I R L

DAVID

GRADE 1 SCIENCE

scope and sequence 2008 – 2009

COURSE OUTLINE

Acting Like a Scientist
- Learn how to use tools and equipment to measure distance in centimeters, mass in grams, volume in milliliters, and temperature in degrees Celsius
- Follow steps in the scientific process
- Compile data in tables, draw graphs, and interpret results

Matterland
- Identify matter as a solid, liquid, or gas
- Explain the properties of each type of matter
- Learn about the relative motion of molecules in each state
- Demonstrate that matter can change states by heating or cooling
- Become familiar with mixtures, solutions, and surface tension

Everyday Weather
- Understand what causes the seasons
- Construct a rain gauge and weather vane to measure weather conditions
- Use equipment to record observations on a weather calendar
- Learn about cloud formation, cloud type, precipitation, condensation, evaporation, and the water cycle

Animal Classification
- Classify major animal groups according to their identifying characteristics
- Study mammals, birds, reptiles, amphibians, insects, and fish

Adaptations
- Discover how animals use their characteristics to thrive in their environment
- Learn how to infer what animals eat from the shapes of their teeth
- Study animal defense and behavior

Habitats
- Learn to recognize plants and animals common to a variety of habitats
- Study food chains
- Learn about endangered plants and animals
- Read about John Muir's tireless work to preserve the wilderness

Oceans and Undersea Life
- Discover the diversity and dangers of the oceans
- Explore tide pools and the depths
- Find out how waves and currents move
- Read about the life and major accomplishments of Jacques Cousteau

Light Up Your Life
- Explore how light behaves
- Investigate how light reflects off different surfaces
- Demonstrate how light travels in straight lines
- Classify objects according to how much light the objects transmit
- Learn about Thomas Edison's life and his major achievements

Course Overview

Students learn to perform experiments and record observations, and understand how scientists see the natural world. They germinate seeds to observe plant growth, and make a weathervane. Students will explore topics such as:

- **Matter**—states of matter; mixtures and solutions
- **Weather**—cloud formation; the water cycle
- **Animal Classification and Adaptation**—insects; amphibians and reptiles; birds; mammals
- **Habitats**—forests, deserts, rain forests, grasslands, and more; naturalist John Muir and conservation
- **Oceans**—waves and currents; coasts; coral reefs and kelp forests; oceanographer Jacques Cousteau
- **Plants**—germination, functions of roots, stems, flowers, chlorophyll, and more
- **Human Body**—major systems; Elizabeth Blackwell, the first woman doctor
- **Light**—how light travels; reflections; inventor Thomas Edison

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GRADE 1 SCIENCE

scope and sequence 2008 – 2009

COURSE OUTLINE (CONT.)

The Human Body

- Become familiar with the major systems of the human body
- Learn about Elizabeth Blackwell's determination to become the first woman to earn a medical degree

Our Green World

- Study the functions of roots, stems, leaves, flowers, fruits, and seeds
- Examine fibrous and tap roots
- Observe stems transporting water from roots to leaves
- Dissect and germinate seeds
- Match fruits to seeds
- Learn that flowers turn into fruit
- Learn that chlorophyll is the substance that allows plants to manufacture food

STANDARD CURRICULUM ITEMS

- Green bean seeds
- Grass seeds
- Directional compass
- Graduated cylinder
- Thermometer
- Plastic pipette
- Safety goggles
- Magnifier
- Bar magnet
- Mirrors
- Feathers
- Plastic 1 cm cubes
- Bucket balance
- Iron fillings

ADDITIONAL CURRICULUM ITEMS

Some lessons require additional resources, including common household items, and books that are readily available online or in your local library:

- Styrofoam balls
- Silver Mylar non-tear film
- Inflatable globe

An Octopus Is Amazing by Patricia Lauber

Down Comes the Rain by Franklyn Branley

Flash, Crash, Rumble, and Roll by Franklyn Branley

What Color Is Camouflage? by Carolyn Otto

What Is the World Made Of? All About Solids, Liquids, and Gases by Kathleen Weidner Zoehfeld

Lesson Time and Scheduling

Total lessons: 72. If you teach Science twice a week, you can comfortably complete the program within a typical school year.

Lesson Time: 60 minutes. You might choose to split the lessons into smaller segments and take a break between investigations. The K12 online lesson tracking system allows you to pick up wherever you left off in any given lesson.

Scope and Sequence for this first grade Science curriculum as provided by as provided by :

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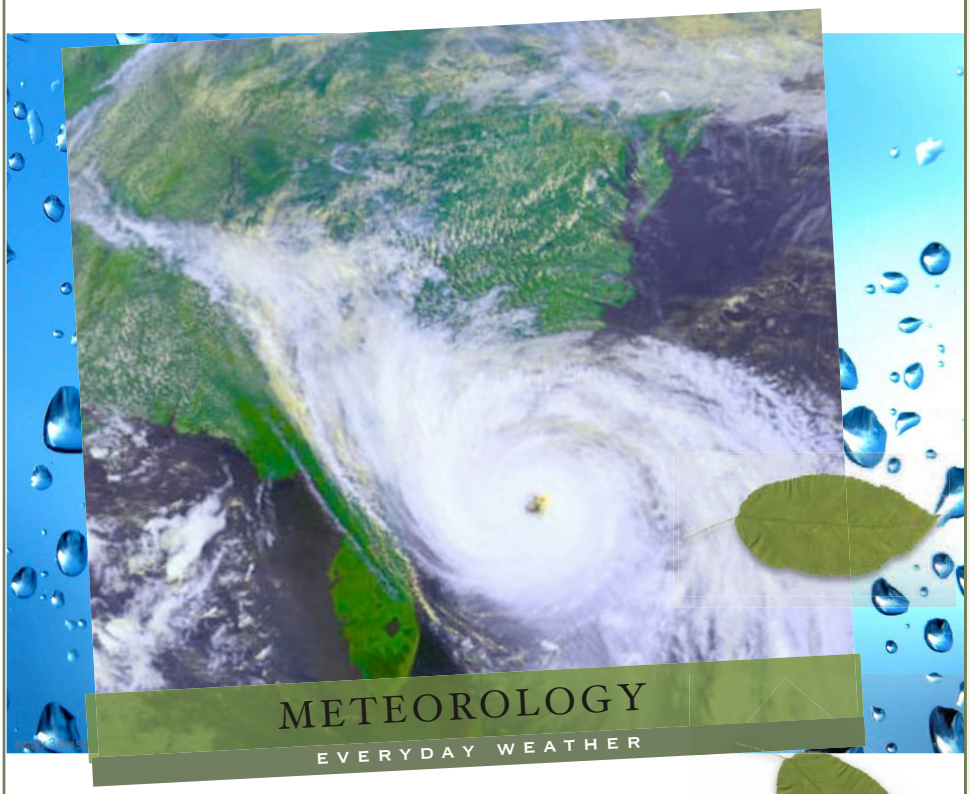
EDUCATION FOLIO

miscellaneous activities



METEOROLOGY & DATA-GATHERING

Weather changes from day to day and from season to season. This unit intends to cover an overview of wind, rain, snow, clouds, and thunderstorms, and how the Earth's water moves in a cycle. The student then becomes a meteorologist -- observing the weather using simple tools and recording observations on a chart.

Student created several simple tools for this unit; a weather vane, an anemometer, a rain gauge and a hygrometer. A thermometer and compass were also used for field work.

Daily surface condition observations included current cloud cover, surface temperature, precipitation conditions ("observed weather"), wind direction, wind speed, observable precipitation levels for the past 24 hours and estimated humidity levels.

SEPTEMBER 2008

Monday

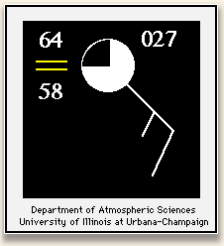
Wind Direction and Speed
Reviewed weather event terminology and definitions for wind speed levels. Built basic weather vane and anemometer, studied and tested basic uses of each.

Tuesday

Rain Gauge
Built a basic rain gauge; studied uses and proper setup

Wednesday

Observed Weather: Station Reporting Symbols



Studied the use of station reporting symbols for atmospheric notation; ongoing data-gathering using notations by the Department of Atmospheric Sciences at the University of Illinois

Thursday

Humidity / Evaporation
Manipulated temperature changes to condense water vapor; estimated current humidity conditions using external, observable condensation levels, simulated cloud formation and natural precipitation.

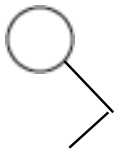
Friday

Cloud Types and Formations
Studied and recreated different cloud types using cotton.

Observations as made per weather station reporting symbols activity. Symbols were taken from the Department of Atmospheric Sciences at the University of Illinois, placed onto the computer as indiividual graphics, and student was allowed to drag them into a spreadsheet in order to record weather conditions

Weather Observations

US-DVDWGR-OFLN-MO

Date	Observed Conditions	Rain	Humidity
August			
Sep 4, 2008	70 	2 8/9 Inches	
Sep 5, 2008	66 	1/2 Inches	
Sep 8, 2008	87 	0 Inches	
Sep 9, 2008	84 	0 Inches	
Sep 15, 2008	69 	1 1/3 inches	
Sep 18, 2008	84 	0 Inches	
Sep 12, 2008			

Rainfall (inches) = .50 x Volume of Rainwater Collected (ml) | [Diameter of Opening (cm)]^2

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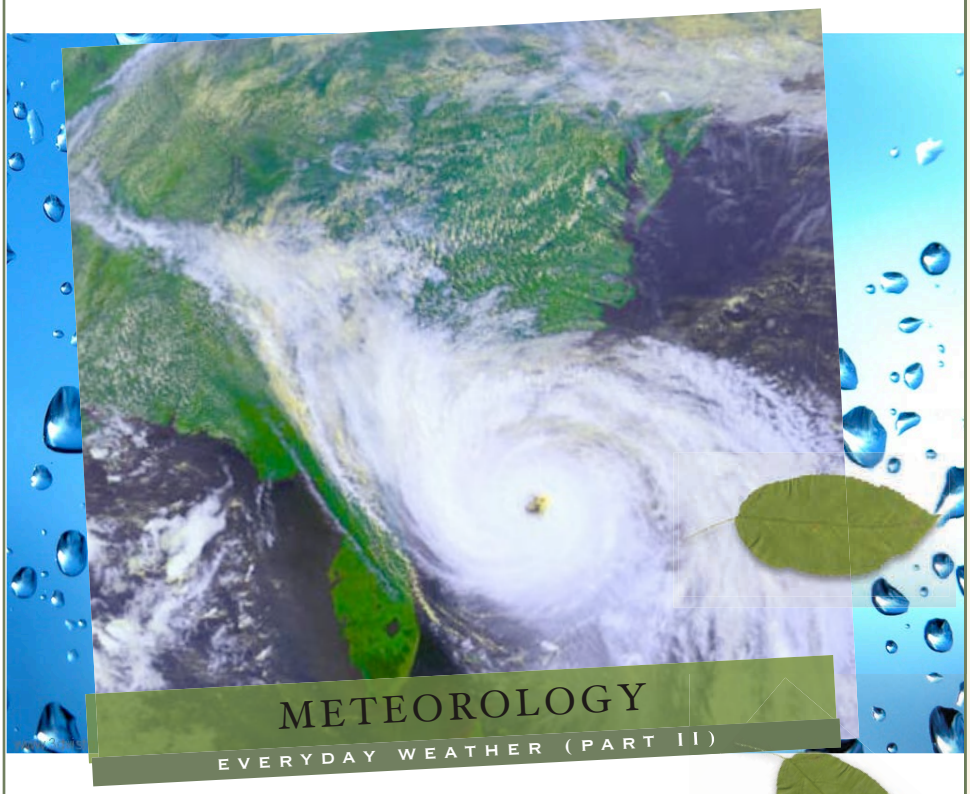
miscellaneous activities



METEOROLOGY & DATA-GATHERING

Materials used in this unit include professional and home-made meteorology tools; varied models and experiments; books (Down Comes the Rain; Flash, Crash, Rumble and Roll); videos of weather events being studied; and computer models of seasonal weather phenomenon.

