hhmi.org/coolscience/vegquiz/plantparts.html

Plant parts mystery

www.urbanext.uiuc.edu/gpe/index.html

SEEDS

More seed activities (parent pg)

www.thirteen.org/edonline/nttidb/lessons/cb/plantcb.html

Great seed picture

www.theseedsite.co.uk/seedparts.html

KEEP A SCIENCE JOURNAL

Nature is beautiful and amazing, but it is not a video game. The action in nature is far more subtle (usually) but well worth looking and waiting for. Life, death, greed, compassion and romance are all just waiting to be discovered by the observant and patient. Writing it all down is a skill worth developing. Sketching and saving samples of the common things you find along the way all add up to give you a journal you can be especially proud of and will want to cherish your whole life. For a satisfying nature experience, grab that journal and that pencil, maybe a hand lens (magnifying glass) and a pair of binoculars and hit the trail, or the backyard or park. You don't need to have a plan when you go out; but to get you started, we have provided, in no particular order, a few hints as to what might go into a nature journal. These are just ideas to get your creative juices flowing. Writing in your journal should be like writing to yourself. Don't worry about spelling, sentence structure or grammar. Now go out, observe, draw, listen, describe, compare—journal! Remember, the more you put into it, the more you will get out of it.

For each journal entry remember to put:

- The date
- The weather (temperature, clouds, rain, wind, etc.)
- Who you went with

AUTUMN:

- Make a leaf rubbing. Place a leaf under one journal page. Choose a color that matches the leaf. Rub the crayon over the paper where it covers the leaf. In your journal, describe the plant it came from and what it looks like this time of year. Repeat this in the spring.
- Sit by a tree. What things might that tree be used for if it were cut down? What might it be used for if it were to grow? In its lifetime, how many more animals might be able to enjoy it as it grows? What species is the tree? If you know, write it down. Sketch a picture of the tree.
- Use your sense of hearing. Close your eyes. What do you hear? What do you think it means? Write a factual or fictional story about what you hear.
- Find an insect of any kind. Draw it. Describe what it is doing. Don't disturb it in any way. Watch what it does when it is not disturbed.
- Check out a clear night sky. Can you find any constellation? Satellites? Bats?
- Pick up two different rocks. Describe them. Compare weight, shape, texture, color...
- This is a safe time to find a nest as they will be empty by now. How is it made? What material was used? How was it put together? What feathers are nearby?
- Describe the weather changes you see. Draw the clouds, take the temperature, feel the wind.
- Which trees are losing their leaves first? Which in clumps? Does size matter? Species (kind of tree)? Location?
- Draw a tree in the autumn. Remember which one it is. Draw the same tree in the winter, spring and summer.

WINTER:

- Describe a deciduous tree (one that loses its leaves in the winter) and an evergreen tree (one that stays green all a year). How are they shaped? How different do they look this time of year? Is one easier to see in the winter?
- Look for predators (meat eaters). Winter is a hard time of year for them. Look for hawks, owls, weasels and coyotes. How do they look? What do you see that they could be finding to eat?
- There is a different kind of silence when it is snowy or foggy. Sit, listen and describe a snowy or foggy day. What do you hear? How does it sound different than it does on a clear summer day?
- Finish the sentence "I'm so cold I could..." How do animals and plants survive the cold?
- Describe and sketch the nearest mountains. What covers them? Who uses them?
- When it rains, watch how the water washes dirt down a hill. Can you see it start to form tiny rivers? What does the water do when it meets up with sticks, rocks and leaves?
- Use your nose after a rain. How does the world smell? How is that different than usual?
- Put a stick in the ground. Measure its shadow morning, noon and evening. Draw your stick clock in your journal. Show where the shadow is at different times of the day.
- How do birds look in winter? Describe what they do, where they perch, what they say.

SPRING:

- Find a pond or lake. Sketch it and the surrounding area in your journal. Color in where you would expect to find fish in blue, amphibians in green and reptiles in brown.
- Find a pond or puddle. Look closely for animal tracks. Sketch them in your journal. Can you determine where each animal went and what it was doing? Tell a story of the events that lead to the footprints.
- Find a flower, the bigger the better. Watch and see if any animal visitors come to pollinate it. Write and sketch about what you see.
- Carefully draw a flower. How is it built to draw in pollinators? Guess by its size and shape what animals might pollinate it.
- Listen to the birds. Birds sing to claim a territory and advertise for a mate. Describe their songs. Are they sweet? Flat? Enthusiastic? Impressive?
- Try to write a bird's song in words. A quail's call is written as "Chi- ca-go." A chickadee's name comes from its call—"Chicka-dee-dee."
- Don't forget to journal at night. Describe the life attracted by a porch light at night.
- Use your nose. What can you smell? Sit and smell, then look for things that make smells—flowers, trees...
- Find a butterfly. Describe its color, patterns, flight. Where are its wings when it is resting? Now find a moth (easiest at night) and compare.

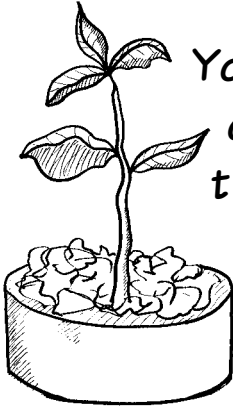
SUMMER:

- Go outside. Watch seeds move, fly, pop open. Write and sketch about what you see.
- Find a column of ants. Don't bother them in any way. Where are they going? What are they carrying? Can you find individual ants with different jobs? How quickly are they moving? Follow and time one ant to find the speed of the column.
- Sit quietly and observe the birds. What birds do you have in your area? Draw, describe and name them when you can.
- Walk through a field of stickers. Pull them out of your socks, sketch and describe them. How many ways can you find that seeds have of sticking? Find the seed in each sticker.
- Finish the thought "I'm so hot I could..." How do animals and plants adjust to the heat?
- Describe the plants and animals near a river or stream. How is life different here than just a little ways away from the water?
- Find an animal path in nature. What animals do you think use it? How worn is it? How tall are the animals that use it? Look for prints, hair, droppings, feathers.
- Find a feather. Draw it and describe its shape, structure, texture, color. Flap the air with it. Is it noisy or silent? Guess what bird might have left it there.
- Visit a flower in the morning, at noon, in the evening and again at night. How does it change throughout the day? Notice its texture, droop, color, how open it is.



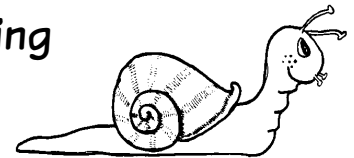
For my notebook

What Is Life?



You are alive, aren't you? How about dogs and cats? They are alive too. You probably just know this without knowing exactly why. How about worms, trees or coral? You are going to be learning about a lot of different living things but first let's learn to tell if something is alive.

Scientists have found that all living things are made of tiny building blocks called cells (selz). Just like you might build a castle out of Legos of different sizes and shapes, living things are made of stacks of different cells. Unfortunately, most cells are too tiny to see so we will learn other ways to tell if something is a living thing. Think of your own body when you read this list of living characteristics.



All living things 1. take in energy (we do this by eating) and 2. get rid of the waste. They all 3. move, although some, like plants, move very slowly. All living things 4. grow and can 5. reproduce or make babies. All living things have some type of 6. circulation- like our blood moving in our bodies, and some type of 7. respiration- like our breathing. The last thing is, all living things 8. respond to what's around them. Many objects that aren't alive do some of these things but only living things do all of them. For instance, a car isn't alive but it moves and gets rid of waste (exhaust). Think about your own body now. Can it do all of the things on this list? Yes, it can because you are alive!

Living Lab #1: SIGNS OF LIFE - instructions

Material:

copy of lab sheet (1 page), pencil
plant and rock to observe (optional)

Aloud: All living things are made of building blocks called cells. Unfortunately, cells are usually too small to see without a microscope so we have to use other features like growth, respiration, a fancy word for breathing, and movement. In the activity today you will think about 4 things you have seen before and decide if they are alive by using a check list of characteristics. Living things will do all of the things on the list. Things that aren't alive can often do some of the things on the list. Some things, like circulation, are hard to see. Do your best and through the year as we study living things you will learn how to look for circulation, respiration and other signs of life.

Procedure:

Lab Day:

1. Before going through the check list of living characteristics, guess which of the four items you think are alive.
2. Do your best to fill in the chart.

HINTS FOR PARENTS:

FOR BIKE AND ROCK:

Let kids use their imaginations but guide them to understand bikes and rocks only move with help from gravity, being pushed etc., and they don't reproduce (make another whole bike or rock). They don't show circulation, respiration or a response to the environment but kids may come up with creative ways to say they do, which is fine.

PLANTS:

Take in energy = although they don't eat, plants get energy from the sun

Give off waste = plants give off oxygen (a waste product) just like we give off carbon dioxide.

Movement = plants move slowly to face the sun, some flowers and leaves open and close at night

Circulation = plants have tubes that carry water up and food down and throughout the plant.

We will be looking at these later in the year, but for now you can check out the tubes when you "string" your celery.

Respiration = plants breathe in carbon dioxide and breathe out oxygen (the reverse of what people do)

Respond to Environment = plants lose their leaves in the winter, give off electrical impulses when cut, sprout when the rain and temperature are just right, etc.

3. Finish lab sheet.

Possible Answers:

1. The easiest characteristics are usually growth (it's easy to see your bike and a rock aren't growing) and reproduction. Even though a piece of rock splits off of a bigger rock, that piece will never grow up to make full sized rocks of its own.
2. If you look at a living thing under a microscope you will see it is made of cells.

Conclusion / Discussion:

– Obviously, people and plants are alive, but not bikes and rocks. Your chart might show a different answer, which is fine, as some characteristics are hard to see. The object isn't to get it right, as much as to start to look for living characteristics in other things such as sponges, corals, worms etc. This takes practice.

For More Lab Fun:

1. If this was easy and fun for the kids, challenge them to explain why a computer, a car, a river or a fire are not alive. All of these show living characteristics.

NAME _____ DATE _____

Living Lab #1: SIGNS OF LIFE

Are the items on the line below alive? On the line next to each one write Y for yes or N for no.

MY GUESS BEFORE DOING THE LAB

People _____ Bike _____ Rock _____ Plant _____

On the chart below, put an X in the box if the object has the characteristic listed. If not, leave it blank. Put a ? if you're not sure.

| CHARACTERISTIC | PEOPLE | BIKE | ROCK | PLANT |
|---|--------|------|------|-------|
| Takes in energy ex: (food, minerals) | | | | |
| Gets rid of waste ex: (sweating, urinating) | | | | |
| Moves (by itself) | | | | |
| Grows | | | | |
| Reproduces (can make babies) | | | | |
| Circulation (stuff moves inside- blood, water etc.) | | | | |
| Respiration (takes in and gives off gasses) Breathing | | | | |
| Responds to environment ex: (moves towards the light, runs from danger) | | | | |

For something to be alive it must be able to do all of the things on the list. After doing the lab, do you think the things on the list are alive? On the line next to each one write Y for yes and N for no.

AFTER LAB

People _____ Bike _____ Rock _____ Plant _____

1. Some characteristics are hard to see- like circulation and respiration.

Which characteristics from the list are the easiest to use?

2. If you could look at any living thing under a microscope, what would you see it was made up of? _____

Living Lab #2: PLOT STUDY - instructions

Material:

copy of lab sheet (1 page), pencil
field, overgrown lot or other wild area at least 1 meter square to do your study
string: 4 meters long, marked at one meter intervals
meter stick
clipboard and pencil
small clear jar or critter keeper
hand lens / magnifying glass (optional but recommended)
field guides of local insects, animals tracks, plants (optional)

Aloud: Today we will do a plot study. This means we will mark off an area, called a plot, outside and look closely at the living and nonliving things that make up that plot. Scientists do this to compare the features of one area with another. By doing this they can learn what kinds of areas certain plants and animals can grow in. It also helps to tell them when an area is becoming unhealthy. We will be looking for living and nonliving things in our study plot. You may have to look closely, but I'm sure that you will be surprised at how much life you will find! There are many living things so tiny we walk right over, and ON them without even knowing they are there.

Procedure:

Lab Day:

1. Choose a good, preferably wild area to study. A field, overgrown garden or empty lot works well. Try to avoid a manicured lawn. There won't be much plant diversity there.
2. Lay your string out in a square in the area you want to do your study. All study takes place in the square. No fair writing down what you see out of the square, even if it is neat-o, but your plot can go as high into the air or as deep into the soil as you wish.
3. Make a list of living and nonliving things you see in the plot. Every species should be listed on a separate line. Don't just put "weed." Put "Dandelion" or "small plant with yellow flowers and spiky leaves." Describe what you can't name. Use as much detail as possible. Under living, put the insects, worms, plants, leaves etc. For nonliving, list the different rocks you see, soil types, any man-made objects, water. Twigs and leaves were once living so they go there. Nonliving is not the same as dead.
4. After looking closely with a hand lens (you might be amazed at how pretty "dirt" can be), inspect under rocks, leaves and branches. These are great places to find beetles, worms and other interesting creatures. Every item turned over should be placed back exactly how it was so its inhabitants will not be displaced. Look up into the sky. Is there a tree above your plot? Birds flying over? The more you can get your children to just spend time looking, the more they will get out of this activity.
5. Choose a living and nonliving thing to draw. Put the living thing in the container while you draw it.
6. Finish your lab paper. For question 3, if you have a plot with a tree, estimate its height, otherwise measure.

Conclusion / Discussion:

- Discuss your list of living and nonliving things. What did you have more of? How would that be different on a beach or in the rainforest?
- Discuss the signs of life passing through. Did you find footprints, droppings etc.? Did you find any signs of human damage?

For More Lab Fun:

1. Start a nature journal. Write a description of the living and nonliving things you come across. Tape in samples of leaves or common plants you come across. Include drawings to help you remember what you have seen.

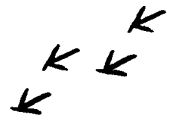
NAME _____ DATE _____

Living Lab #2: PLOT STUDY

List the major living and non-living things in your study area.

LIVING

NON-LIVING



| | |
|--|--|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Signs of living things visiting my plot (droppings, tracks, partly eaten leaves...):

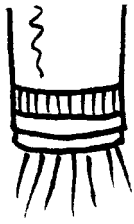
Signs of humans visiting my plot (footprints, writing, trash...):

Choose one living and one non-living thing from your plot to draw. Look very closely at them. Draw them in as much detail as possible.

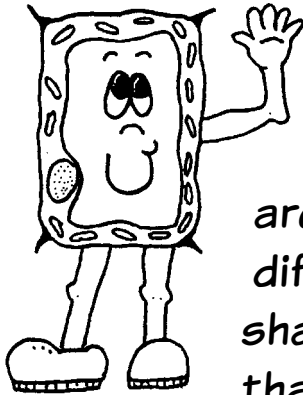
| LIVING | NON-LIVING |
|--------|------------|
| | |

1. Choose one word to describe your plot (forest, grassy...) _____
2. Choose one word for the soil in your plot (rocky, sandy...) _____
3. How tall is the tallest plant in your plot? _____

For my notebook



LIVING THINGS ARE MADE OF CELLS



All living things are made of *cells* just like all snowmen are made of snowflakes. Most cells are too tiny to see just like snowflakes are but if you put enough together you can make something big enough to see. Some living things are made of only one cell but you are made of way too many to count. In your body there are many different kinds of cells to do lots of different jobs. Your blood has round, candy shaped cells that carry oxygen and blobby cells that can change shape to attack diseases in your body. Most animal cells are sort of round and most plant cells are rectangles that are held together like blocks in a wall to hold the plant up. Another difference between animal and plant cells is that plant cells have football shaped things called chloroplasts (klor-o-plasts). Have you ever heard that plants can make food from sunlight? The green chloroplasts in the plant cells do that job. There are so many of them that they make almost the whole plant look green. Most cells also have a nucleus (new-kee-us). This is a very important part of the cell. It is the control center. Just like your brain controls what your body does, the nucleus controls what the cell does, how it moves and how it looks.

Cell Lab #1: AN EGG IS A CELL - instructions

Material:

copy of lab sheet (1 page),
colored pencils: orange, yellow, blue, green and brown
chicken egg
hand lens
small dish

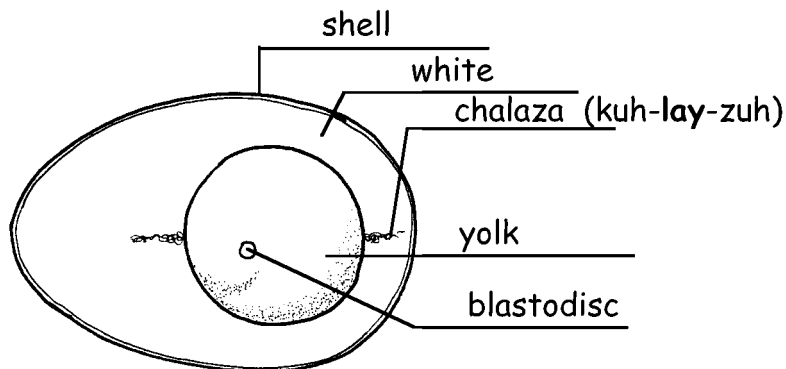
Aloud: What is every living thing made of? Cells, right? Most cells are far too tiny to see. It takes a lot of different types of cells to make all the different parts of all the different living things on earth. Some of those cells are visible without a microscope. We are going to look at one cell that is big enough to see without expensive equipment. An egg is a cell with a very special purpose- beginning a new life. Let's look and learn about cells and this special, life giving cell.

Procedure:

Lab Day:

1. Inspect the shell with a hand lens. It has very tiny holes to allow air and water to enter and leave the cell.
2. Gently break open the egg. Try to not break the yolk. Pour the contents and place the shell onto a small dish. Compare the egg to the egg diagram, finding the parts listed. Inspect the yolk very closely to find the very tiny, white blastodisc. It is a very important part of the cell and contains all of the cell parts except the food storage for the growing chick.
3. Use what you know and the clues from the chart to label the parts of the egg. Color the parts as indicated.
4. Draw the actual cell parts (hint: there are only 2) in the box provided.

Possible Answers:



#1 The yolk and the blastodisc are the actual cell parts.

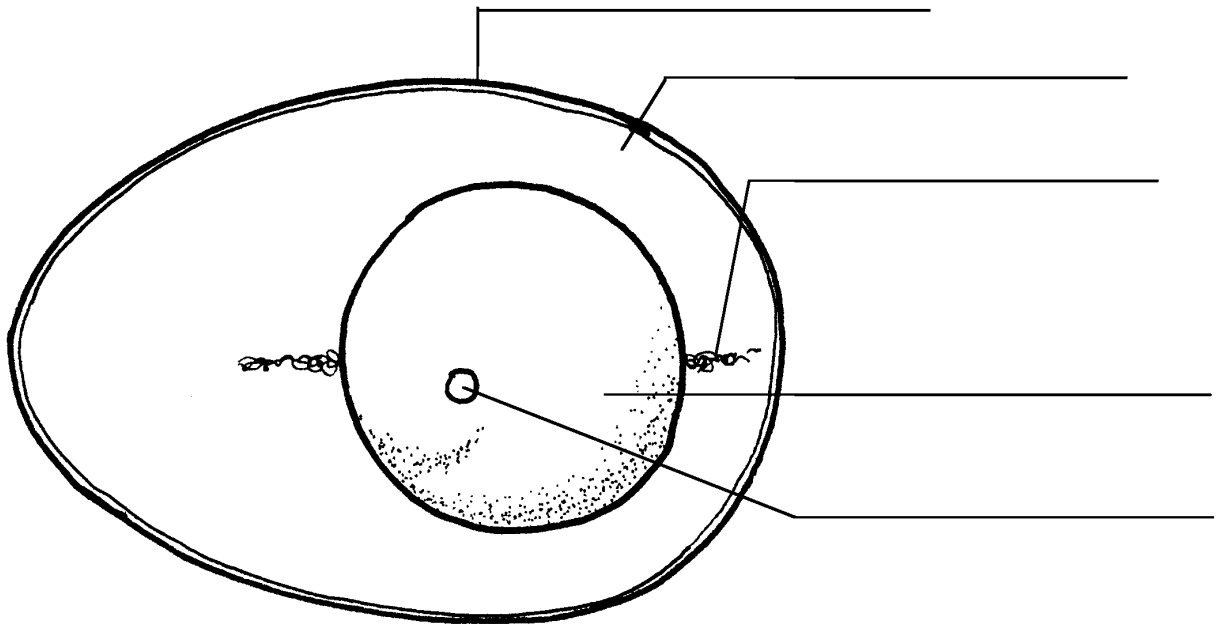
Conclusion / Discussion:

1. Why would this type of cell be so well protected? What might happen if it weren't surrounded by a shell and white gooey liquid?
2. Eventually a chick could hatch out of a fertilized egg. The yolk will have disappeared by then. Where do you think it might have gone? (To feed the growing chick)
3. How could you tell, just by looking that this is an animal cell and not a plant cell? (Plant cells are usually rectangular and have green chloroplasts)

For More Lab Fun:

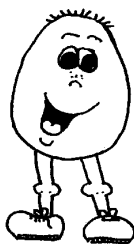
1. Find out which animals lay eggs with a hard shell and which lay eggs without a shell.
2. Host a cell party. Have a cell (egg) and spoon race and a cell toss. Served deviled cells and cell salad sandwiches.

Cell Lab #1: AN EGG IS A CELL



| | | | |
|----------------|------------|--|--------|
| non-cell parts | shell | Protects the egg cell. | brown |
| | white | Cushions the egg cell. | yellow |
| | chalaza | Rope like strands that anchor the cell in place. | green |
| cell parts | yolk | Largest part of the cell. Food storage for the developing chick. | orange |
| | blastodisc | Contains most cell parts including the nucleus. | blue |

1. In the box below sketch the actual cell parts of your egg.



Cell Lab #2: PLANT AND ANIMAL CELLS DIFFER - instructions

Material:

- copy of lab sheet (1 page), pencil
- 6 oz. box light colored gelatin (pineapple or lemon)
- small, square pan (to hold 2 cups of gelatin)
- round bowl (to hold another 2 cups of gelatin)
- 20 or so green grapes (for chloroplasts), cut into half lengthwise
- 2 orange slices or 2 whole strawberries (for the nucleus of each cell)

Aloud: Even when you can find a cell big enough to see, you really can't see its parts very well without a microscope. Today we are going to make a model of a plant cell and a model of an animal cell to show how they are different and how they might look if you were shrunk down many sizes. Maybe for dinner you can sink your teeth into science.

Procedure:

Lab Day:

1. Do the "BEFORE THE LAB" section of the lab sheet.
2. Prepare gelatin as instructed on the box. Pour 2 cups into the square pan and 2 cups into the round pan.
3. After gelatin is mostly set, have students determine which pan represents the plant cell (the square one). Add the grapes (chloroplasts) to the plant cell. Stir them around into the gelatin.
4. Add one orange slice or strawberry to each bowl, pushing it into the middle of each one.
5. Complete lab. If desired, label the gelatin cell parts with flags on toothpicks. Make sure to include a label for the chloroplast, nucleus and cell membrane.

Possible Answers:

1. The rectangular one is the plant cell. The round one is the animal cell.
2. Chloroplasts go into the plant cell.
5. A plant cell: is rectangular and has chloroplasts.

For More Lab Fun:

1. Find other things to make cell models out of. How about Legos or K'Nex?
2. Act out the different parts of the cell. The cell membrane keeps out intruders (bacteria, toxins etc.) and keeps the cell together, the nucleus is the control center (boss) of the cell and the chloroplasts make food.
3. To help children understand the function of the cell parts, let them call the family boss (dad or mom) "nucleus" for a day. Maybe you have a dog that keeps out intruders. Let him be called the "cell membrane" for the day. Whoever is usually the cook can be called "chloroplast" for the day. Encourage your children to feed the "cell membrane" and help the "chloroplast" get dinner ready. Don't forget, when the "nucleus" tell you to clean your room, you better do it!

NAME _____

DATE _____

Cell Lab #2: PLANT AND ANIMAL CELLS DIFFER

BEFORE THE LAB:

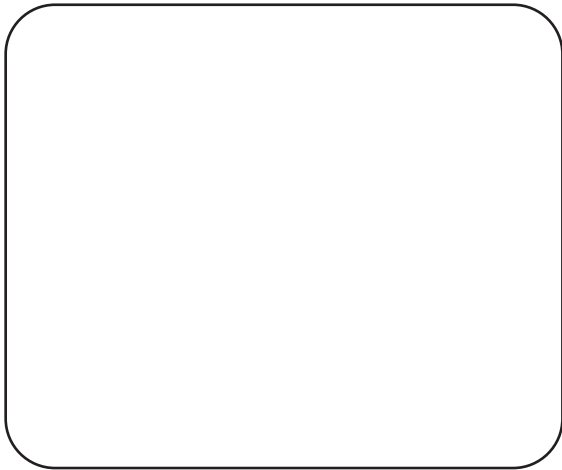
1. Label the shapes below either "Animal Cell" or "Plant Cell."
2. In which cell will you put the chloroplasts (grapes)? _____

AFTER MAKING THE CELLS:

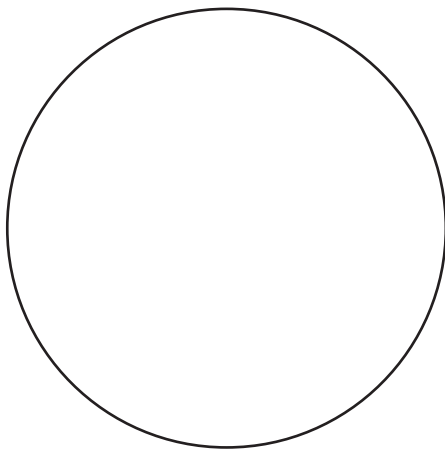
3. Draw the cells that you made.
4. Label the cell membrane, nucleus and chloroplasts.

The first pointer is drawn to show you how.