Student studied radar images of weather and watched video of Hurricane Katrina. Also followed story of storm chasers and visited the local NOAA weather center open house.

SEPTEMBER 2008

Monday

Labor Day
No school

Tuesday

The Water Cycle; Hailstones
Reviewed the water cycle of evaporation, condensation, precipitation. Created models of ice layered inside a hailstone using clay; built and observed a model simulation of the water cycle.

Wednesday

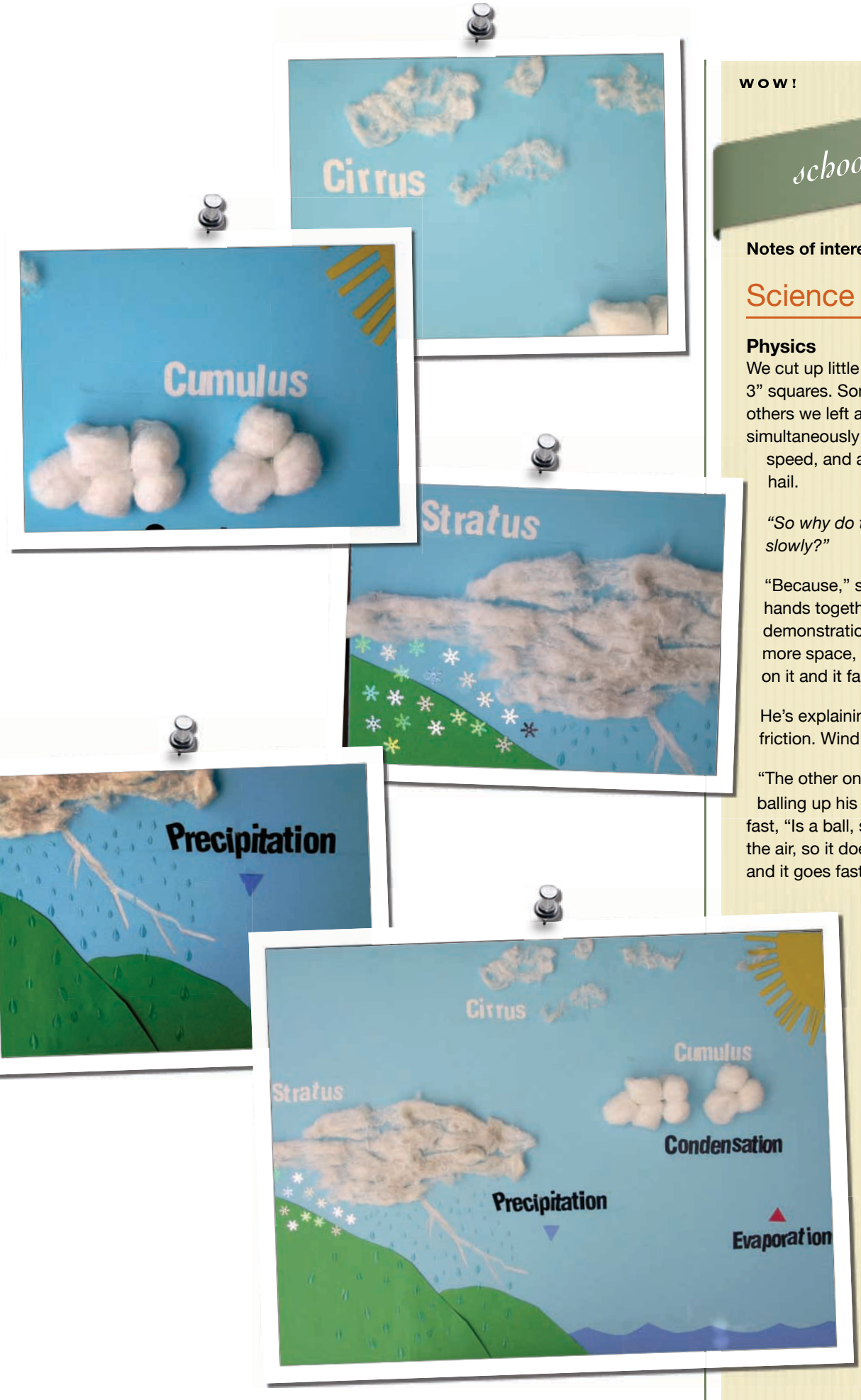
Drifting Snowflakes
Built models of snowflakes vs hailstones out of paper (crumpled vs flat) to observe differences in how they fall. Measured simulated snowfall (using collected frost).

Thursday

Thunder and Lightening
Discussed lightening formation and personal safety during a lightening storm. Used a balloon and foil to conduct and discharge electricity.

Friday

Weather Report
Covered all weather data gathered over the past several days. Visited the NOAA Weather Center open house; asked questions of meteorologists, saw Dopplar radar tower up close, visited computer center where predictive models are created and tracked. Learned out how weather alerts are sent out to the public and how they affect the actions of community leaders.



school moments

Notes of interest, insights, etc.

Science

Physics

We cut up little pieces of paper, about 3" squares. Some we balled up tight, others we left as-is. Dropped them simultaneously to gauge relative speed, and apply to snowflakes vs. hail.

"So why do the snowflakes fall more slowly?"

"Because," says David, pressing his hands together horizontally as a demonstration, "The flat one has more space, so the air is pushing up on it and it falls slower."

He's explaining surface area and friction. Wind resistance.

"The other one," he continues, balling up his fist and dropping it fast, "Is a ball, so less of it is touching the air, so it doesn't get pushed on and it goes faster."

I credit this bit of physics knowledge and complete understanding to the St. Louis Science Center's stage show, "Science Goes Splat," which he has seen at least three times and volunteered in twice.

Thank you, SLSC!

SAINT LOUIS sciencenter

October 2, 2008

The Droplet's Adventure

There once was a drop of water...

...that lived in a pond. He was bored because he couldn't walk and go on an adventure.

Then one hot day, he started to turn into air. He was excited because he was going on an adventure! He saw some tree leaves that he never saw before, because he was always down low. But now he was in the sky, getting higher. He saw some colorful birds, and then he saw a hot air balloon. He started to feel cold, and then he got colder, and colder, and colder, and then he was a cloud with lots of other droplets. All around him were other water droplets, dark and crowded and cold. And then he even felt colder, and he shivered. And then he was frozen.

Then he started to fall and then the wind picked him up and blew him into the clouds again. More water droplets surrounded him and they froze. He fell again and got blown up, and more water droplets surrounded him and froze, and then they fell again. Then they got blown back up for another layer, and more water droplets surrounded him, and then he fell down again. Then he got blown up again. And then more water droplets surrounded him and froze, and then they fell again. He was laughing because he was having so much fun, and he hit the ground and rolled off into the pond again. When he hit the pond, he was water again because the ice melted off. He was back where he came from, and he was happy.

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EDUCATION FOLIO

summary

JANUARY 2009

Monday

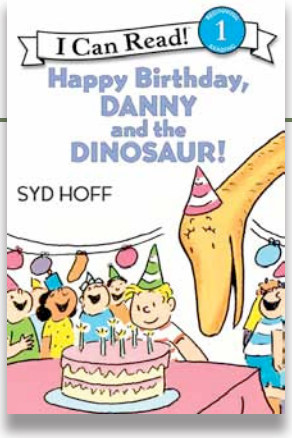
Amphibian review
Reviewed amphibian and reptile classifications; modeled amphibian skin, practiced classification and compared different films of reptiles hatching (snakes, crocodile, alligators); watched brief overview of frog development.

REFLECTION, REFRACTION, TRANSPARENCY

Explore light and its properties. See how it comes from various sources, reflects off objects, and travels in a straight line. Put on a shadow puppet show and then investigate shadow clocks to observe how shadows change as the sun moves though the sky. Finally read about a hard-working inventor, Thomas Edison.

BrainPop Junior used as an introduction to light and its properties; student used mirrors to reflect light, and understands the angles of light striking a smooth surface. Student used K12 materials to create cutouts for shadow puppets. Toy dinosaurs and flashlights were used to learn the relationship between distance of an object from a light source and the size / clarity of the shadow cast. Studied a basic biography of Thomas Edison and answered comprehension questions about Edison's inventions.

Danny and the Dinosaur



Comprehension questions provided for the book, Danny and the Dinosaur:

Who are the two most important characters (or "main characters") in the story?
Danny and the Dinosaur. ("That's the title, even!")

Where does Danny meet the dinosaur?
At the museum

Is he friendly or scary?
Friendly

Is the dinosaur a real or make-believe character?
Make believe.

What kind of person is Danny? How do you know?
A kid...he's nice. Because the way he acts with the dinosaur.

How does Danny help the dinosaur?
By giving him a break from the museum.

How does the dinosaur help people in town?
By helping them cross the street, giving them a ride, helping them get around.

What kinds of things do Danny and the dinosaur do together?
Play, give other people rides, they went swimming, they had ice cream.

Definitions for Danny and the Dinosaur:

museum

A place where you can see dinosaur bones and what people looked like and armor stuff.

swords

They have a sharp point at the end and knights use them to kill people.

voice

Someone talking, like "What I am doing right now."

noise

A sound, like the (Star Wars) gun there. Noise is sound.

buildings

What people build to live in or sometimes work in. They're also made out of bricks, sometimes wood and they decorate them with signs, mailboxes, sometimes with ponds.

climb

To get up on something, like this (climbs up on the bed)

knock

To knock something down, like...this chair. (Another definition?) To knock on a door, like (bang, bang, bang)

bundles

(Student did not know; packages, in this case.)