_____ CELL

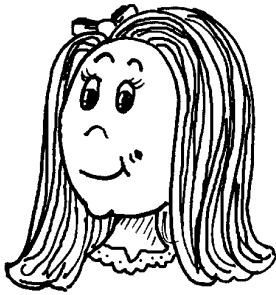


_____ CELL

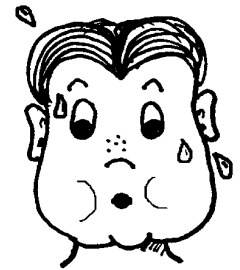
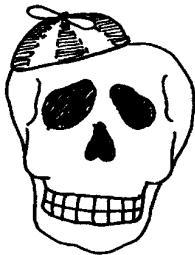


5. I can tell a plant cell from an animal cell because a plant cell:

and _____



THE HUMAN BODY



by

HUMAN BODY FOLDER – instructions

Material:

copy of The Human Body divider (page 41), pencil
12" x 12" colored cardstock (I like scrapbooking paper as it lasts longer and doesn't fade)
12" x 18" construction paper or good, thick drawing paper
3 hole punch
glue gel (Elmer's School glue Gel- We call it blue glue because it is)
stapler
scissors
yarn
colored pencils

Aloud: We are going to start studying the human body- your body. Every part in your body helps you to stay alive. We will be learning what many of these parts do and how they work together. Can you imagine riding a bike if the wheels were missing? What if it had no pedals? Just like the different parts of a bike, your body parts must work together. If just one part is missing, or not doing its job, your body can stop working for you. Groups of body parts that help do a job together are called body systems. One body system keeps you fed, another keeps your blood moving. Before we learn about these systems, we are going to put together a folder to store all of your human body information in. It will be a folder of how your own body works.

Procedure:

Lab Day:

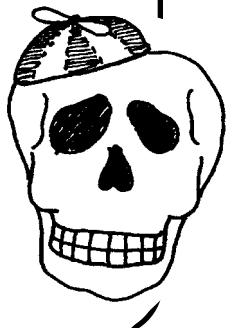
1. Decorate and color "The Human Body" divider page. Add your name to it. Glue it to the 12" x 12" page to make the front cover for your folder.
2. Fold up the bottom 6" of the 12" x 18" piece of paper so that you form a 12" x 12" page with a pocket at the bottom. Staple the right side closed. The pocket will be inside the folder.
3. With the 12" x 12" cover in front and the pocket inside, three hole punch the left side of both pages. Tie yarn in the holes to hold the folder together.
4. As you do the human body units, add any pages to your folder that you wish. Lab pages can be tied in with the yarn, paper models (like a muscle model and skeleton "puzzle" you will be making) can be put into the pocket.
5. Have fun learning all about how your body works!

For my notebook

SKELETAL AND MUSCULAR SYSTEMS

Why aren't you just a gooey blob like a sea jelly? Because you have bones. These bones protect delicate organs like your heart, brain and lungs and they support you so that you can stand up and move. Did you know that most animals don't have any bones at all? Insects, worms, slugs, sea jellies and many others have no bones. Run your hands around your ribs. You can follow them from your vertebrae or backbones all the way around to the front by your chest. All of your ribs together form your rib cage. Why do you think they call it a "cage"? Feel the bony plate where your ribs meet in front. This is your sternum (*str-nuhm*) and it protects some very important organs inside of you. Bones are connected to each other in remarkable ways that allow us to move around, but without muscles to pull our bones back and forth we would be as still as a puppet with no strings. Bend your arm at the elbow. When you do this, the muscle on the front of your upper arm pulls to become shorter. When you straighten your arm again, the muscle in back pulls and shortens. These muscles that move you around aren't the only muscles in your body. Your heart is one special kind of muscle but there are many others. Muscles help with everything from breathing to digesting food to moving your eyes.

So, with bones to hold you up and muscles to get you moving you can go places no sea jelly could ever imagine.



Skeletal System Lab #1: MY SKELETON HOLDS ME UP

- instructions

Material:

copy of lab sheet (1 page)
scissors
glue gel (Elmer's School Glue Gel)
1 - 8 1/2" x 11" black (or other color of choice) construction paper
white or gold pen that will mark on black paper

Aloud: Your skeleton is a framework of bones that gives you shape and holds you up. It also protects delicate organs from bumps and bruises. Bones have funny names but they aren't really hard ones to learn. You probably already know that your brain is protected by your skull. You may even know that hips are wide bones called the pelvis. When you hit your arm just right it sends an icky tingle down your arm doesn't it? So it isn't very humorous to hit your humerus, is it? Your femurs are the longest bones in your body. Can you find which ones those are? Have fun cutting out and gluing your skeleton puzzle together and as you go, think about which part of your body each bone is in.

Procedure:

Lab Day:

1. Cut around each section of bones. The black around each one gives little hands a little room for error.
2. Lay the bones on the black paper where you think they should go. Check arms and legs, feet and hands on the sample in the corner of the lab sheet.
3. Once you have everything where it belongs, remove and glue the pieces down one at a time.
4. If you wish, use a white or gold pen to label the major bones.

Possible Answers:

See sample on lab sheet for correct bone placement

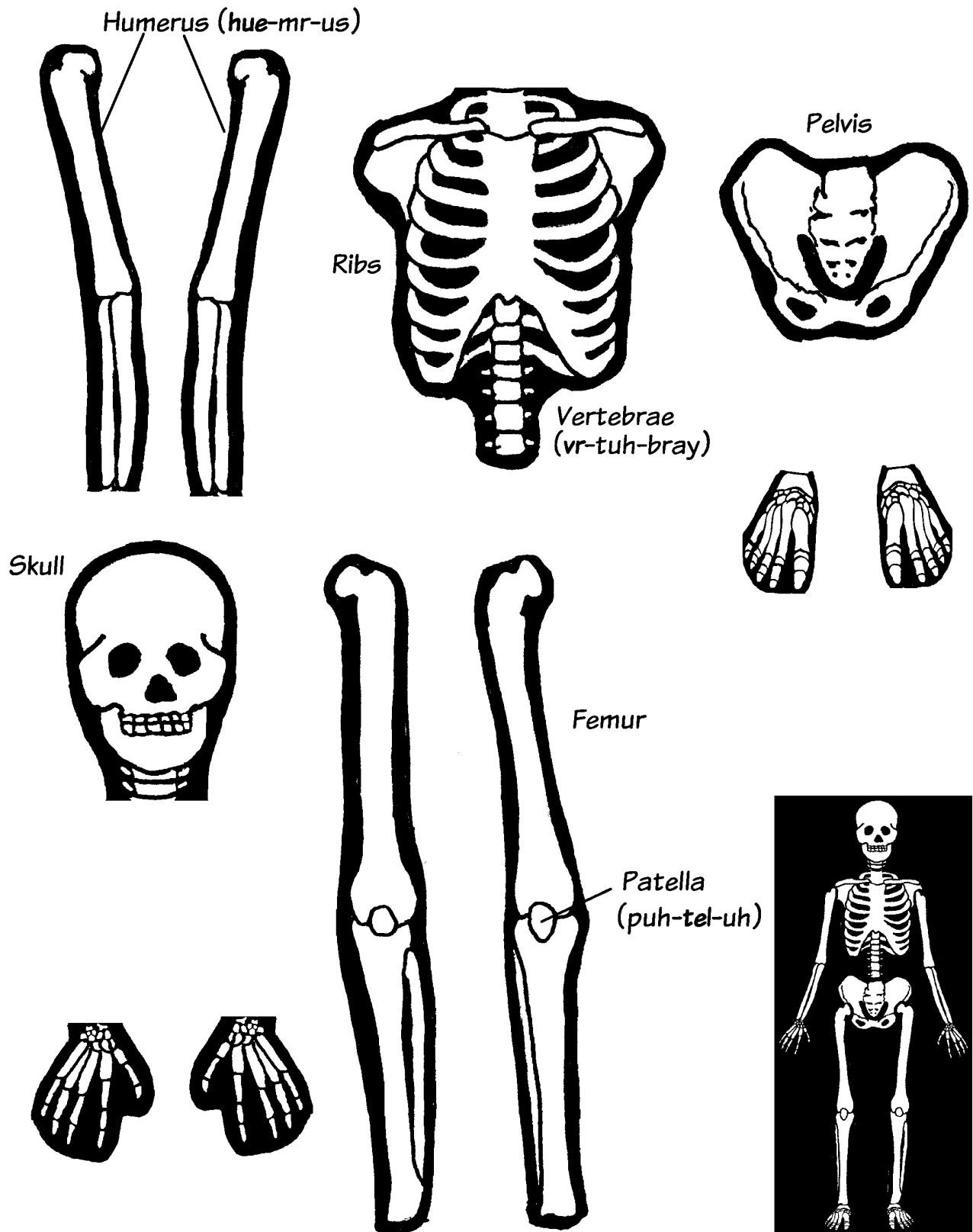
Conclusion / Discussion:

1. Without bones animals can't get very tall, or must live in water so the water can hold them up. Sea jellies are tall but they float in water. On land the tallest invertebrate (boneless animal) is probably an insect. Doesn't compare to human height, does it?
2. How do we know there will never really be monstrously large spiders and scorpions like we see in science fiction movies?

For More Lab Fun:

1. Play Simon Says using the names of bones. You can pat your skull or touch your patellas, tickle your ribs or thump your sternum.
2. Next time you pull apart a chicken or turkey for dinner, take a good look at the bones. Compare them to human bones.
3. Older children may want to identify and label the following bones as well
 - lower arm bones are the radius and ulna
 - lower leg bones are the tibia and fibula
 - fingers and toes are all phalanges
 - your jaw is your mandible
 - your shoulder blades are called scapula
 - your collar bone is your clavicle

Skeletal System Lab #1: MY SKELETON HOLDS ME UP



Muscle Lab #1: MUSCLES AREN'T PUSHY - instructions

Material:

copy of lab sheet (3 pages), pencil
1 - tagboard or very heavy copy paper - 8 1/2" x 11"
pair of scissors
hole punch
1 metal fastener
string or thread 70 cm. long (about 28") cut in half
tape
ruler

Aloud: Bones hold us up but without muscles to move those bones we'd be a lot like a tree - stuck in one spot. Muscles pull to move bones but they can't push. Because of this, muscles have to work in twos. To bend your arm, one muscle pulls and then to straighten your arm back out, a muscle on the other side has to pull. We're going to make a model of an arm and show how two muscles work together to move it.

Procedure:

Lab Day: Make Your Arm Model

1. Trace or photocopy pattern of upper and lower arm onto thick paper. Cut out.
2. Punch holes at circles and at center of X's. You will have 3 holes in piece Q and 1 hole in piece Z.
3. Place pieces Q and Z as indicated in top diagram on page 56. Push metal fastener into holes at the X's to secure pieces.
4. Thread one piece of string from back, through each hole at the top of Q and tape them down onto piece Z where indicated in bottom diagram.

Using Your Model

5. With arm in position shown in diagrams, pull slack from strings then measure and record length from end of hole to start of tape. Record on line labeled "Beginning."
6. Carefully pull string #1 until arm can't move any further. Again, measure both strings and record on chart. Compare lengths with those from the beginning to fill in all answers in the row for "String #1 pulled."
7. Pull string #2. Repeat measurements and record.
8. Finish filling in chart for "String #2 pulled."
9. Answer lab questions.

Possible Answers:

1. Lower arm and hand or forearm.
2. Upper arm
3. Muscles
4. 2
5. Front

Conclusion / Discussion:

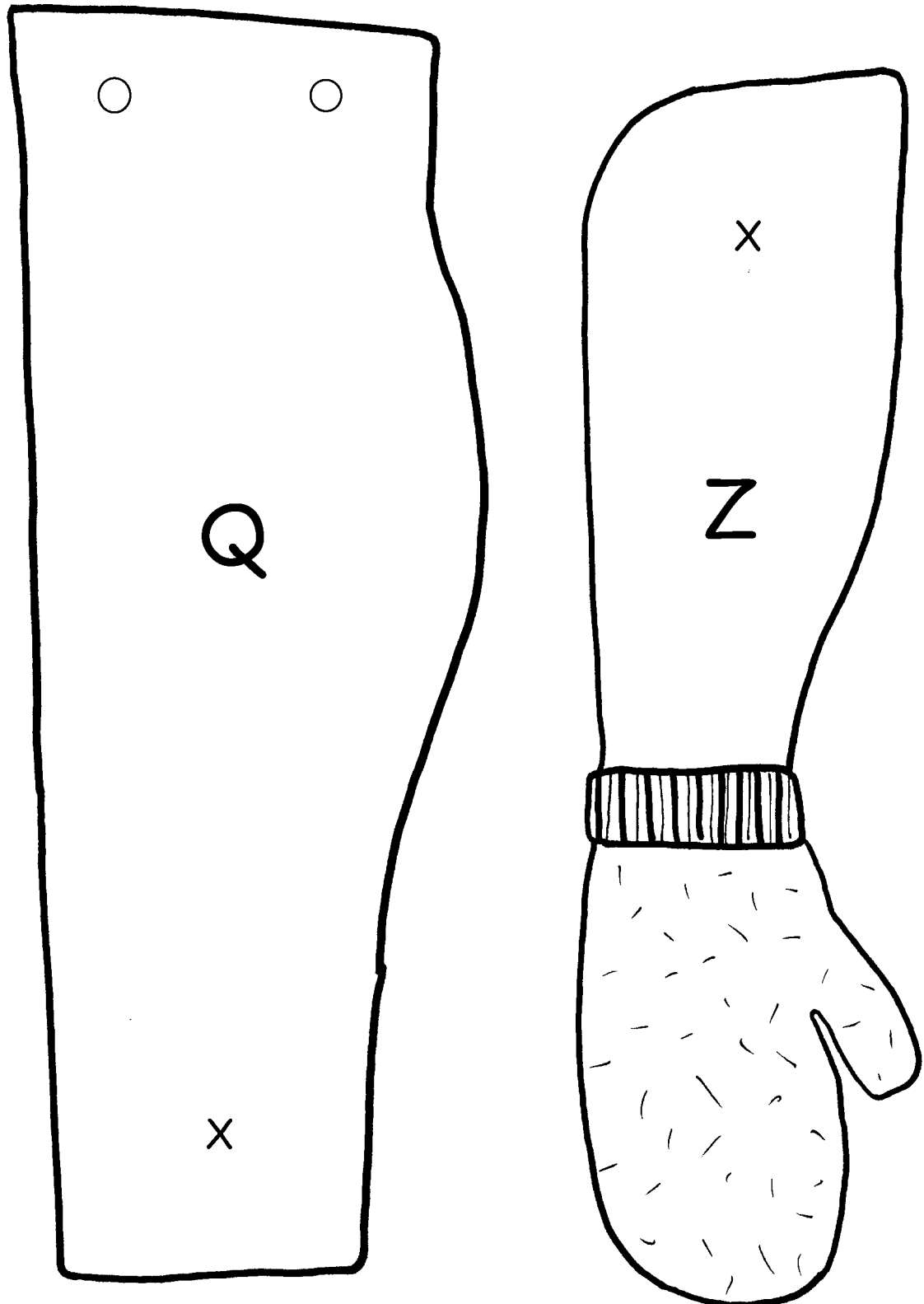
- Help children notice that as a muscle pulls it is actually becoming shorter. When the opposing muscle (the one that does the opposite motion) pulls, the original muscle relaxes and gets longer.

NAME _____

DATE _____

Muscle Lab #1: MUSCLES AREN'T PUSHY- pg. 1

Trace the parts below onto tagboard. Cut out and follow the directions to assemble your arm model.



NAME _____ DATE _____

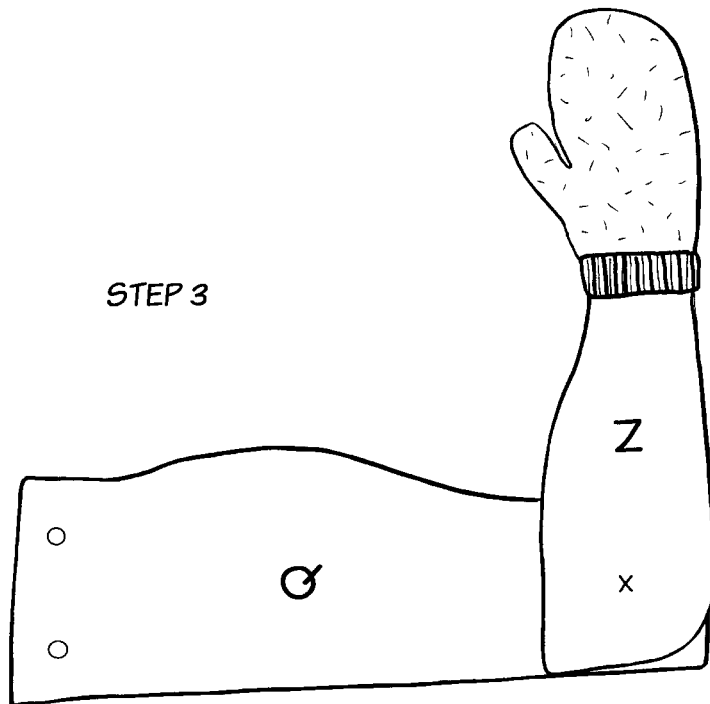
Muscle Lab #1: MUSCLES AREN'T PUSHY- pg. 2

| | Length of String #1 | Length of String #2 | String #1 gets (Shorter or longer) | String #2 gets (Shorter or longer) | Arm (bends or straightens) |
|-------------------|------------------------|------------------------|---------------------------------------|---------------------------------------|-------------------------------|
| Beginning | cm. | cm. | _____ | _____ | _____ |
| Pull String #1 | cm. | cm. | | | |
| Pull String #2 | cm. | cm. | | | |

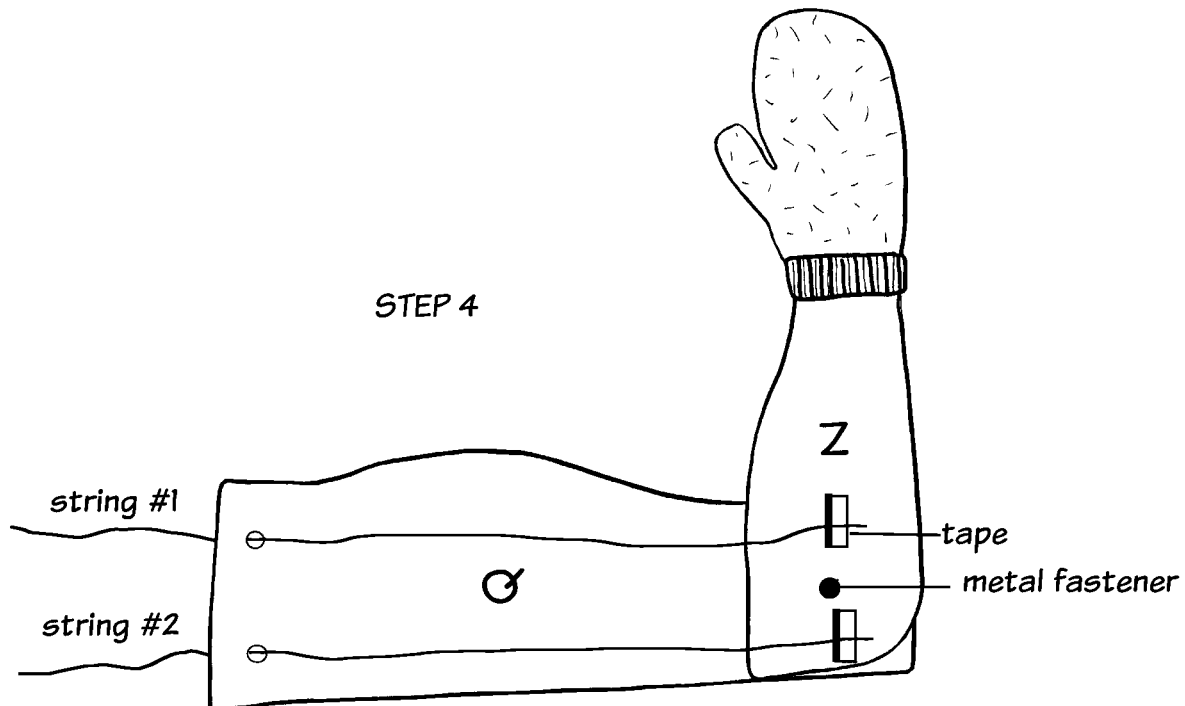
1. What part of your body is part Z supposed to be? _____
2. What part is part Q supposed to be? _____
3. The strings are supposed to be _____
4. How many muscles does it take to move an arm up and down? _____
5. When your elbow bends which muscle is getting shorter, the muscle in the front or the one in the back of your arm? _____

Muscles Lab #1: MUSCLES AREN'T PUSHY- pg. 3

STEP 3



STEP 4

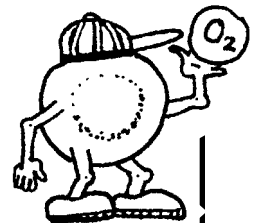


Side of tape shown in dark should be about even with metal fastener.
Be careful tape doesn't hang over and stick to part Q.

For my notebook

CIRCULATORY SYSTEM - YOUR HEART AND BLOOD

You know that muscles are important body parts, but which muscle is the MOST important? Your heart would probably have to take that prize. Your heart is a muscle that pushes blood all through your body. This blood carries oxygen, food and water and it carries special cells that fight diseases. Blood travels through tubes called blood vessels. The vessels going away from your heart are called arteries (ahr-tuh-reez). The vessels going back to your heart are called veins (vaynz). How long are all these vessels? Well, if you could lay them all end to end they would go all the way around the world. Now, hold up your hand and make a fist. Your fist is about the size of your heart. Not very big for all the work it does, is it? Your heart may not be very big but it sure is powerful. Try to squeeze a tennis ball hard enough for it to squish in. That's how hard your heart squeezes and it does that between 80 and 100 times each minute. Now that is a powerful muscle!



So, your circulatory system moves blood all through your body. The heart is the muscle that pushes the blood away through arteries and then back again through veins. Along the way, blood carries oxygen, food and water as well as cells that fight diseases. By drinking water, eating right and exercising regularly you can help keep this amazing system healthy for many years. Now that doesn't seem like too much to ask for something that works that hard for you, does it?

Circulatory System Lab #1: YOUR HEART RATE - instructions

Material:

copy of lab sheets (2 pages), pencil
watch with second hand
crayons- 6 colors

Aloud: Your heart works hard to supply your whole body with the food, water and oxygen it needs. Your body needs these things just like a car needs gasoline. Without fuel, your body will stop working. In fact, the harder your body works, the faster it uses up the fuel in it. When you are exercising hard, your heart pumps faster to hurry food, oxygen and water to all the parts of your body. When you slow down, so can your heart because your body doesn't need as much of these things. In this lab you will compare how fast your heart is working when you are resting with how fast it works when you are exercising. Let's see just how well your heart can tell how much work your body is doing.

Procedure:

Lab Day:

1. Fill in questions 1 - 4 on lab page 1.
2. PARENTS: It's might be easiest if you to take your child's pulse for him. Younger children often lose count easily.
3. Practice finding your (or your child's) pulse. One easy place to find a pulse is on the wrist. Using your index and middle fingers but NOT your thumb (which has it's own pulse) find the stiff ridge that runs down the inside of the wrist on the thumb side. Place two fingers on the thumb side of this ridge. Push down slightly and you should find a pulse.
4. Sit very still and quiet for a minute. Take pulse for 20 seconds. Continue with activities and checking pulse. Fill in beats per 20 seconds. For exercise #10 choose your own favorite. Depending on math level, either add pulse three times (for example, if you count 60 heartbeats in 20 seconds, you would add $60 + 60 + 60$) or multiply pulse by 3 (60×3) to find pulse for one minute. Finish page one.
5. Fill in and color graph to show comparison between resting and working heart rates. Complete lab.

Possible Answers:

4. My heart pumps faster when I am working hard because my body needs more fuel when it is working.

Conclusion / Discussion:

1. How did the difficulty of the exercise compare to the heart rate? Why is this?

For More Lab Fun:

1. Take pulse every minute after exercising. See how long it takes pulse to return to normal. Graph the results.
2. Take a field trip to a blood bank. See how they screen donors and take blood. Learn about blood types.
3. Learn the basics of CPR.

NAME _____

DATE _____

Circulatory System Lab #1: YOUR HEART RATE - pg. 1

Of the activities below, I think:

1. _____ will be the easiest and

2. _____ will be the hardest.

3. I think my heart will beat fastest when I _____

4. I think my heart will beat slowest when I _____



My heart rate for 20 seconds of:

- | | | | |
|-----------------------|---------------|---|-----------------------------|
| 5. Sitting still | = _____ beats | X | 3 = _____ beats each minute |
| 6. Walking (1 minute) | = _____ beats | X | 3 = _____ beats per minute |
| 7. Jumping Jacks (10) | = _____ beats | X | 3 = _____ beats per minute |
| 8. Sit ups (10) | = _____ beats | X | 3 = _____ beats per minute |
| 9. Push ups (10) | = _____ beats | X | 3 = _____ beats per minute |
| 10. _____ | = _____ beats | X | 3 = _____ beats per minute |

(exercise of my choice)

Circulatory System Lab #1: YOUR HEART RATE-pg. 2

Enter the heart rates you calculated onto the graph below.

Color in the graph using a different crayon for each activity.

[illegible]

1. _____ was the easiest for me to do. My heart beat slowest when I did _____
2. _____ was the hardest for me to do. My heart beat fastest when I did _____
3. _____ exercises that make me work hardest, make my heart pump faster.
(The same or Different)
4. My heart pumps faster when I am working hard because _____

Circulatory System Lab #2: BLOOD MODEL - instructions

Material:

- copy of lab sheets (2 pages), pencil
- crayons- tan, blue, yellow, red
- 1 1/2 cup or larger clear jar with wide mouth
- stirring spoon
- 1/2 cup light Karo syrup (PLASMA) (plaz-muh)
- 1/2 cup Red Hots candies (RED BLOOD CELLS)
- 5 dry large lima beans (WHITE BLOOD CELLS)
- 1 tablespoon dry lentils or split yellow peas (PLATELETS) (playt-lets)

Aloud: Blood looks like a smooth, red liquid, but it's not. Blood is actually a straw colored liquid with tiny cells mixed in it. Your lab today will show you the main blood parts so you can learn what they are for and what they look like. Blood parts are so tiny you can't see them without a microscope so, after coloring the blood picture, we will be making a model of blood to show how the parts look close up.

Procedure:

Lab Day:

1. Color in the blood picture as indicated. Make sure to read all of the information on this sheet.
2. Measure out the amounts of Karo syrup, Red Hots, lima beans and lentils indicated above. Pour them into the jar, one at a time, calling them the blood parts they represent. For instance, don't say "Pour in the Karo syrup." Instead say, " Pour in the Plasma."
3. Mix gently with spoon and compare to real blood.