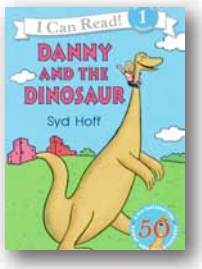
wait

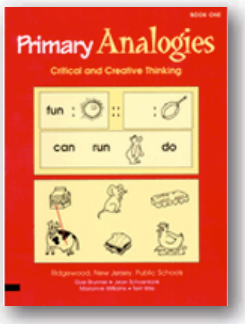
To sit around....like if you're at a dentist appointment, you have to wait until it's your turn.

Language Arts

Danny and the Dinosaur
Student read Danny and the Dinosaur (Monday), answering comprehension questions and reviewing criteria for classification. Also defined list of vocabulary words.

Also completed page 19 of Primary Analogies booklet.





Note:

Record-keeping up to this point has been experimental, without a good system in place to record the work done in Science and History. (The other subjects tend to create more of a paper trail, whereas these two are more hands-on.)

While this record is incomplete, the Scope and Sequence at the beginning of the book details the material covered in the 2008-2009 academic year.

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educational activities 2009

Seeds, Stems, Flowers and Fruits

Discover the secret life of plants. Germinate different kinds of seeds to find out what plants need in order to grow and stay healthy. Dissect a bean and take a close look at its parts. Examine roots, stems, leaves, xylem, flowers, and fruit; describe their functions and identify these structures in some of the foods we eat.

Plant and maintain a terrarium, window box and vegetable garden.

Student Vocabulary

- seed
- germination
- seed coat
- seed pod
- cotyledon
- embryo
- stem
- chlorophyll
- xylem
- fibrous root
- tap root

FEBRUARY 2009

Experiments

Seeds
Two sets of seeds were prepared in plastic bags with damp paper towels for soil. One was placed in the cool window, one was placed on a heated seedling mat. Measurements were taken to find out of heat affected the germination times of the seeds.

Xylem and the vascular system
Celery was allowed to sit in blue-tinted water for several days so as to observe the coloration changes throughout the plant's vascular system, from stems to leaves.

After experimenting for awhile, David discovers he can separate the xylem from the rest of the celery. He's so excited he has to email Dad and Grandma about it.

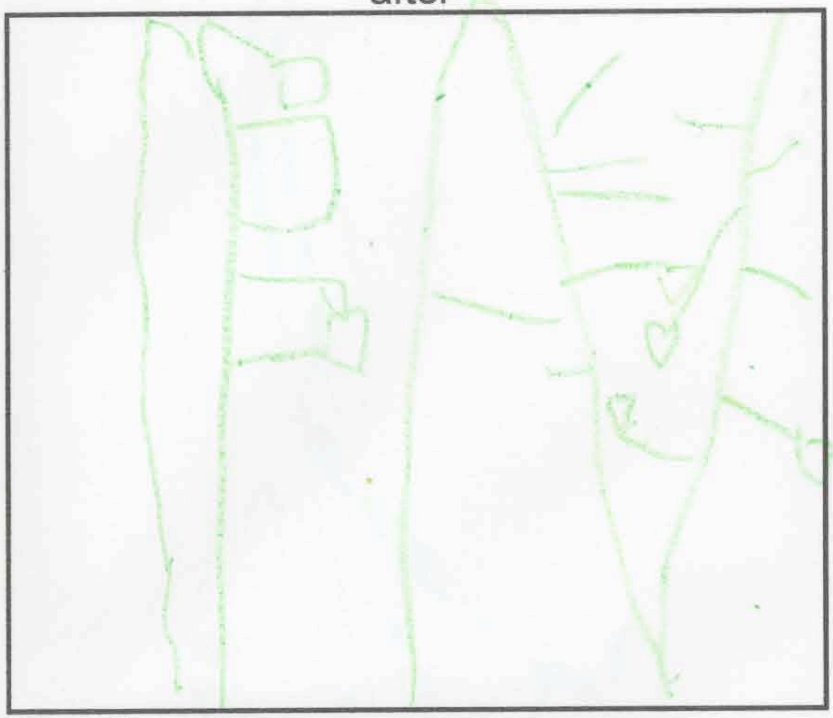
Name _____ Date _____

Super Strong Stems

In the first box, draw what the celery looks like before you let it sit in the glass of water. Write your prediction. In the second box, draw what the celery looks like after you let it sit in water. Write your conclusion.

before

after

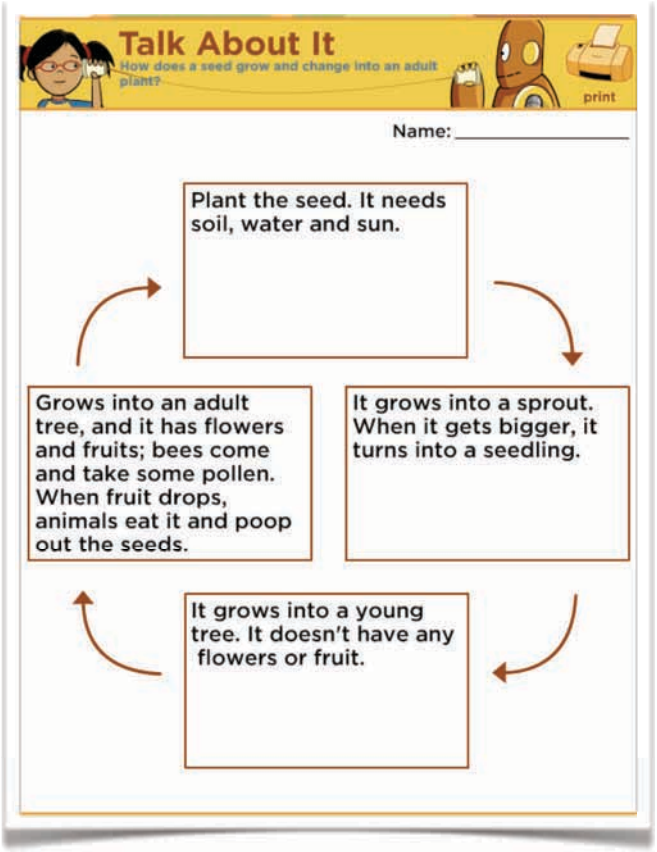


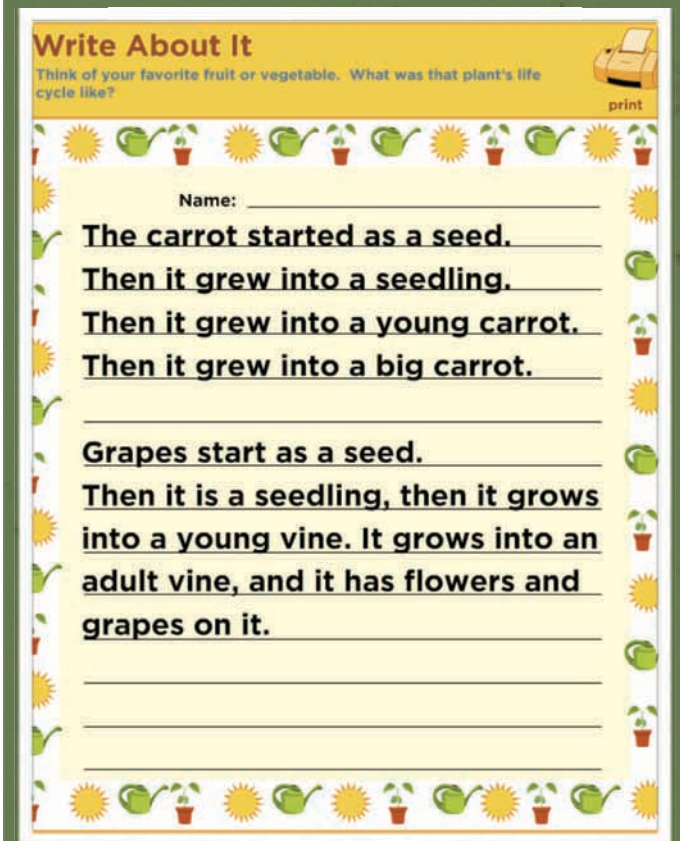
Prediction: I think that the celery will be happy again and grow.

Conclusion: The leaves went up again because the tubes filled up with water again.

Plant Life Cycle

Talk About It
(First day intro)
How does a seed grow and change into an adult plant?





Write About It
(First day intro)
Think of your favorite fruit or vegetable. What was that plant's life cycle like?

Roots
Student was presented with two sets of roots; the rooted cutting of a philodendron plant and a carrot.

"Can I feel the roots?" He asked.

Student examined the roots out of the water with a magnifying glass. "Hey, Mom, did you know roots are smooth? And look! They're different colors than the plant! They're brown and green, too!"

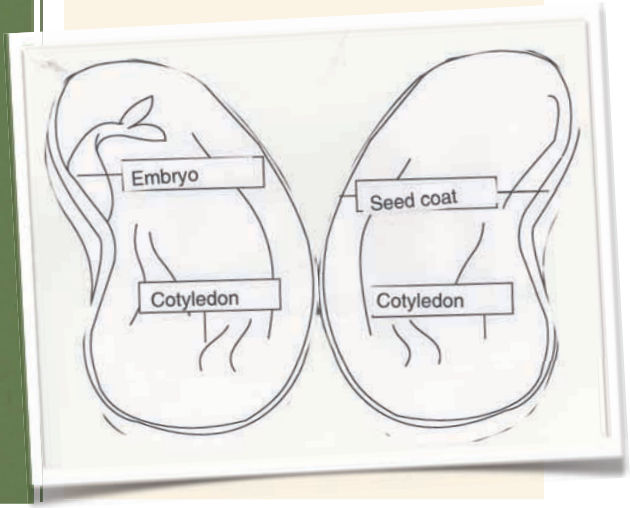
Assignment (following pages) was given to examine, measure, name and draw the roots.

Student also had to note the condition of celery left out of the water for 12 hours versus the celery which had been left in a glass of water for several days, and report on the differences and theorize why it was so.

Leaves
Student did leaf rubbings and picked out which leaves on the houseplants had the most chlorophyll and which ones had the least. Worksheet completed showing the difference between the veins and the petiole.

"Cut out and label the seed parts' to show the plant embryo, the seed coat and the cotyledons."