Possible Answers: (to page 66)

- Red hots = red blood cells
- Karo syrup = plasma
- Dry lima beans = white blood cells
- Dry lentils = platelets
- Plasma keeps things moving and transports food
- Red blood cells carry oxygen
- White blood cells fight diseases by eating harmful bacteria
- Platelets plug up wounds to help clot the blood

Conclusion / Discussion:

- Discuss the following: Is blood all red? (No). What part of blood gives it its red color? (red blood cells). How many major parts make up blood? (4).

For More Lab Fun:

1. Look at the underside of your tongue in the mirror. Can you see where the blood has no oxygen (blue veins) and where the blood has oxygen (red arteries)?
2. Make a round cake. Frost it with yellow frosting (plasma). Decorate with white jelly beans (white blood cells), red M & Ms (red blood cells) and silver cake decorating balls (platelets). Put on a vampire cape and share your blood with your friends.

For Your Information:

1. Blood is red because red blood cells have iron in them. Iron mixed with oxygen becomes red. On the way back to the heart, after giving up its oxygen, blood is a bluish color. Insects and other animals have different colored blood because their blood cells aren't iron-based.
2. Arteries carry blood away from the heart so they usually contain red, oxygenated blood. Veins carry blood back to the heart so they usually carry blood with no oxygen.

NAME _____

DATE _____

Circulatory System Lab #2: BLOOD MODEL- pg. 1

This is what a drop of blood looks like under a microscope. Read the clues below and color the parts of the blood as indicated. Next, read the jobs each blood part performs. Write the name of that blood part.

White Blood Cells: I am the biggest cell in your blood. I have a nucleus that is often split into 2 or 3 parts. Color me tan.

Plasma: I am mostly water. I make up about half of your blood. Color me yellow.

Platelets: I am the tiniest part in your blood. Color me blue.

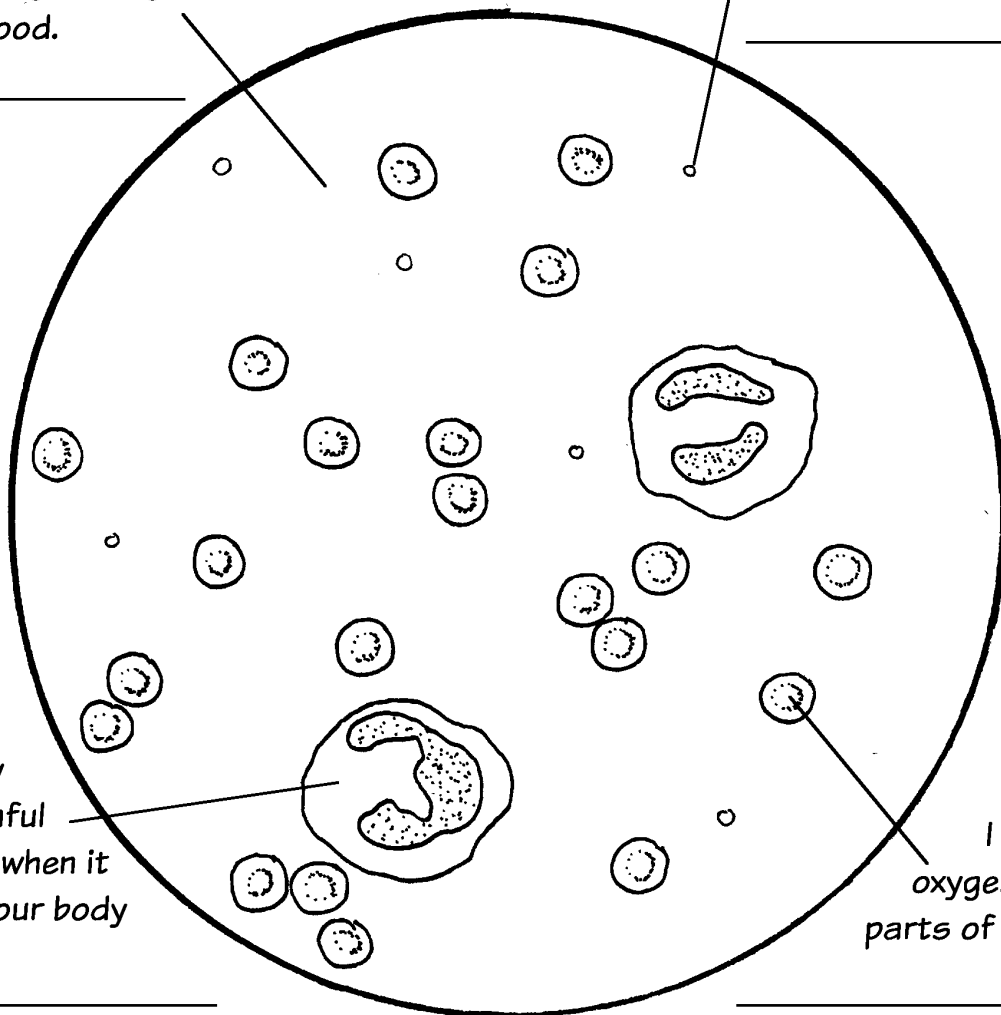
Red Blood Cells: I am shaped like a round candy, dented in on both sides. There are more of me than any other blood cells. You can color me red.

I am the liquid that keeps everything moving. I also carry food.

I plug up cuts to stop them from bleeding.

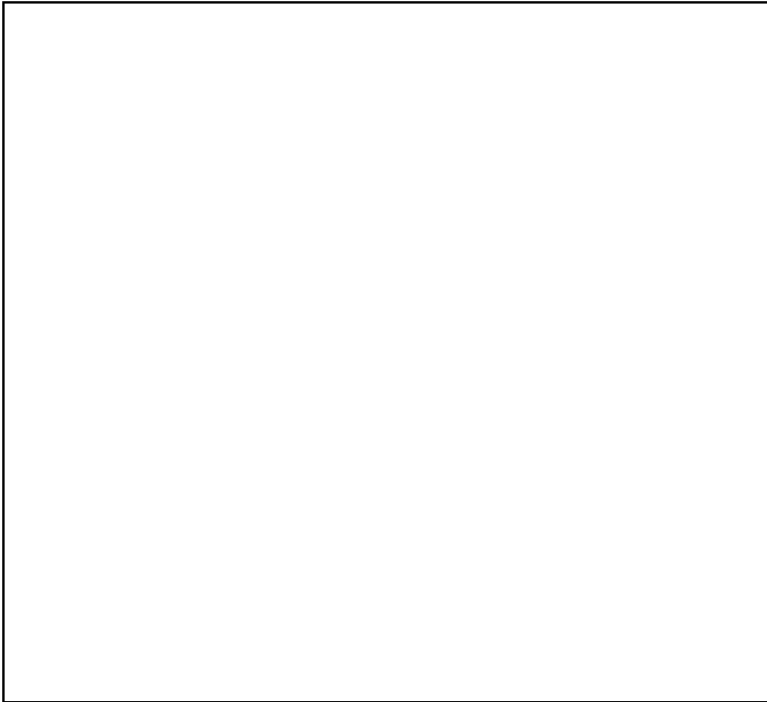
I actually eat harmful bacteria when it enters your body

I carry oxygen to all parts of the body

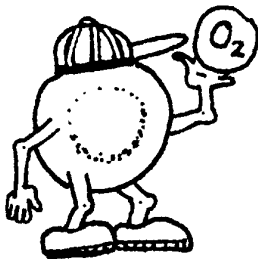
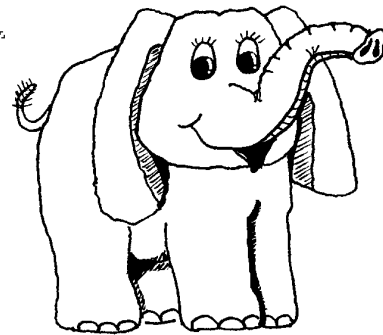


Circulatory System Lab #2: BLOOD MODEL- pg. 2

Draw your blood model in the square below.



A person's heart weighs
about 1 pound.
An elephant's heart weighs
about 44 pounds!



What am I and what
am I delivering?

Which blood part does each item represent?

Red hots candies = _____

Karo syrup = _____

Dry Lima Beans = _____

Dry Lentils = _____

In the spaces below, write the job done by each part of your blood.

Plasma _____

Red Blood Cells _____

White Blood Cells _____

Platelets _____

For my notebook

YOUR RESPIRATORY SYSTEM BREATHES FOR YOU

What surrounds you all the times but you cannot see it, feel it, hear it, taste it or smell it? Air! There is nothing more important to your body than air. Air is a mixture of many things but the oxygen in air is what your body needs most. Oxygen is a gas that your body combines with the food you have eaten to make energy. When you run your body needs more energy, doesn't it? Because of this, when you exercise, you breathe faster to get more oxygen to make more energy. When you slow down, your breathing can slow down too. When you inhale or breathe in, air goes in your nose or mouth, down a tube called a trachea (tray-kee-uh) and into your 2 lungs. Your lungs are big bags made of a bunch of tiny bags that fill with air. Blood is pumped in tubes all around these tiny air sacs. Oxygen from the air goes into the blood and carbon dioxide, a waste your body makes, comes from your blood and goes into the air sacs. When you breathe out, the carbon dioxide leaves your body. In with the good and out with the bad. It's a great system and it shows how all of our body systems work together to keep us alive.

Your respiratory system breathes in air, passes the oxygen to your *circulatory system* – which combines it with food from your *digestive system* to make energy for your *muscular system*. Whew! And I thought breathing was so simple!



circulatory system - pg. 57; digestive system - pg. 77; muscular system - pg. 45

Respiratory System Lab #1: BREATHING RATE - instructions

Material:

copy of lab sheets (2 pages), pencil
completed "Circulatory System lab- YOUR HEART RATE" page 62 (for reference)
watch with second hand
crayons- 6 colors

Aloud: When you breathe your body takes in oxygen. This oxygen is carried to all the cells in your body. Oxygen is needed by your cells to turn food into fuel. Without this fuel your body wouldn't be able to grow and do work. If oxygen is needed for your cells to do work, how do you think your breathing will change when your body is working harder than normal? We are going to do a lab to find out how hard work and exercise effect the way you breathe.

Procedure:

Lab Day:

1. Fill in questions 1 - 4 on lab page 1.
2. PARENTS: It is probably easiest if you count your child's breaths. Younger children often lose count easily.
3. Sit very still and quiet for a minute. Count the breaths you take for 30 seconds. Continue with activities and checking breathing rates. Fill in breaths per 30 seconds. For exercise #10 choose your own favorite exercise. Depending on math level, either add breaths two times (for example, if you take 20 breaths in 30 seconds you would add $20 + 20$) or multiply breaths by 2 (20×2) to find breathing rate for one minute. Finish page one.
4. Fill in and color graph to show comparison between resting and working breathing rates. Complete lab. Refer to YOUR HEART RATE lab page 62 to answer question #3 (hardest exercise for my heart)

Possible Answers:

- #4. My heart and lungs work together to take oxygen from outside the body and move it to all the cells in my body.

Conclusion / Discussion;

1. Discuss results. How did the difficulty of the exercise compare to the breathing and heart rates?. Why is this?
2. Discuss how the circulatory, respiratory and digestive systems are interconnected. They all do their part to provide the body with the chemicals it needs to survive.

For More Lab Fun:

1. Learn the basics of the Heimlich maneuver.
2. Develop an exercise routine that conditions your muscles as well as your heart and lungs.

NAME _____

DATE _____

Respiratory System Lab #1: BREATHING RATE- pg. 1



Of the activities below, I think:

1. _____ will be the easiest and
2. _____ will be the hardest.
3. I think my breathing will be slowest when I _____
4. I think my breathing will be fastest when I _____

My breathing rate for 30 seconds of:

- | | | | |
|-----------------------|-----------------|---|------------------------------|
| 5. Sitting still | = _____ breaths | X | 2 = _____ breaths per minute |
| 6. Walking (1 minute) | = _____ breaths | X | 2 = _____ breaths per minute |
| 7. Jumping Jacks (10) | = _____ breaths | X | 2 = _____ breaths per minute |
| 8. Sit ups (10) | = _____ breaths | X | 2 = _____ breaths per minute |
| 9. Push ups (10) | = _____ breaths | X | 2 = _____ breaths per minute |
| 10. _____ | = _____ breaths | X | 2 = _____ breaths per minute |

(exercise of my choice)

Respiratory System Lab #1: BREATHING RATE- pg. 2

Enter the breathing rates you calculated onto the graph below. Color in the graph using a different crayon for each activity.

[illegible]

1. _____ was the *easiest* for me to do. I breathed slowest when I did _____
2. _____ was the hardest for me to do. I breathed fastest when I did _____
3. The hardest exercise for me was _____. The hardest exercise for my breathing was _____ and the hardest for my heart was _____
4. My heart and lungs work together to _____

Respiratory System Lab #2: I NEED OXYGEN - instructions

Material:

copy of lab sheet (1 page), pencil
4 pieces of 8 1/2" x 11" paper or paper plates
long tube (like vacuum cleaner tube or wrapping paper tube) label the tube "trachea"
red and blue math counters or chips about 10 each color
colored pencils- various colors
a helper/teacher (acting as the giant)

Aloud: Today you get to be a red blood cell (RBC) carrying oxygen through the body of a giant. You are going to start your journey in the giant's heart. From there you will go to the lungs, pick up some oxygen and go back to the heart. The giant's heart will pump hard enough to get you all the way to the giant's foot. Because the giant is walking, his foot will be using up oxygen and making carbon dioxide- a waste product. You will need to trade your oxygen for the carbon dioxide, take it to the heart so it can send you back to the lungs. Once in the lungs the giant will breathe out, sending the carbon dioxide out of his body. You will pick up more oxygen and go back around again. It's a long way to go for a little blood cell, like yourself, but you know it is a job that must be done for the giant to live.

Procedure:

Lab Day:

1. Using your highly developed artistic abilities, draw a big nose on one paper, a heart on another, a lung on another and a foot on another. Label each one. Color them, if you would like.
2. TEACHER: Lay out the papers as shown on the Respiratory Setup on back of this page (page 74). Lay the tube between the nose and the lungs. Spread the others out so that the entire giant is about 10 feet tall. The tube is the trachea. Place 5 blue chips on the foot plate.
3. GIANT: (inhales, bringing oxygen into his lungs)- slide 1 red chip down the trachea onto the paper lungs.
4. RBC: 1) Start in the heart 2) Go to the lungs to pick up one oxygen 3) Back to the heart 4) Out the heart and down to the foot. At the foot, trade your oxygen for one carbon dioxide there 5) Head back to the heart with the carbon dioxide 6) And finally back to the lungs to get rid of your carbon dioxide.
5. GIANT: (exhale) slide the blue chip up towards the nose so it can leave the body. Inhale again, sliding another red chip onto the lung.
6. Repeat as often as you would like to get children to understand the pathways of the blood, oxygen and carbon dioxide.
7. Have children complete the lab sheet, using the appropriate colored pencil (red or blue) to color in the path of the oxygen and carbon dioxide.

Possible Answers:

SEE BACK OF PAGE FOR SETUP AND ANSWERS

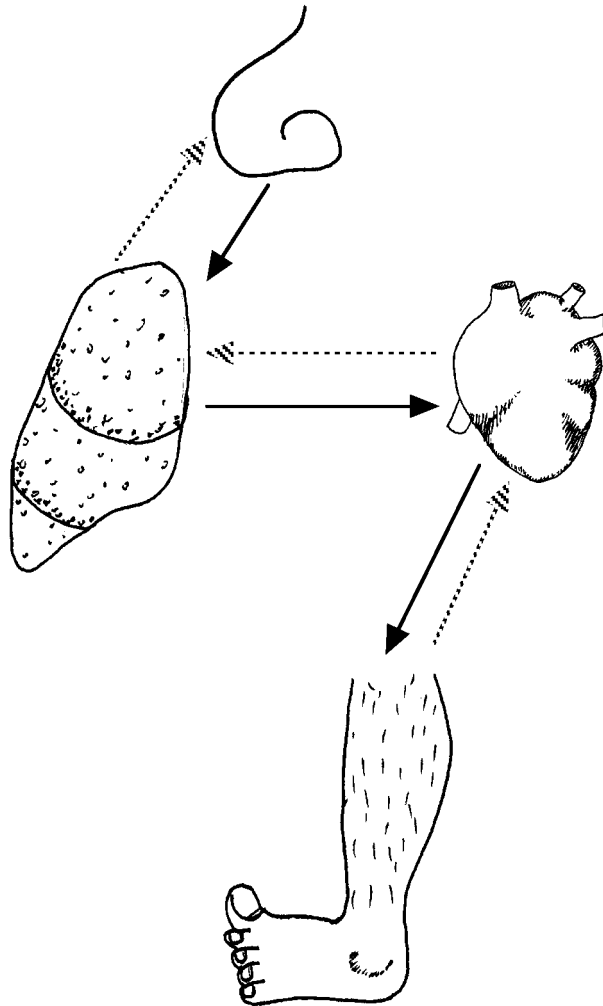
For More Lab Fun:

1. Continue with the giant breathing but start with all 10 blue chips on the plate and "breathe" faster, sliding the red chips onto the plate more quickly. Ask your child what he thinks is happening (the giant is exercising and using up more oxygen). The blood has to get moving to keep up with the oxygen demands. Go faster and slower, asking what might be going on (The giant could be riding a bike, watching a scary movie, sleeping etc.)

Respiratory System Lab #2: I NEED OXYGEN - instructions

SETUP:

Set up your giant as shown below. Make sure the parts are fairly far apart (about 10' total). Arrows are the answers for questions #1 and #2 of the lab. Don't show them to the students!



POSSIBLE ANSWERS:

- #1 (solid lines = red = oxygen) Note: Oxygen makes the hemoglobin in blood turn red so oxygenated blood is red.
- #2 (dashed lines = blue = carbon dioxide) Note: Deoxygenated blood (blood without oxygen) has a bluish color.
- #3 When you exercise your body is using more oxygen and producing more carbon dioxide so RBCs have to deliver them faster.
- #4 Your RBCs are moving faster because your heart is pumping faster. You can feel your heart, breathing and pulse speed up.

CONCLUSION / DISCUSSION:

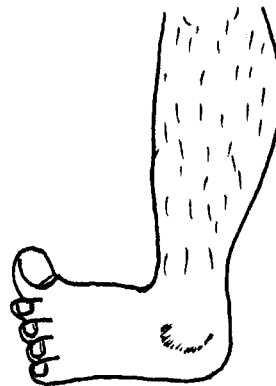
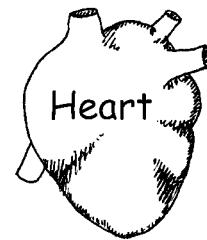
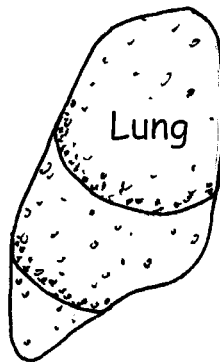
1. Tell children that oxygen makes the blood red and when there isn't oxygen in it blood looks blue. Have them look at the underside of their tongues to see blue veins. To show red, oxygenated blood, in semidarkness, shine a flashlight through a finger or into your mouth, with your mouth closed around the light. You'll be surprised at how red your cheeks are with light shining through them. It's fun!

NAME _____

DATE _____

Respiratory System Lab #2: I NEED OXYGEN

1. With a red pencil, use arrows to show the path oxygen takes from where it enters the body until it reaches the foot.
2. With a blue pencil, use arrows to show the return journey made by carbon dioxide.



3. Why do your RBCs have to move faster when you are exercising?

4. How can you tell your RBCs are moving faster? Can you feel them?

NAME _____

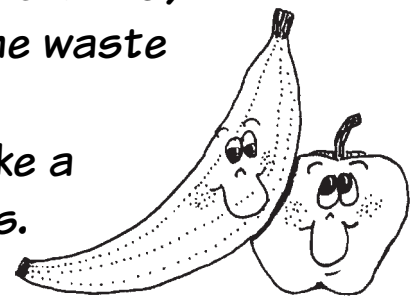
DATE _____

For my notebook

THE DIGESTIVE SYSTEM FUELS YOUR CELLS

What is your favorite fruit? How about your favorite vegetable? Did you know that the food you eat is used to make new cells so your body can grow and repair itself? It also provides energy to your body cells to do work. Do you remember how your heart and breathing get faster as you work harder? That's because the cells all over your body need more oxygen and food as you work harder. Your blood delivers that oxygen and food. When you eat, you know that food goes to your stomach, but to your brain, skin and every other part of your body? Yes! Food, water and oxygen go to all parts of your body to make new cells and to keep the cells you already have healthy. Have you heard the saying "You are what you eat"? It's really true. When you eat a handful of peanuts, new cells all over your body will be made of tiny parts from those peanuts. It takes chewing, sloshing, mixing and a lot of time to turn those peanuts into the parts needed to make cells. In fact, food can stay inside your body for 2 days. Your digestive system is more than just a stomach. It starts at your teeth, goes to your esophagus (ih-sohf-uh-guhs), stomach, small and large intestines (in-tehs-tihns) and ends at your anus, (ay-nuhs) where the waste leaves your body.

So, let's find out what it takes to make a bunch of broccoli into a batch of body cells.



Digestive System Lab #1: DIGESTIVE DIAGRAM - instructions

Material:

copy of lab sheet (1 page), pencil
Digestive System Notebook page (for reference)
colored pencils (blue, green, yellow, red, brown)

Aloud: It takes a lot of work to make food into energy for your body. We learned what some of the parts of the digestive system are called. Now let's color in a diagram of the digestive system to learn what those parts look like.

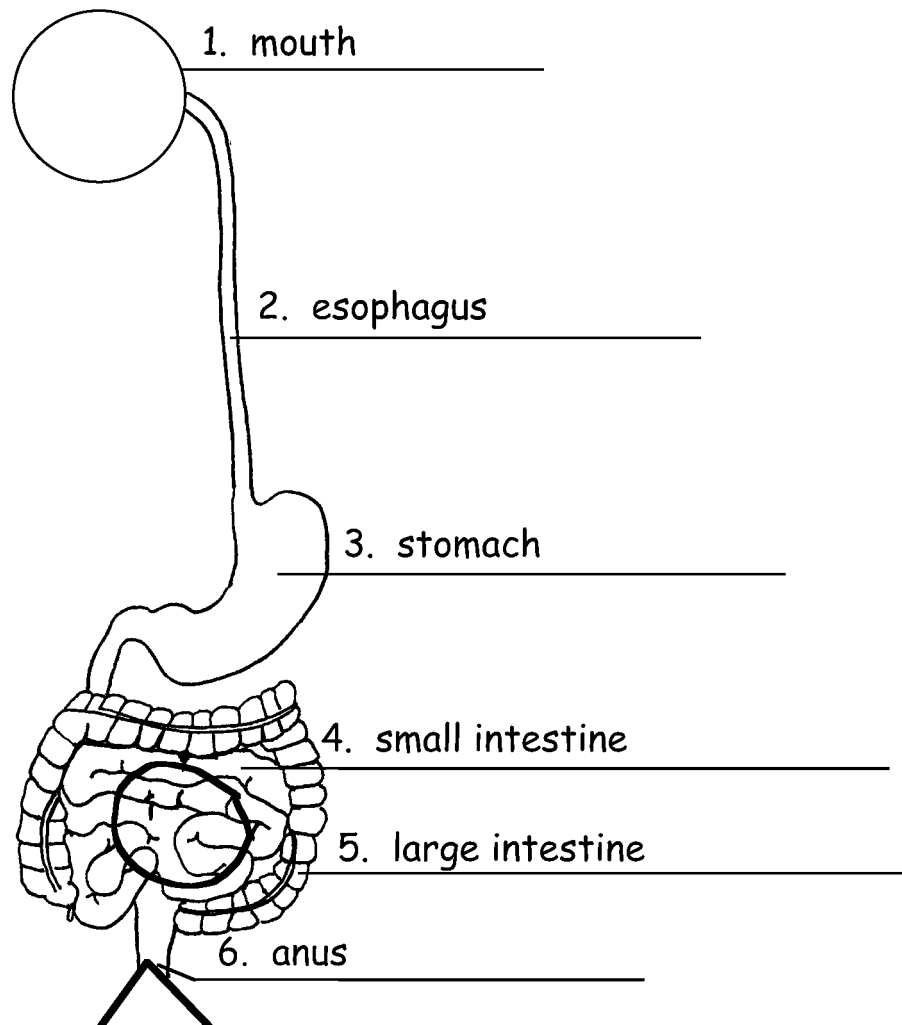
Procedure:

Lab Day:

1. Follow the instructions on the lab sheet. Label each part as numbered and then color in as indicated.
2. Follow the instructions at the bottom of the page.