Seed assignment

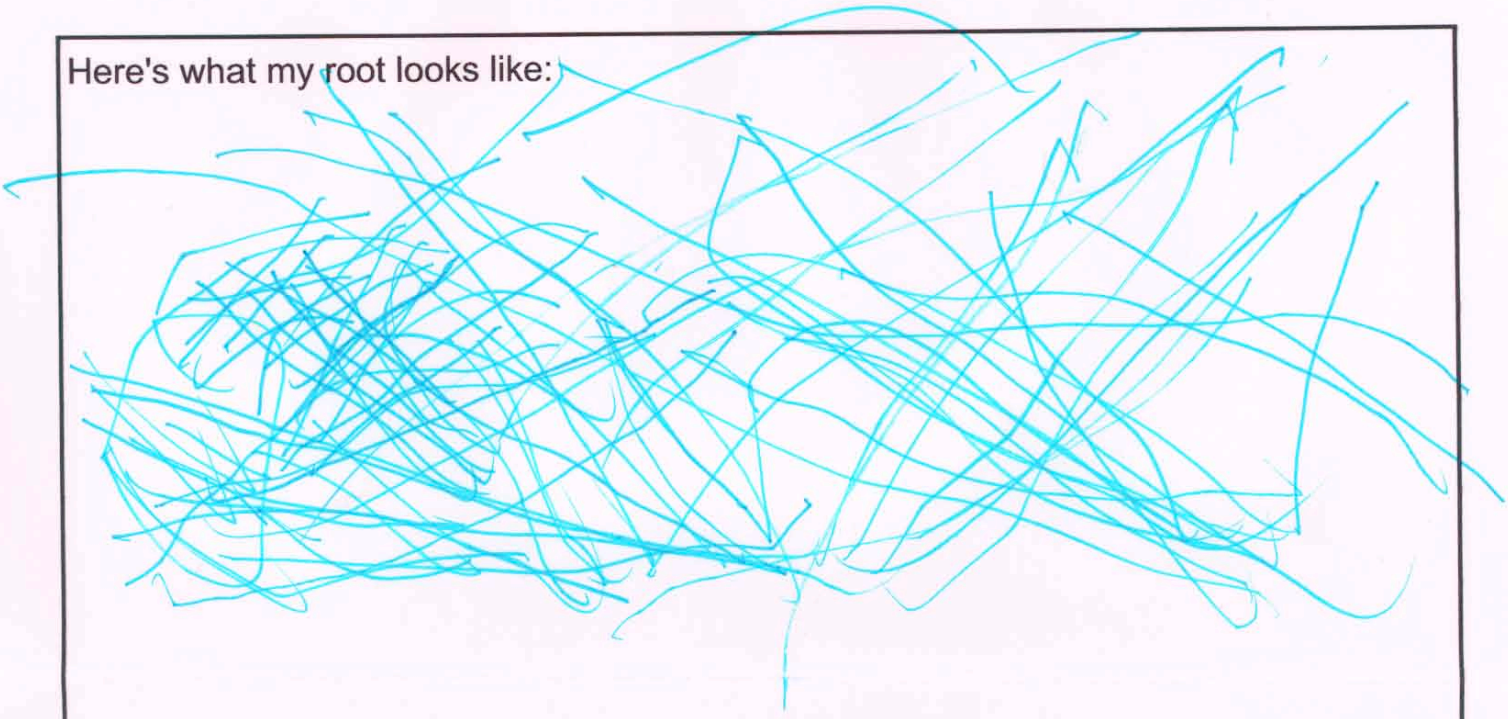


Name _____ Date _____

Rootin' Tootin' Roots!

Observe an example of fibrous roots and answer the questions.

Here's what my root looks like:



OBSERVATIONS:

The longest part of this root measures 19 cm.

What color is the root? BROWN

What plant did this root come from? PHILODENDRON

How do you know this is a fibrous root? Because it isn't a straight line — it is roots ... like all over the place ... tangled.

Name Date

Rootin' Tootin' Roots!

Observe an example of a taproot and answer the questions.

Here's what my root looks like:

OBSERVATIONS:

The longest part of this root measures 26 cm.

What color is the root? ORANGE

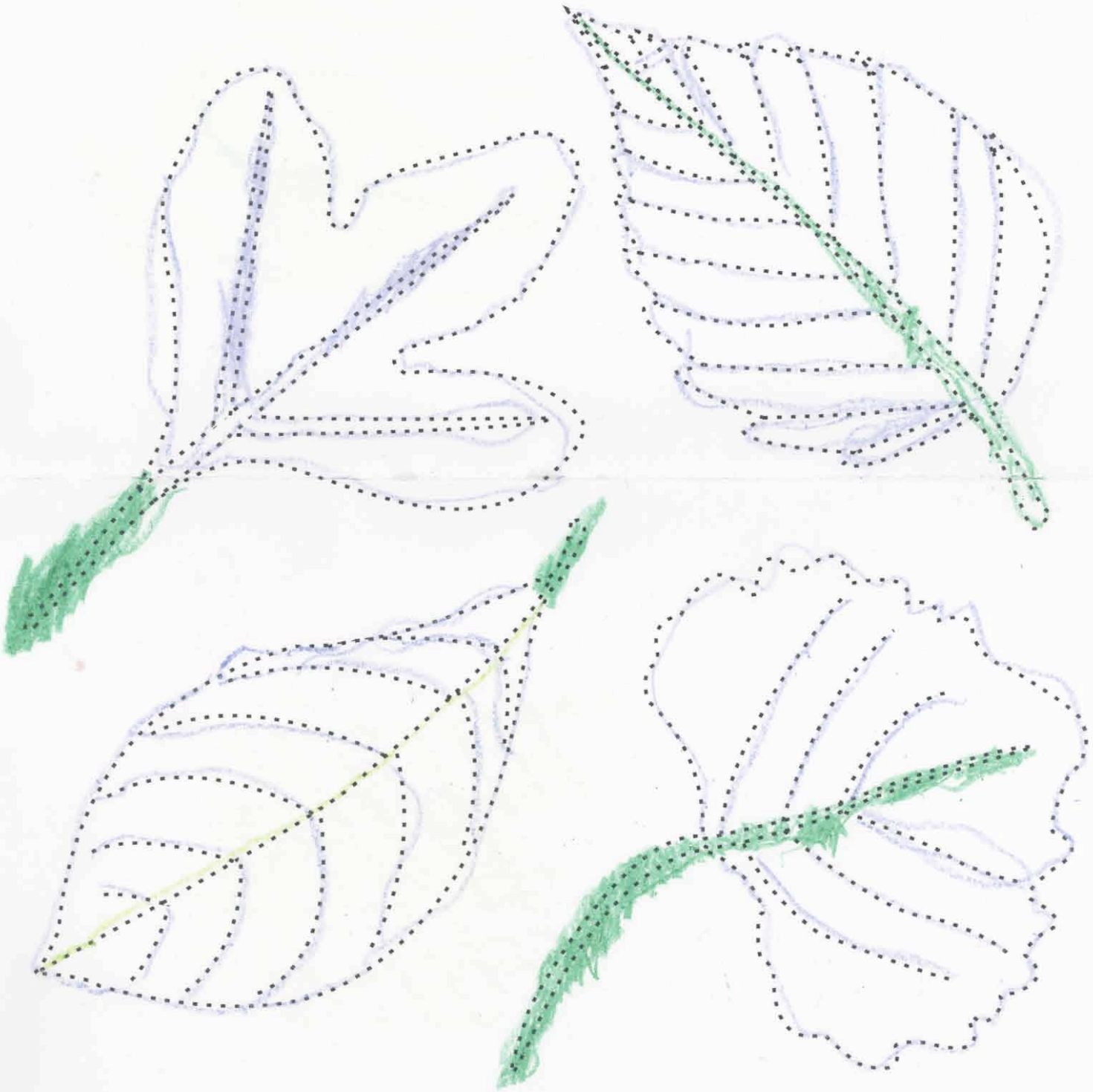
What plant did this root come from? CARROT

How do you know this is a taproot? Because it is a straight line going down w/ little roots poking out of it, and not roots going all over the place.

Name Date

Different Leaves

Trace the leaves and veins. Then label the petiole and a vein on each leaf.



Science Tests

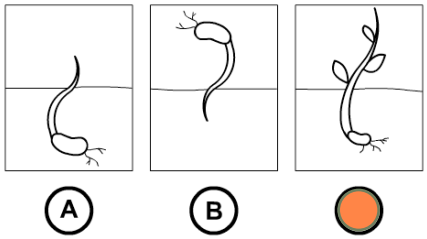
(1) Name three things, besides nutrients, that all plants need in order to live and grow.

Air, Water, Light

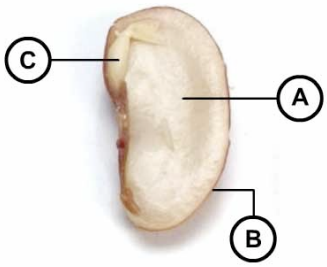
Finish this sentence: Plants start to grow from a *seed*.

What process takes place when a seed first begins to grow into a plant? *Germination*.

Look at the picture. Which shows a seed that has **finished** germinating?



(2) What letter is pointing to the part of the seed that protects the tiny plant inside of it? *B*



What letter is pointing to the tiny plant inside the seed? *C*

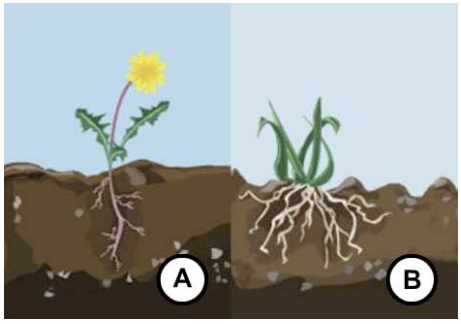
What letter is pointing to the two large halves of the seed? *A*

What do the cotyledons do? *They provide food for the embryo.*

(3) Where are the roots located on a plant? *Underneath the dirt*

Name two ways that roots help a plant. *When a strong gust of wind comes, the wind won't blow the plant over; roots also take in water for the plants.*

Look at the picture below.



Which shows a taproot? *A*

Which shows fibrous roots? *B*

(4) What is one thing that a stem does for a plant? *It sucks up water and nutrients for the plant to survive.*

Why do the leaves need to be held upward toward the sunlight? *Because they use the sun to make food for the plant.*

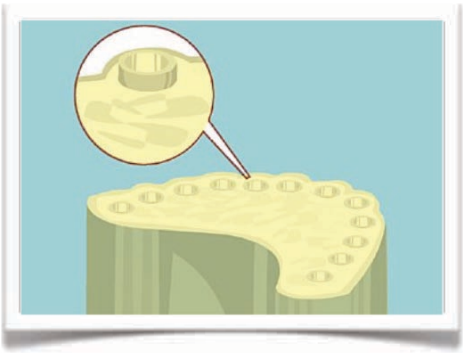
Look at the picture below.