For Your Information:

See diagram below for answers

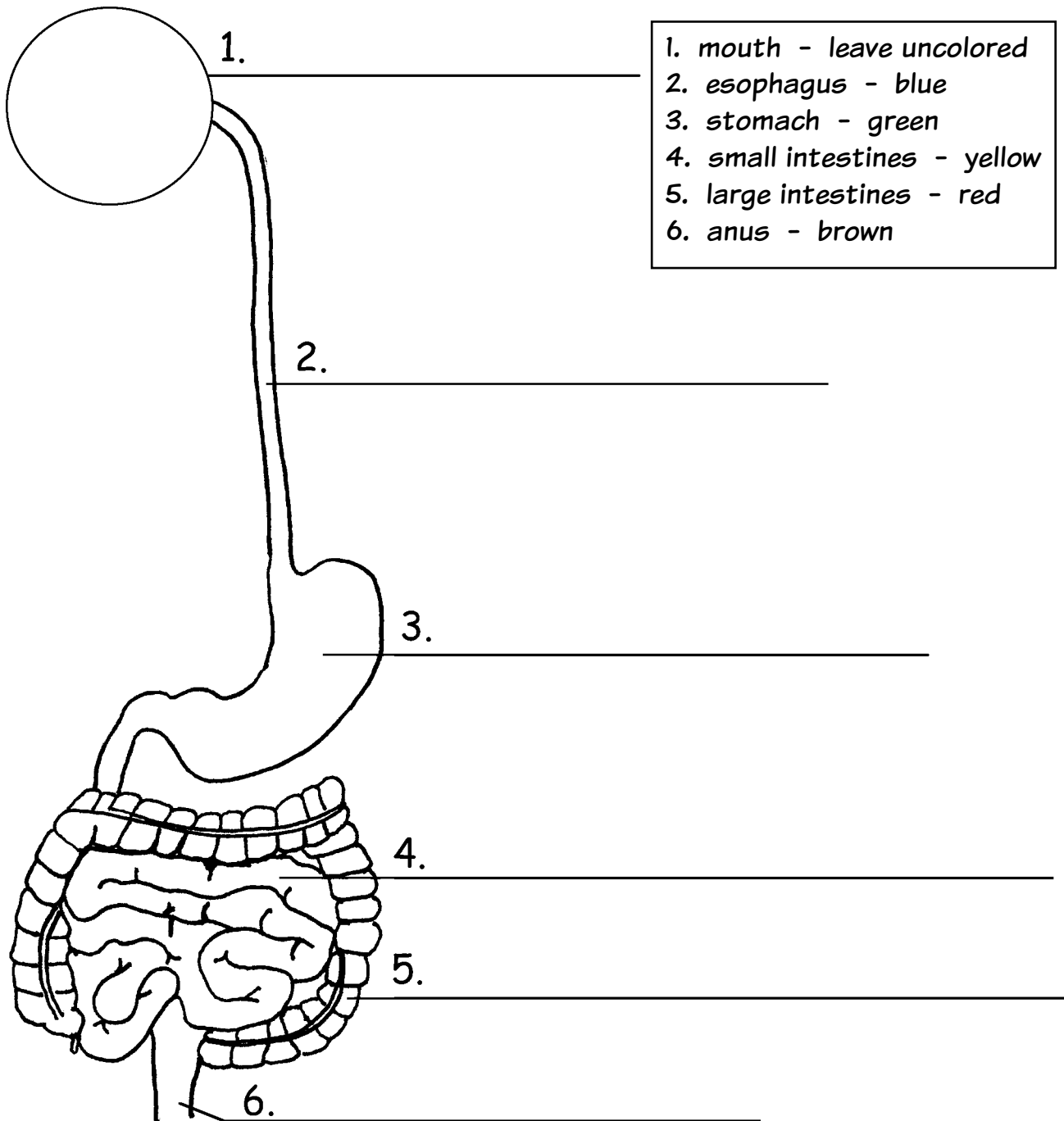


NAME _____

DATE _____

Digestive System Lab #1: DIGESTIVE DIAGRAM

Use the key to label the parts of the digestive system and then color them in with the colors indicated.



Draw silly teeth in the circle to show where food is first broken down.

Draw a circle on a coiled part of the digestive system.

Draw a triangle showing where undigested food and waste leave the body.

Digestive System Lab #2: FOOD TRAVELS FAR – instructions

Material:

copy of lab sheet (1 page), pencil
yarn- about 22' long
yard stick
5- 3" x 5" recipe cards
stapler

Aloud: "Mmmm. Great muffin. Thank you." The food you eat takes a longer journey through your body than you might expect. After you finish chewing up that muffin, your tongue pushes it back to be swallowed and it goes into a long tube called the esophagus. The esophagus squeezes the now smashed up muffin down into your stomach where it is mixed and mashed some more. After about 3 hours the muffin will leave your stomach and enter your small intestines. From there it will go on to the large intestines before leaving your body. Let's find out just how long your digestive tract is.

Procedure:

Lab Day:

1. Complete the "Hypothesis" section of the lab.
2. From one end of the yarn, mark off 3 inches. This is the length of the average child's mouth. Tie a knot in the yarn at that mark and label the index card "Mouth – 3 inches." Staple card to that section of the yarn.
3. From the first knot, measure and mark off 10 inches for the esophagus. Tie a knot and label the next index card "Esophagus – 10 inches."
4. Food dumps from the esophagus into the stomach. Measure 6 inches for the length of a child's stomach. Knot the yarn and label this section "Stomach – 6 inches."
5. The small intestine is the shocker. Measure off 15 feet for the small intestines. Food can spend about 3 hours in the small intestines where digestion is completed and from which the nutrients from the food can be absorbed. Knot and label this section "Small intestine – 15 feet."
6. Finally, measure off an additional 4 feet for the large intestines where water will be absorbed into the body. Cut the yarn at this point and label this section "Large intestine – 4 feet."
7. Stretch out your entire digestive system. Were you surprised at how long it is?
8. Enter actual lengths on #4. For #5, add together lengths, rounding to the nearest foot (total = 21').
9. Subtract your guess from the actual length to find how far off you were. Discuss the difference. Were you surprised? Were you close?
10. For #7 divide length of yarn by height of child OR have child lay next to yarn, mark where his head reached, have child move up yarn to there and repeat until he has figured out how many body lengths long his yarn (digestive tract) is.
11. For #8: At three meals a day, in three days, your child will have eaten $3 \times 3 = 9$ meals before his last one is all the way through his digestive tract.

Possible Answers:

Answers provided in the directions.

Conclusion / Discussion:

1. Discuss how many steps and how far food travels before it is completely digested.
2. Discuss the fact that at any one time a person has 9 past meals somewhere within their digestive tract. It's amazing we EVER feel hungry!

For More Lab Fun:

1. Eat an apple (or anything else). Throughout the day, announce the times it reaches each new point as follows: Esophagus in 15 seconds, stomach in 10 more seconds, small intestine in 3 hours, large intestine in 3 more hours and anus (exit) in about 2 days. You will need a calendar for the last one. In 3 days I want you to call out, "Hey everybody! The apple's done!"

NAME _____ DATE _____

Digestive System Lab #2: FOOD TRAVELS FAR

HYPOTHESIS (MY BEST GUESS):

1. My height to the nearest foot (measure) _____
2. The length of my digestive tract (estimate) _____ feet
3. The time it will take a muffin to be digested _____

TEST:

4. Length of the:



mouth + _____
esophagus + _____
stomach + _____
small intestine + _____
large intestines + _____

5. Length of the entire digestive tract = _____
rounded to the nearest foot

RESULTS:

6. Actual length - My guess = Amount I was off

_____ - _____ = _____

CONCLUSION:

7. I would have to lay _____ of me down, end to end to make the length of my digestive tract.
8. My muffin will be finished digesting in about 3 days. I will have eaten _____ more meals by that time.

For my notebook

MY NERVOUS SYSTEM IS IN CONTROL

Can you pat your head and rub your tummy at the same time? Well, that may be a bit tricky but I bet you can walk across the floor and eat an apple at the same time. Your brain is doing an incredible number of things to make all this happen, from controlling 2 legs that are moving at opposite times, to moving your arms, to telling you when to bite, chew and swallow. I bet you can even tell me how the apple tastes and looks. Your body is taking in a lot of information, sending this information through nerves to your spinal cord, up to your brain to be figured out and then a response is sent back to the proper muscles. I can't imagine a computer handling this much information this quickly. Before all of this can happen though, information has to come into your body. You have five senses that bring in information. You have eyes, ears, a nose, a mouth and skin so you can see, hear, smell, taste and feel what's around you. Even when you are sleeping your brain is handling information. When you feel a feather, the information runs from your fingertips, through nerves,

which are special, long cells that go to your spinal cord. Your spinal cord runs through the hollow center of your vertebrae and leads right up to your brain. Your nervous system is like a tiny super highway for messages.



cell - pg. 21; vertebrae - pg. 45

Nervous System Lab #1: REACTION TIME - instructions

Material:

copy of lab sheet (1 page), pencil
standard (inch) ruler
colored pencil (for graphing)

Aloud: Your nervous system works incredibly fast to keep your hand from burning when you accidentally touch something that is too hot. Sometimes we are moving our hand away from danger even before we know it hurts. Your nervous system is also in charge of letting you taste good food as you are eating. All of this happens very quickly. Today we are going to do a lab to show how quickly a message can get from your eyes, along a system of nerves to your brain and then along another set of nerves all the way out to your hand. We are also going to see if you can increase the speed by practicing.

Procedure:

Lab Day:

1. Circle "Yes" or "No" for the Hypothesis part of the lab.
2. Have a helper hold the ruler about 1" above the catcher's hand with the zero end pointing down. Catcher should have their hand ready to pinch the ruler as it falls between his thumb and fingers (see diagram on lab sheet).
3. Helper drops the ruler with no warning. Catcher tries to catch the ruler as quickly as possible.
4. Note the point at which the catch was made (how many inches along the ruler). A smaller number means a quicker catch. Write the number on the chart.
5. Repeat above steps 4 more times.
6. To make a line graph, transfer data to the graph in the following manner: For catch #1 follow the horizontal line next to the label "CATCH #1" until you get to the inch mark where the ruler was caught. Place a dot there. Do this for each catch. Connect the dots to show how the reaction time changed. If the line goes up reaction time got slower, if the line goes down, reaction time got faster (better).
7. Complete #4 with "got better," "stayed the same" or "got worse."

Conclusion / Discussion:

1. How did your reaction time change with practice. Can you train your nervous system to work faster?
2. Why do you think some people have quicker reactions to danger than others?

For More Lab Fun:

1. Test people of various ages. Does reaction time change with age? Compare and chart your results.
2. Test reaction time before and after exercise. Does exercise have an effect on reaction time?
3. Have the helper say, "Now," as they let go of the ruler. Does reaction time improve when you can "hear" the ruler drop?

NAME _____ DATE _____

Nervous System Lab #1: REACTION TIME

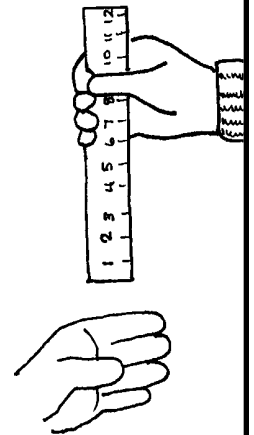
HYPOTHESIS:

1. Do you think you can teach your body to react more quickly with practice?
 YES NO

TEST:

2. On the chart below, write the inch mark where you caught the ruler.

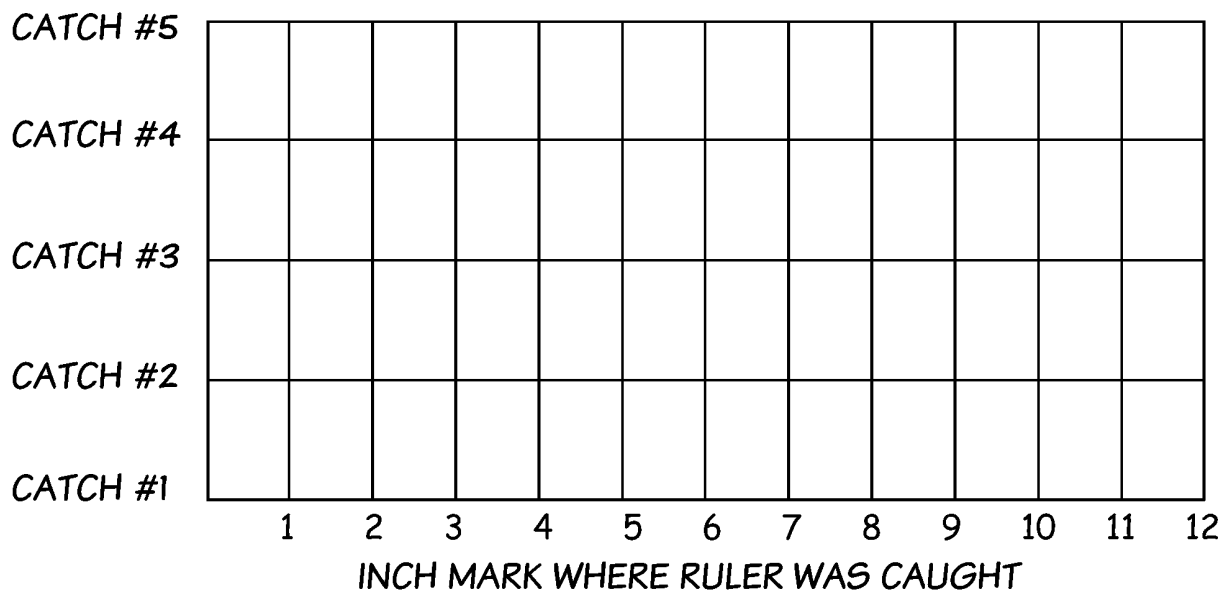
| CATCH #1 | CATCH #2 | CATCH #3 | CATCH #4 | CATCH #5 |
|----------|----------|----------|----------|----------|
| | | | | |



RESULTS:

3. Use the information from your chart above to make a line graph. For each catch, go across the graph and make a dot at the inch mark where you caught the ruler. Draw a line to connect all five dots.

GRAPH OF MY REACTION TIMES



CONCLUSION:

4. My reaction time _____ with practice.

Nervous System Lab #2: I'M SENSIBLE - instructions

Material:

- *This lab takes awhile to set up but I have yet to meet a child (or adult!) that doesn't enjoy this lab.**
- copy of lab sheets (2 pages), pencil
 - items to identify by taste, touch etc. This is a list of ideas. Use what you have and what your kids know.
 - touch - cotton swab, paper clips
 - smell - vinegar, garlic
 - taste - chocolate chip, banana slice
 - sight - orange, white vinegar
 - hearing - jingle bells, coins
 - 4 small paper sacks to hide the touch and hearing items
 - 3 small paper plates
 - 2 spoons
 - 3 small jars with lids- at least one MUST be see-through
 - 4 paper towels to cover (hide) some of the items
 - dry-erase marker

Aloud: Step on a tack and you will jump away quickly. Smell cinnamon rolls and you will probably smile. A message has to get to your brain to tell you what is there and what to do about it. We talked about the long path the message has to take, but how does the message get into your body? You have five senses that bring information to your nerves. You have nerve endings all along your skin to tell you what you have touched, eyes to tell you what you have seen, a nose to tell you what you are smelling, ears to tell you what you are hearing and a tongue to tell you what you taste. All of these features bring information into your body, take that information to your brain and then tell your body what to do about it. And remember, it doesn't take very long. Today you are going to test your 5 senses to see how well they work to inform your brain of what is around you. Do your best but most importantly, follow directions and have fun!