Which plant has a hard, woody stem? *A*

Which plant has a soft, green stem? *B*

(5) Name the two ways that stems help plants. *They keep the plant from being blown away and they suck up water and nutrients for the plant.*

Look at the picture below:



What do we call the tubes that carry water to the parts of the plant? *Xylem*

In what direction does the xylem carry water in a plant — up towards the branches and leaves, or down towards the roots? *Up to the leaves.*

(6) In which part of a plant is food made? *Leaves*

What color does chlorophyll make the leaves? *Green*

Why does a plant need chlorophyll? *To make food for the plant by the sun and it helps the plant stay alive.*

Name the part of of a leaf that is attached to a stem and holds the leaf towards the sun. *The ?*

Name the part of the leaf that carries food and water to different parts of the leaf. *Veins*

What is inside of fruit? *Seeds*

What part of a plant does the fruit come from? *Flowers*

Name four foods you eat that are fruit. *Grapes, strawberries, raspberries, blueberries.*

(7: Unit) Name two things plants need to live and grow. *answer*

Science test (cont)

Complete this sentence. "When a seed begins to germinate, a new plant begins to *blank*? Grow

What do the cotyledons provide for the baby plant inside a seed — air or food? *Food*

Name two things that plants need to live and grow. *Sun and soil (with nutrients)*

What is inside an apple and can grow into a new apple tree? *Seeds.*

What part of a plant takes in water and nutrients from the soil and anchors the plant to the ground; the seed or the roots? *Roots*

What part of the plant uses sunlight to make food? *The leaves*

One of the jobs of a stem is to carry water and nutrients to the leaves. What else do stems do for the plant? *It helps the plant stay in the ground.*

In the stem of a plant, what are the tube-like structures tat carry water and nutrients to the plant called; the xylem or the seed? *Xylem*

What part of the apple do you eat; the seed or the fruit? *Fruit*

What often colorful and scented part of the plant can grow into a fruit? *Pollen.*

Incorrect answers (red) reviewed.

Bulbs

Amaryllis
David is growing an Amaryllis plant in a pot indoors.

Two weeks after planting

Six weeks after planting

Final

David was given a terrarium with five types of seeds and told to plant and care for them. "When it gets warmer," he says, "I'm going to bring it outside and take off the lid so it will get some nice warm air, some sunshine to make more food, and the bees and insects will pollinate the plants!"

He also selected the location for the terrarium. "We need someplace with lots of sunlight! Let's go inside and look around!"

Watering the seeds

Covering the terrarium

Finding light

I R L

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educational activities 2009

Unit Summary

Take a journey though the various systems in the human body, including skeletal, muscular, digestive, circulatory, respiratory, and nervous systems. Using your own body as a guide, explore the different parts that make up each system and how they function.

Student Vocabulary

- **skeleton**
- **ligament**
- **digestion**
- **esophagus**
- **small intestines**
- **large intestines**
- **blood vessels**
- **oxygen**
- **carbon dioxide**
- **nerves**
- **spinal cord**

MARCH 2009

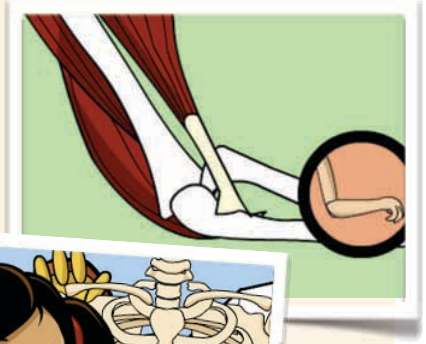
Experiments

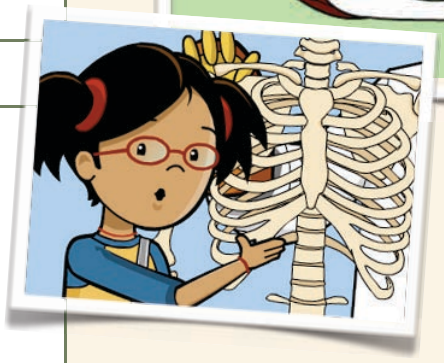
Paper Model

David had his body traced onto a five-foot long sheet of newsprint paper. He used this as an ongoing prop to learn about the different systems of the human body

Bones and Muscles

David watched Brainpop and Brainpop Jr. clips on bones, muscles, circulatory system, respiratory system and nervous system, answering the quizzes on each.





Digestion and Taste

Student reviewed the sense of taste and tasks of the tongue in the “Me and My Body” book series. Diagrams of the tongue and taste-bud system were presented .

Student experimented with the four types of food tastes (salty, sweet, bitter, sour) and the areas of the tongue which detect them.

Human Body Tests

(1) Bones and Muscles

Bones support your body and give you shape. Some bones, such as your ribs and skull, also have another job. What is it?

To protect; protect stuff like your brain and your heart and lungs.

Stand up and pretend your body had no bones. What would your body be like?

(David collapsed on the ground and made squelchy noises.)

Why are muscles attached to bones–to make our skin stay tight, or to help our bodies move?

To help our bodies move.

(2) The Digestive System

Does digestion begin in your intestines, or in your mouth?

Your mouth

When you swallow food, where does it go first–down your esophagus (food tube) or directly into your stomach?

The esophagus

What part of the digestive system squeezes and mashes food until it looks like a thick soup–the stomach or the esophagus?

The stomach

Where does unused food go–into your large intestine or into your stomach?

Large intestines.

(3) The Circulatory System

What muscle pumps blood to all parts of your body?

Your heart.

Your heart pumps blood all around your body through these tubes. What are they called?

Blood vessels

When you breathe in, your _____ fills up with the air you need to keep you alive.

Lungs

(4) The Nervous System

The nervous system is made up of nerves, the spinal cord and the _____.

Your brain.

Your brain sends messages up and down your spinal cord and through your _____ .

Nerves

What part of your nervous system controls your whole body and allows you to think, remember and feel?

Your brain.

(5) Unit Test

Do your ribs help your heart beat, or do they protect your heart from getting hurt?

Protect your heart from getting hurt.

If you didn't have bones in your body, could you stand up straight and tall?

No

What are attached to your bones and let you move–your skin or your muscles?

Muscles

Where does your body first begin to digest food? In your mouth as you bite and chew your food, or in your stomach where it is mixed and mashed?

Mixed and mashed in your stomach.

Find the stomach on your body outline.

(Points to stomach)

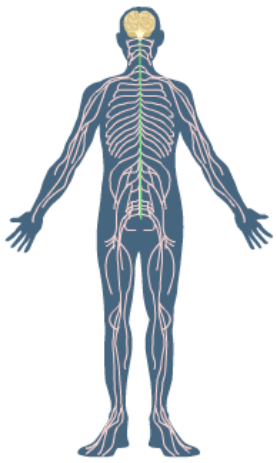
Which part of your body pumps the blood...your lungs, or your heart?

Heart.

Your heart pumps blood all around your body through tubes. Are these tubes called nerves or blood vessels?

Blood Vessels

Through which of these body parts does your brain send messages...your blood vessels or your nerves?



Nerves

Which part of your body helps you remember your friend's name: Your heart or your brain?

Brain.

Yes or No: We need to breathe air into our lungs to stay alive .

Yes

Find the lungs on your body outline.

(points to the lungs)

Find the intestines on your body outline.

(points to the intestines)

INVESTIGATIONS

Lungs in a Bottle

Make a model lung: cut off the bottom of a large soda bottle; cut off the zippered part of a sandwich bag and put it around the bottom of the bottle. Fasten with a rubber band. Put a straw in the neck of a balloon; seal with tape. Thread the straw and balloon into the neck of the bottle; secure with clay. The bag is a diaphragm.

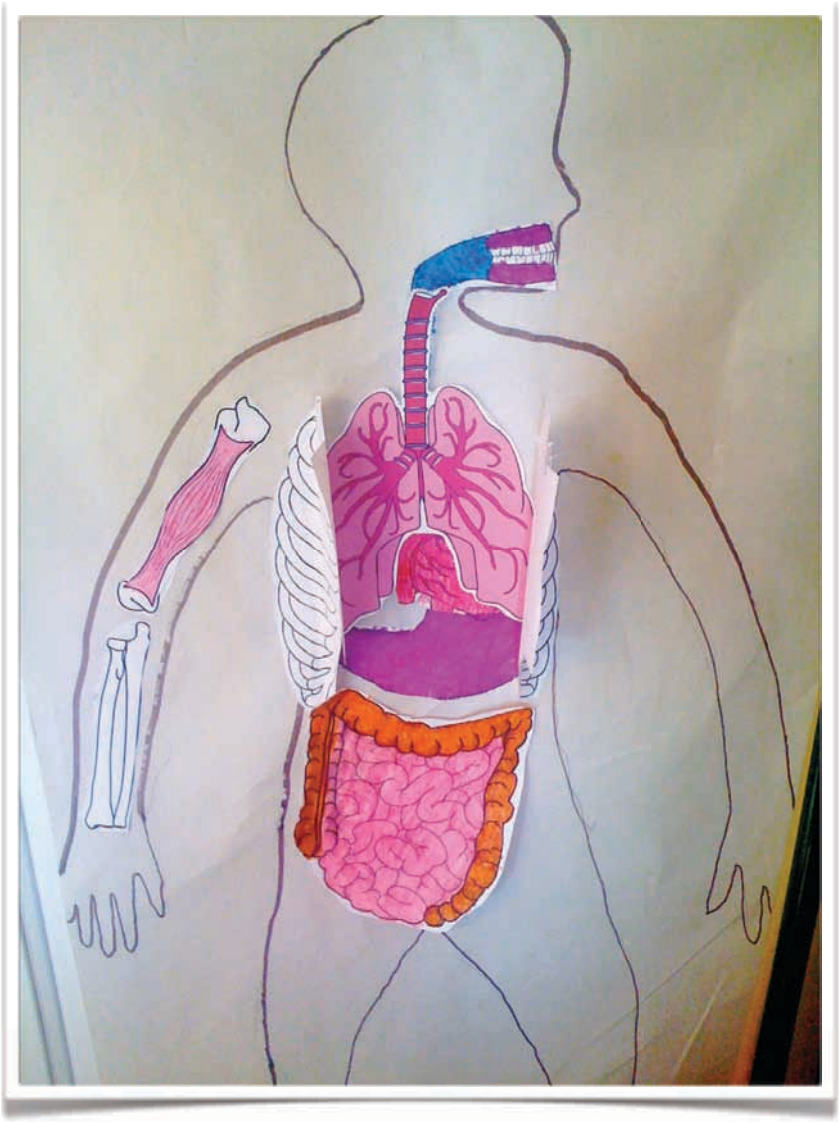
Digestion

Get out two paper cups; label one "lemon" and one "water." Add three tablespoons of milk to each, then add two spoons of water to the water cup and two spoons of lemon juice to the lemon cup. Cover with plastic wrap and check in one minute. Check again after 2 hours. What did you notice?

"The one with water stayed the same. The one with lemon juice got lumpier and stuff stuck to the sides of the cup."

Human Body Model

David created a model of his body by having his body outline traced onto a five-foot long sheet of newsprint paper. Different systems and body parts were mapped on the model.