Procedure:

Lab Day: Lab Setup: FOR TEACHER/PARENT TO READ

1. You will be setting up lab "stations" with different items to test. Try to keep them in line along a countertop or around a table.
2. On two paper sacks write "Touch." Place the 2 touch items inside and roll down the tops of the bags. These are stations 1 and 2.
3. Place the orange on a plate and about 1/4 c. of vinegar in a well sealed, see-through jar. Screw the lid down so no smell escapes. With the dry erase marker, write "Sight" on the plate and the jar. These are stations 3 and 4.
4. Put 1/4 cup more vinegar into another jar and some smashed, open garlic in another. Cover these with a paper towel and write "Smell only - No Peeking" on the towels. When it's time to test these you need to have the students close their eyes while you open the jars so they can smell what's inside. These are for stations 5 and 6.
5. On the other 2 sacks, write "Hearing." Place the hearing items inside these and roll the tops down for stations 7 and 8. Allow the children to shake these when it's time to test them.
6. On each of the last 2 plates place a spoon with the taste item in the spoon. You will need to spoon them into the children's mouths (with their eyes closed) for the test. Cover these with a paper towel also.
7. Go through the test with each child, assisting as needed to prevent "peeking."
8. Complete lab sheet.

CONTINUED ON BACK OF PAGE

Nervous System Lab #2: I'M SENSIBLE - instructions

Possible Answers:

Which sense is the most keen for each animal

Owl - hearing because they hunt at night, often in complete darkness

Vulture - smell because they eat rotting meat and must smell it from miles away

Bat - hearing because they also hunt at night and use their hearing to locate flying insects

Bald eagle - sight because they hunt during the day and use their sight to find prey.

Bloodhound - smell because they are specifically bred to find a scent and follow it. Their skin folds even cover their eyes when they put their heads down so they don't become distracted by what they see.

Conclusion / Discussion:

1. *How would it be to lose one of your senses? Try walking blindfolded (with a helper, for safety). Imagine eating without being able to taste your food. How would that be good or bad?*

For More Lab Fun:

1. *Kids always love to check out optical illusions to see how our senses often fool us.*
2. *Read a book about Helen Keller who was born without sight or hearing. How different was her world from your own?*
3. *Watch one of your own pets. Try to discover by watching them which sense is the most important for them. Does your dog hear sounds that you cannot? What about your guinea pig? What seems to frighten him the most, a quick movement or loud noise?*

NAME _____ DATE _____

Nervous System Lab #2: I'M SENSIBLE- pg. 1

For each station, use only the sense listed.
Write what you think you have found and
then write what other senses might have
helped you to identify it.



| A Station # | B Sense to Use | C Item (Name or Describe) | D Sense I would like to use |
|-------------------|----------------------|---------------------------------|-----------------------------------|
| 1 | touch | | |
| 2 | touch | | |
| 3 | sight | | |
| 4 | sight | | |
| 5 | smell | | |
| 6 | smell | | |
| 7 | hearing | | |
| 8 | hearing | | |
| 9 | taste | | |
| 10 | taste | | |

Nervous System Lab #2: I'M SENSIBLE- pg. 2

1. For each sense, this is how many I got right:

touch _____ sight _____ smell _____ hearing _____ taste _____

2. It looks like my sense of _____ is the most accurate.

3. This is how many times I wish I could have used each sense (column "D")

touch _____ sight _____ smell _____ hearing _____ taste _____

4. I wanted to use my sense of _____ most often. This is the sense I trust the most.

5. (Circle one) The sense I trust the most is: **different than** **the same as**
the sense that was the most accurate during this lab.

6. Every animal has a sense that is more keen than the others. This is their "dominant" sense. For each of the animals listed below, see if you can figure out which sense is the dominant sense.

Owl _____ because _____

Vulture _____ because _____

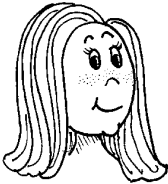
Bat _____ because _____

Bald eagle _____ because _____

Bloodhound _____ because _____



For my notebook



GENES GUIDE YOUR GROWTH



Have you ever been told you were having a growth spurt? It's true that your body doesn't grow and change at a smooth rate. Growth and body changes happen in spurts. From the time you are born until the time you are very old your body will go through many amazing changes. Even before you are born the *cells* in your body carry the plans that determine when and how your body changes will occur. If you practice good healthy habits like eating and exercising right these plans can proceed at the proper rate and time. From the helpless baby you were at birth you have learned to walk, talk and dress yourself. At about 10 years old a body begins its journey to becoming its adult form. By around 18 - 20 years old most body systems are fully developed and upward growth stops. By continuing to make good, healthy choices you can keep your body fit and active throughout your adult life and well into old age. These plans in your cells are determined by your genes (jeenz). Genes are the special messages you get or inherit from your parents. Your genes help determine everything from how tall you are to how curly your hair is. Unless you have an identical twin, not one other person in the whole world has inherited the exact same body plan you have. From your one-of-a-kind fingerprints to your body's plans for your future growth, you are the only YOU there will ever be. Now that's a gift worth taking extra care of!

Genetics Lab #1: I'M THE ONLY ME! - instructions

Material:

copy of lab sheets (2 pages), pencil

Aloud: Your life started when one cell from your mom combined with one cell from your dad. These cells have tiny parts inside called genes. Your genes determine your hair color, sex, height and many other features. Except for identical twins, no two people share the exact same features; but you will share many features with your parents, because you inherit half of your genes from each one. Let's look at some traits to see what you have inherited.

Procedure:

Lab Day:

1. Examine the features listed for you and your parents (or siblings!) and fill in the chart.

Explanation of some characteristics:

Cleft chin - chin with a deep "crease" down the middle

Free earlobes have a section at the bottom where they don't attach to the side of the head. Attached earlobes are attached to the head clear to the bottom of the earlobe.

Tongue rollers can curl their tongue into a "U" shape. This is not something a person can learn to do if they are born without the gene to do it!

Widow's peak is where the hairline forms a V down the forehead (think Eddie Munster).

Hairy knuckles refers to hair on the middle section of each finger, between the joints, not actually the knuckles.

2. For page 102, which of the traits do you share with your mother ONLY? Which do you share with your father ONLY? How many of the traits showed in neither parent and ended up showing in you?
3. Fill in the graph at the bottom. Color in how many traits you got from:
Line 1: Mom ONLY Line 2: Dad ONLY or Line 3: from Mom and Dad- meaning they both show it (a dominant trait) or they both do not show it (a recessive trait).

For More Lab Fun:

1. Make a chart to compare other relatives' features with your own. Which side of the family seems to have the strongest genes?
2. Start a family tree. Check old family photos to see if your ancestors had the same traits you have. How far back does that widow's peak go?
3. Visit a Labrador Retriever breeder. Can two black labs have yellow puppies? Can two yellows have black puppies? Which color seems to be weaker (recessive)?
4. Do you have a pen pal or friend from another country? Ask them to fill in the graph and chart the differences from one family-culture-geographic location to your own.

For Your Information:


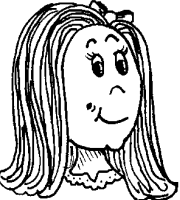
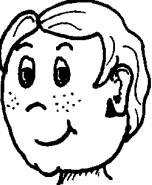
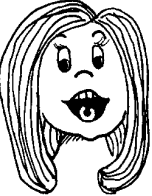
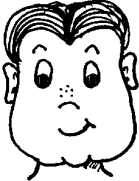


1. Weak traits are called "recessive." Strong traits are called "dominant."
2. The traits given show a simple form of dominance. Some traits (not mentioned in this lab) are much more complex, some are linked to the sex chromosome and some traits blend.

NAME _____

DATE _____

Genetics Lab #1: I'M THE ONLY ME! - pg. 1

All of the features below are determined by the genes you inherit from your mom and dad. Color in the blanks for each feature you have and compare.

| | | ME | MOM | DAD |
|---|-------------------|----|-----|-----|
|  | CLEFT CHIN | | | |
| | SMOOTH CHIN | | | |
|  | DIMPLES | | | |
| | NO DIMPLES | | | |
|  | FREE EARLOBE | | | |
| | ATTACHED EARLOBE | | | |
|  | TONGUE ROLLER | | | |
| | NON-TONGUE ROLLER | | | |
|  | WIDOW'S PEAK | | | |
| | ROUNDED HAIRLINE | | | |
|  | FRECKLES | | | |
| | NO FRECKLES | | | |
|  | HAIRY KNUCKLES | | | |
| | BALD KNUCKLES | | | |

Genetics Lab #1: I'M THE ONLY ME! - pg. 2

I share these traits with my mom

| | |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

I share these traits with my dad

| | |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

Weak (recessive) traits (like dimples) can be carried by your parents but not show. If you get the same weak trait from both of your parents, even though it doesn't show in them, it will show in you.

These traits were secretly hiding in Mom and Dad and showed up in me!

| | |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |



I got this many traits from:



| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|------|---|---|---|---|---|---|---|
| Mom | | | | | | | |
| Dad | | | | | | | |
| Both | | | | | | | |

I am exactly like.....ME!

Genetics Lab #2: MY OWN FINGERPRINTS - instructions

Material:

- copy of lab sheet (1 page), pencil
- 1" wide, transparent tape
- 3 extra people (to provide additional thumbprints)
- hand lens (optional)

Aloud: Do you know what you have that nobody else in the world has? You have your own set of fingerprints that are unlike anybody else's in the whole world! With all the people in the world, it's hard to imagine that no two people would have the same fingerprints. Today you are going to analyze your fingerprints and see if you can match up a "mystery print" to the person it came from.

Procedure:

Lab Day:

1. On a piece of scratch paper, color in a heavy area of pencil. Make it dark enough that the pencil rubs off onto your finger. You may have to "reload" this area as you go along with the lab.
2. Starting with your left hand, rub your pinky in the pencil lead until it is coated. Have a helper tear off about a 1" piece of tape. Put the tape on the finger so that the print transfers to the tape. Remove from finger and tape it down in the first oval on your lab sheet.
3. Do the same for each finger on the left hand and then do the same for the right hand in the ovals on the line below.
4. Analyze each print. You may want to use a hand lens to help you. On the lines under each print, write whether that print is an arch, loop or whorl. (There are others, but these are the major ones. If your child has something different, choose the closest and call it good).
5. For #1, write how many of each print type you have.
6. Have 3 other people do a right thumbprint for you and place in the boxes below. Write the name of each print donor on the line below their print.
7. TEACHERS: Get an extra, mystery print from one of the donors- preferably the most unusual so it will be easier for the students to distinguish.
8. Compare the known prints with the mystery print. Write who you think the print belongs to on the line provided.

Conclusion / Discussion:

1. How can having individual prints help us?
2. How do we use fingerprints in our society? Could we do these things if people shared the same fingerprints?

For More Lab Fun:

1. Do fingerprint art with one of Ed Emberley's Print Drawing books.
2. Do fingerprints from both of your parents. Next do fingerprints of some friends or neighbors. Count how many arches, loops and whorls your parents have and then how many your friends have. Do your parents' prints have more similarities to yours or not? Why might your prints be more like your parents'?

NAME _____

DATE _____

Genetics Lab #2: MY OWN FINGERPRINTS

These are the three basic types of fingerprints:



Arch

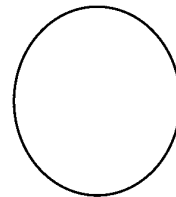
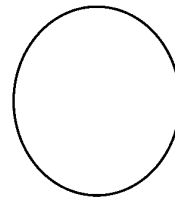
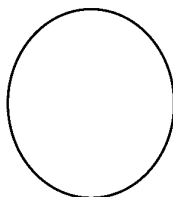
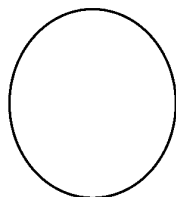
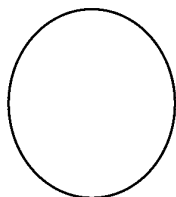


Loop

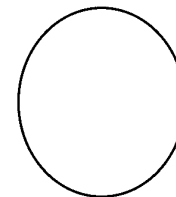
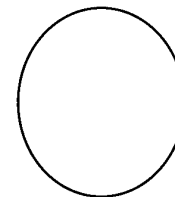
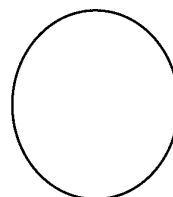
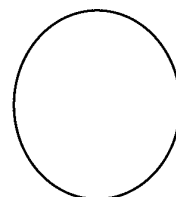
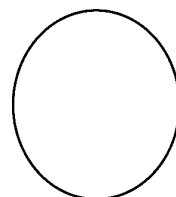


Whorl

My
Left
Hand

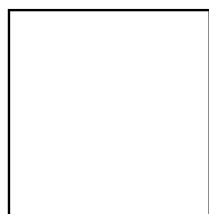


My
Right
Hand



1. I have _____ arches _____ loops _____ whorls.

This is the right thumbprint of:



Mystery
Print!



(Name)

(Name)

(Name)

?

2. I think the mystery print belongs to _____

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