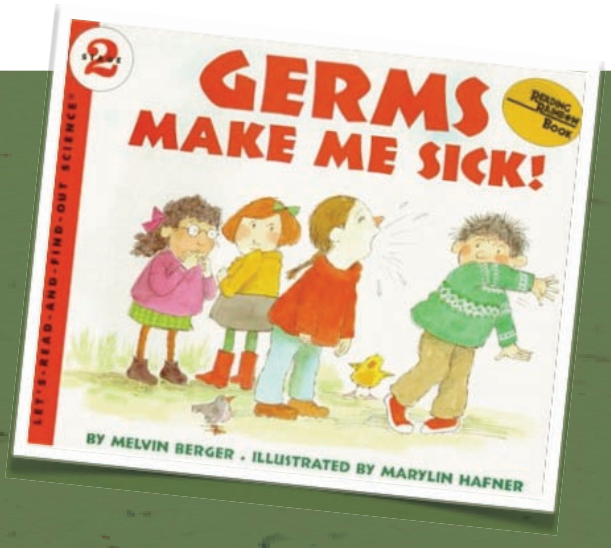


"Germs Make Me Sick"

Melvin Berger

Read About It

Learn more about germs, how they make you sick, and how to chase them away.



I R L

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Exploring and Building Habitats

Go on a safari through a wetland and a forest, and even take a peek at life underground.

Find out how animals and plants survive the coldest and driest places on Earth. Get acquainted with the African grassland, then find a rain forest right in your own home.

Learn about the term "endangered," and find out what you can do about it.

Then meet John Muir, a man who helped protect some of our planet's most beautiful habitats.

Student Vocabulary

- canopy
- understory
- emergent layer
- cactus
- nocturnal
- twilight
- caribou
- lichen
- camouflage
- predator
- wetland
- burrow

MARCH–APRIL 2009

Visual-Aural Learning

Overview and Introduction
Student was shown two short animated videos on the biomes of earth and animal environments using **Brainpop.com**.

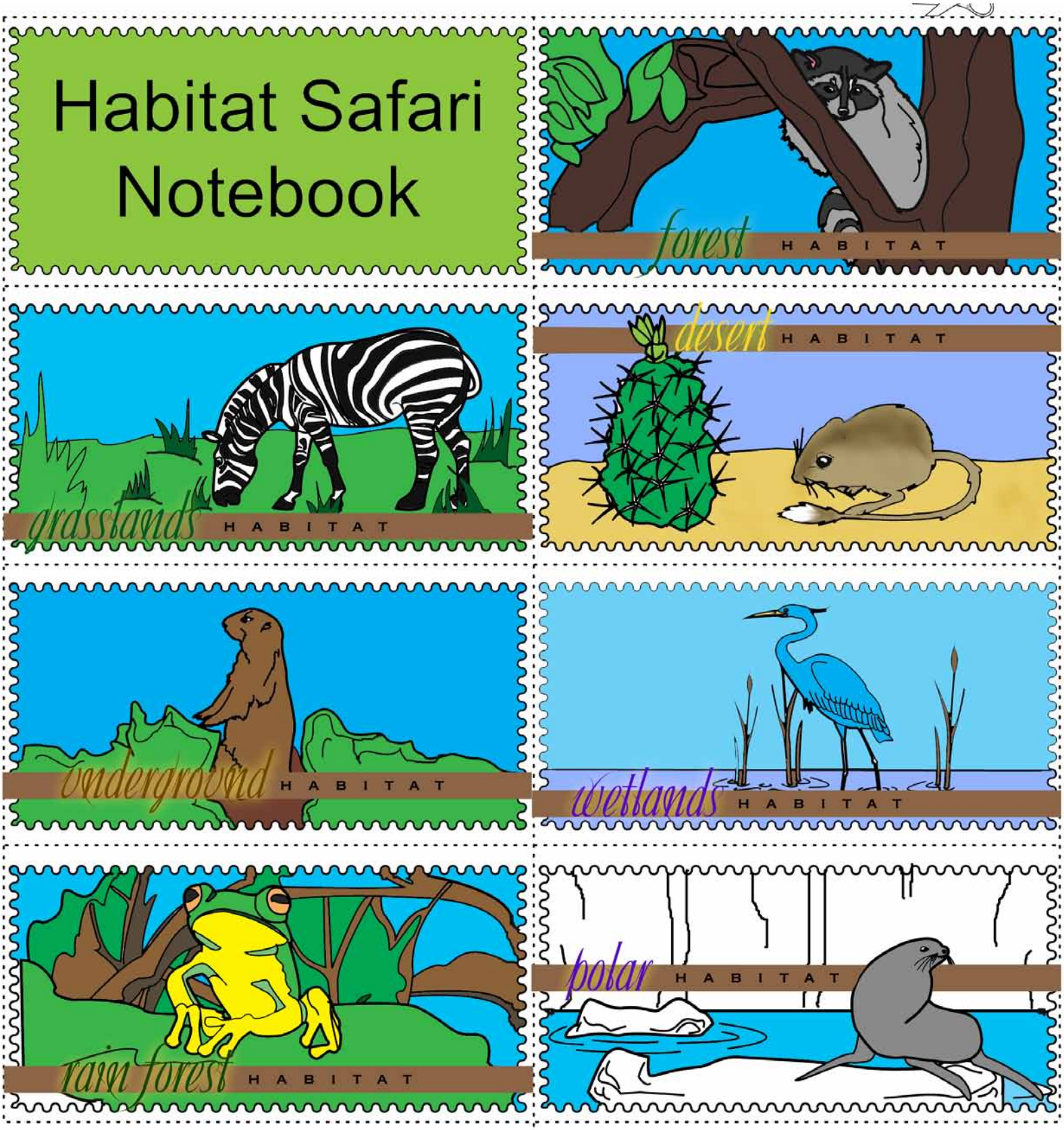
"Wait a Minute..."
David was able to successfully predict the outcomes of most of the experiments. The underground habitat, however, was different.

We made a little underground habitat with prairie dogs out of Play-Doh, stuck to a baking sheet, then put it in the sun and put it under ice, and measured temperatures with a meat thermometer. He was impressed that the burrow stayed cool under the sun, and predicted that it would freeze under the ice. When it turned out to be at room temperature instead, he cocked his head and said, "*Wait a minute....you mean it's cold in here when it's hot inside and hot in here when it's cold outside? Woah!*"

Habitat Safari Notebook Stamps

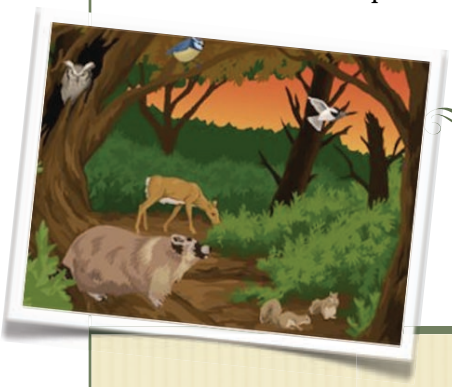
Stamp outlines were provided in .pdf format from k12.com. They were modified and turned into a PhotoShop document; David then colored in the outlines using PhotoShop's bucket and eyedropper tools. He was shows how to use the burn tool for the Kangaroo Mouse (Desert Habitat) stamp.

More ornate wording was later added by his graphic designer mom, who couldn't stand NOT doing it.



Forest Habitat

Student read a story about an animal (raccoon) in the forest and got an overview of the types of animals that live in the different strata of the temperate forest climate: Canopy, Understory, Shrub Layer and Forest Floor.



A model of the forest habitat was constructed using an old shoebox, clay, celery sticks, broccoli and dirt. Student then made a presentation of the model, which was recorded to DVD (see book insert).

Artwork of the forest habitat was completed using PhotoShop software. The picture was then printed and mounted onto brown construction paper, and displayed in the student's home. A planned field trip to the temperate forest environment was cancelled due to inclement weather.

Building a Shoebox-Sized Habitat

"A habitat is where animals live that has what they need, like food, water, and shelter."

— David

temperate forest

HABITAT MODEL

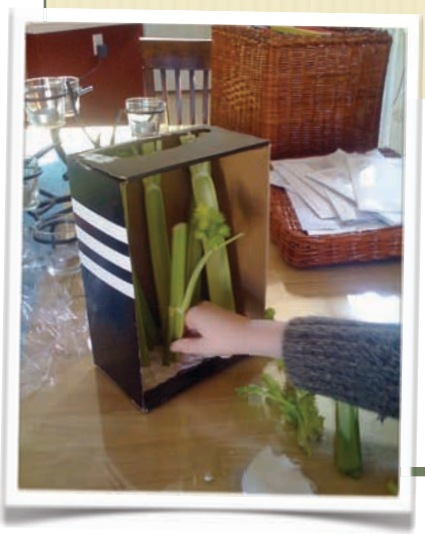
Canopy Layer (tall celery)

Understory Layer (short celery)

Shrub Layer (broccoli florets)

Forest Floor (dirt-covered clay)

Shine a lamp in the top and ask David to explain how the different layers of the forest flora affect the amount of sunlight that reaches the forest floor.



Desert Habitat

Student read a story about an animal (owl) in the desert and got an overview of the types of animals that live in the desert and how they get food and water to survive, as well as cope with the heat.

A simple experiment was conducted to show how animals can get enough water in the desert from the food they eat. A slice of bread was placed in one plastic baggie, and a slice of potato in another. They were allowed to heat in the sunlight until condensation formed on the inside.

Artwork of the desert habitat was completed using PhotoShop software. The picture was then printed and mounted onto yellow construction paper, and displayed in the student's home.

Polar Habitat

Student read about different species of animals that live in the polar regions, their climate, and food sources. He also watched a short video about the arctic biome on **Brainpop.com**.

An experiment was conducted to show how blubber protects the arctic animals from the severe cold they face. A baggie was half-filled with air and placed on David's hand; an ice cube was then placed on the baggie so that the air in the bag insulated his hand. The other hand was also subjected to the ice cube treatment, without the insulation.

Artwork of the polar habitat was completed using PhotoShop, printed and mounted onto white construction paper, and displayed in his home.

Grasslands Habitat

Student read a story about grazing animals and predators in the grasslands and how they survive. He also watched a movie on the grasslands from **brainpop.com**.

A measuring experiment to show how fast grass grows was performed to show how the grazing animals on the plains do not run out of food. Grass was grown in a cup, measured, cut, and remeasured again four days later.

Artwork of the grasslands habitat was completed using PhotoShop software. The picture was then printed and mounted onto brown construction paper, and displayed in the student's home.

Rainforest Habitat

Student read about the four layers of the Rainforest Habitat (Emergent, Canopy, Understory, Forest Floor) and the animals that live there.

Rainforest Scavenger Hunt was conducted to show how many things we use in everyday life came from rainforest (rubber, philodendron/spider/african violet plants, chocolate, avocados, papaya, mango, cinnamon, bamboo, etc.) and how we depend on them.

Artwork of the rainforest habitat was completed using PhotoShop software. The picture was then printed and mounted onto green construction paper, and displayed in the student's home.

Wetland Habitat

Student watched a short video about freshwater habitats on **Brainpop.com**. He also saw a short film from the Missouri Department of Conservation on local wetlands, and the types of animals he might expect to find there.

An experiment was conducted to show how the wetlands function as both a protection from soil erosion and to help protect the waterways and land from pollution. Clay was pressed onto the sides of a bowl to simulate bedrock; one side of the clay was covered with sponges, the other left plain. both covered with soil. Water was then sprayed onto the soil to study the cushioning effects of the spongy wetland soil.

Artwork of the was completed using PhotoShop, printed, mounted, and displayed in student's home.

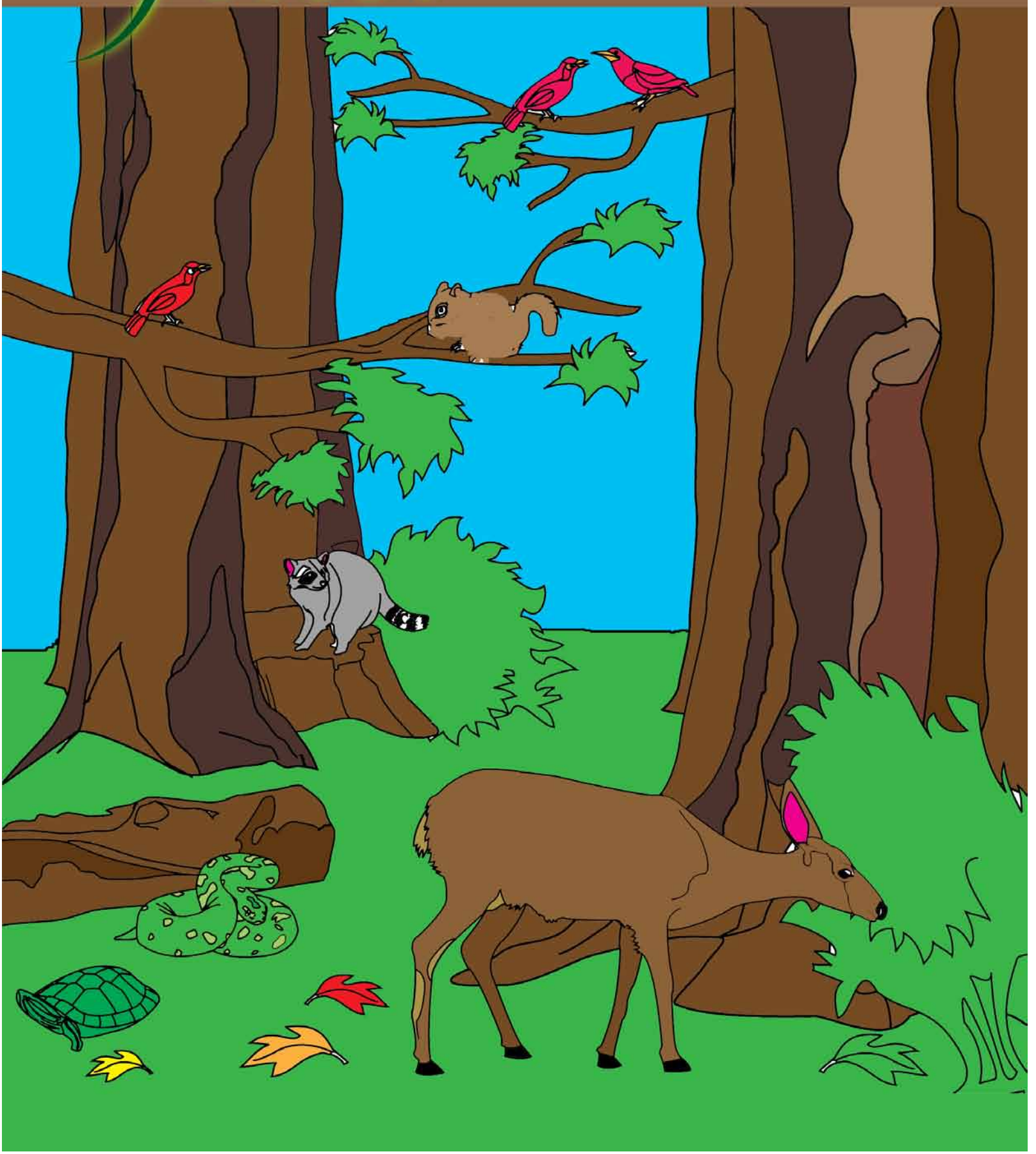
Underground Habitat

Student read about the types of animals he might find living underground (worms, moles, prairie dogs), and watched a short video about prairie dogs.

An experiment to show the insulting effect of earthen burrows was done; a lump of clay was formed on a baking sheet with a hole poked into the clay. David measured the temperature inside and outside the burrow with a meat thermometer when the sheet had been left in the sun for five minutes, and when covered with ice for five minutes.

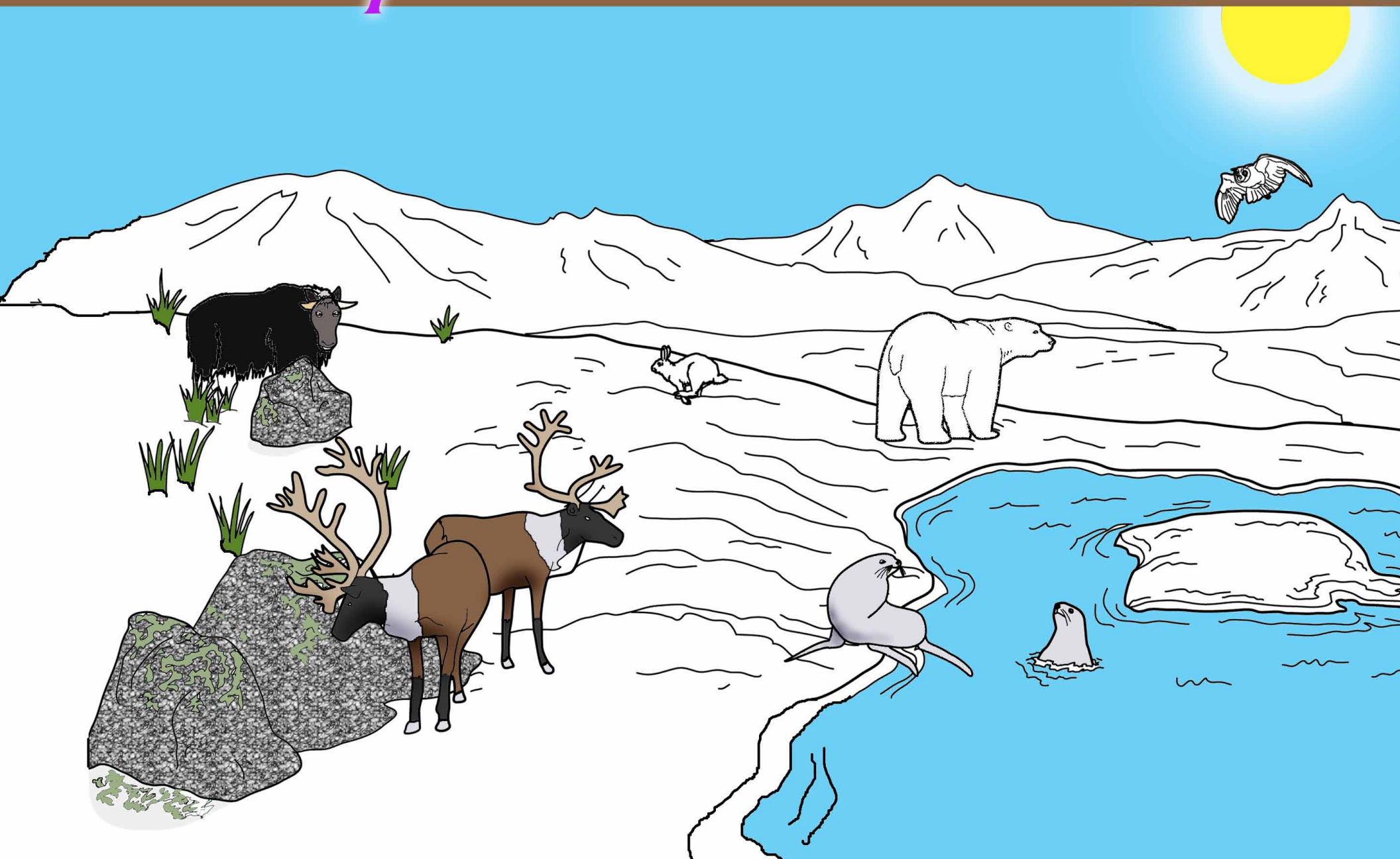
Artwork of the underground habitat was completed using PhotoShop software. The picture was then printed and mounted onto brown construction paper, and displayed in the student's home.

forest HABITAT

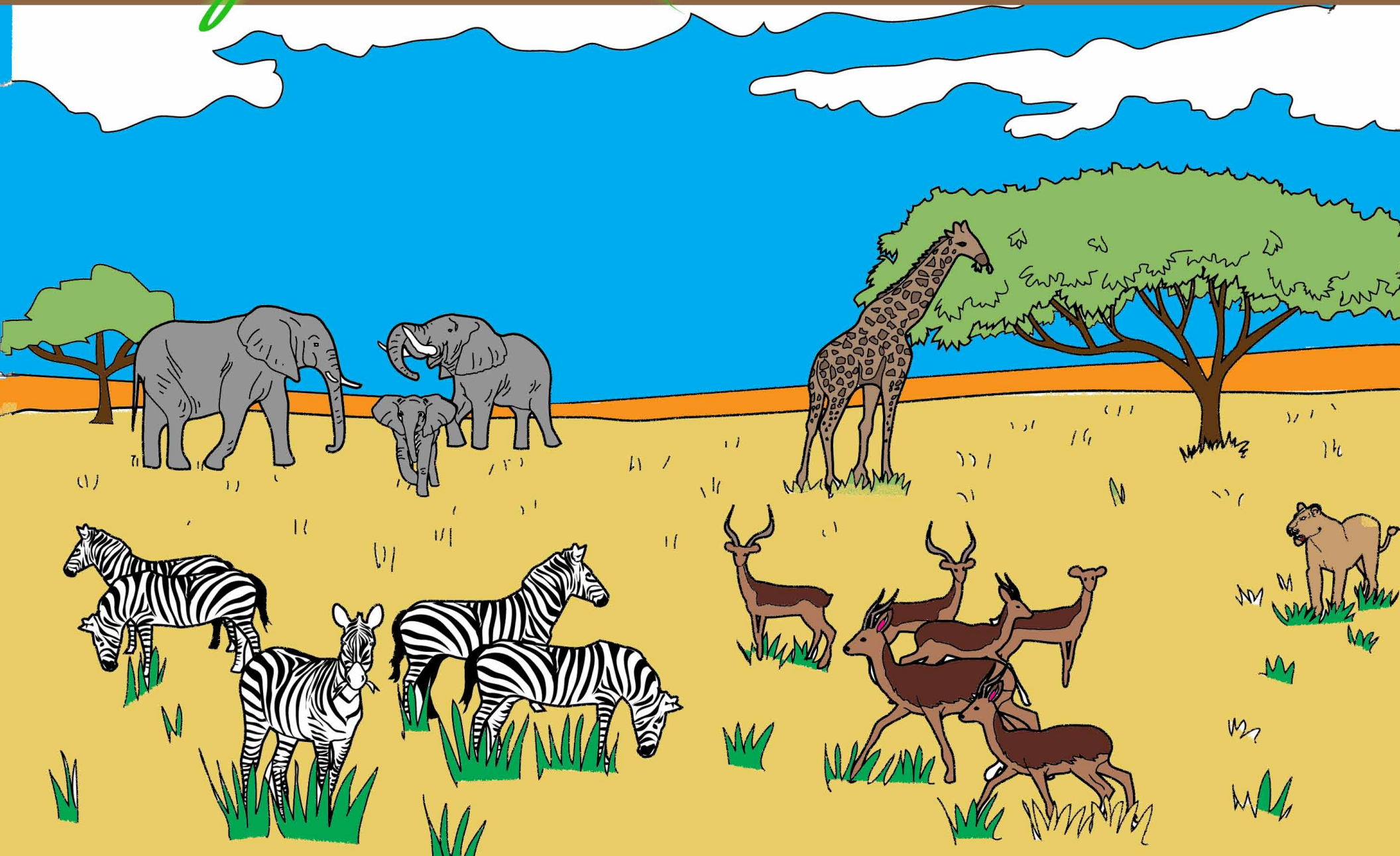


desert HABITAT

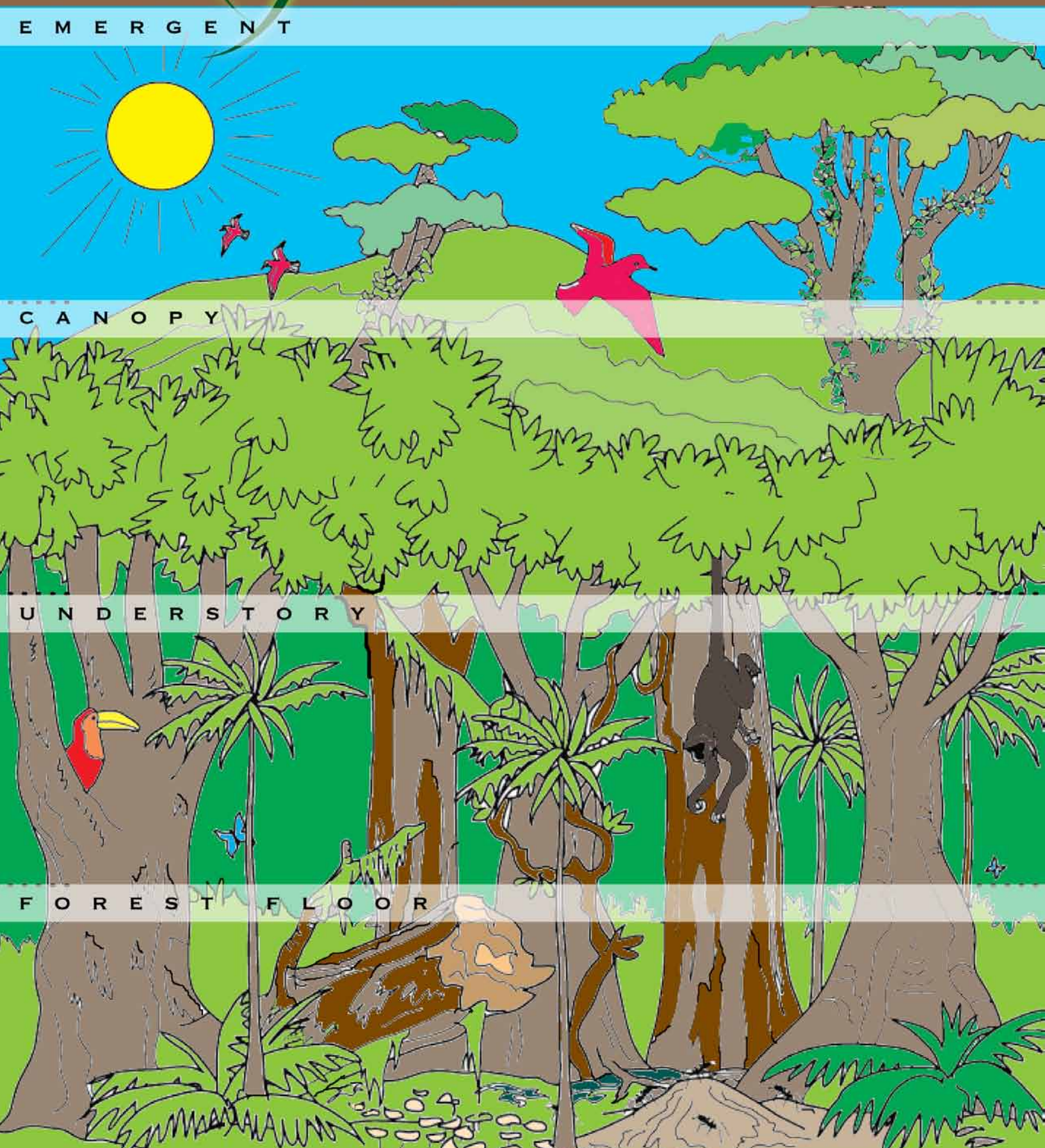
polar HABITAT



grasslands HABITAT



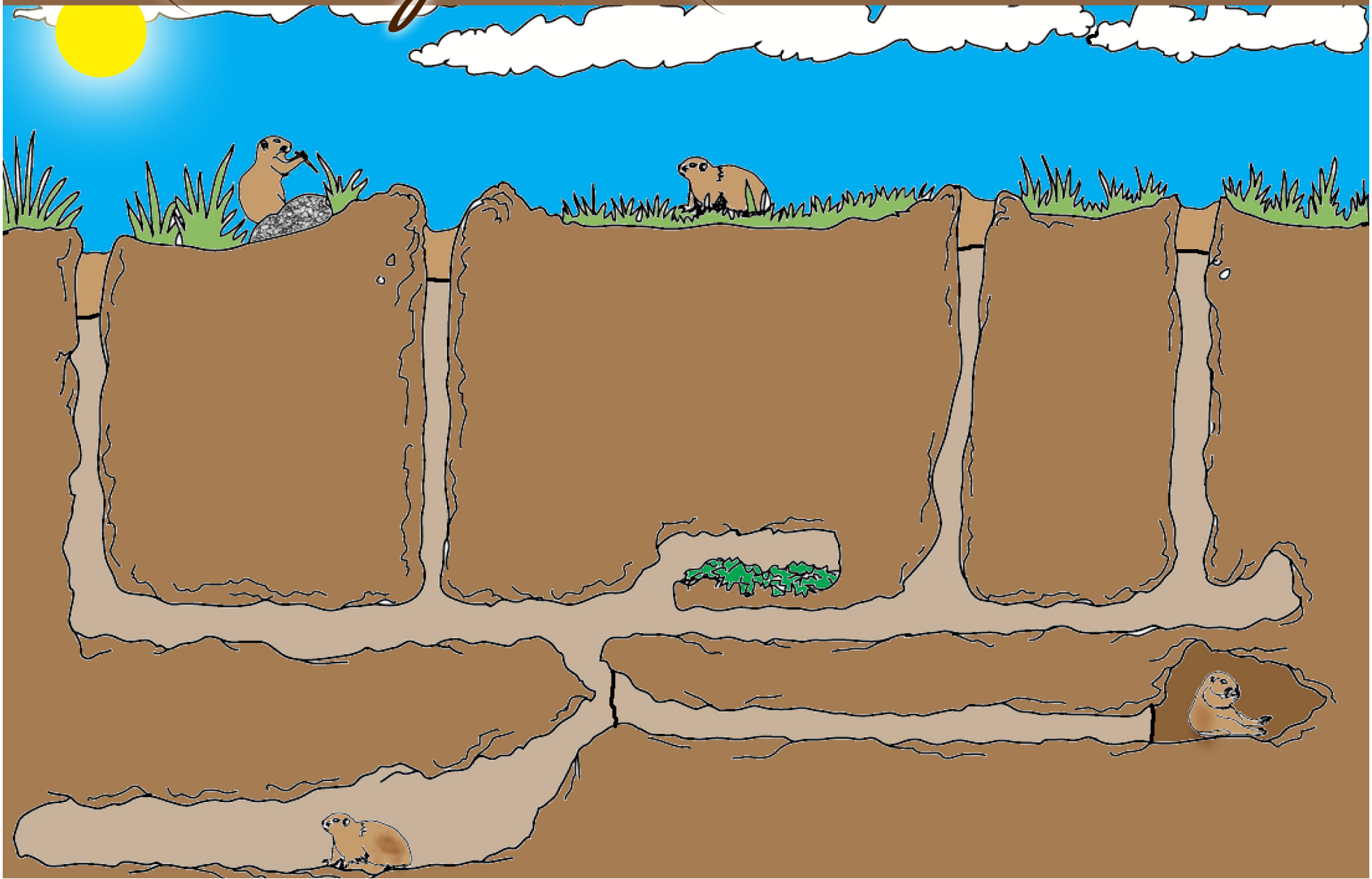
rainforest HABITAT



wetlands

H A B I T A T

underground HABITAT



Animal Habitat Tests

(1) Introduction to Habitats

What is the name for a place where animals and plants live?

A Habitat.

Name two different habitats.

Tropical Forest and Polar.

Think about the two different habitats you named. Describe one thing about them that is the same and one thing that is different.

The same is that they both have animals that live there. They're different because one is really hot and one is really cold.

(2) Forest Habitat

Which would you find in a forest habitat--large open grassy areas or many tall trees?

Lots of tall trees.

Name an animal you would expect to see in a forest.

A Squirrel.

Which forest layer is at the very top and gets a lot of sunshine and shades the forest below--the shrub layer or the canopy?

The canopy.

In which forest layer would you find a mouse and a turtle--the forest floor or the understory?

The forest floor.

Where can deer find food and shelter--in the canopy or the shrub layer?

The shrub layer.

Birds make their nests in every layer of the forest, but most make their nests in the shrub layer and what other layer--the understory or the forest floor?

The understory.

(3) The Desert Habitat

How would you describe a desert--hot and dry or hot and wet?

Hot and dry

What kind of desert plant doesn't need much water to live, has a thick trunk with a waxy surface that helps it hold water, and roots that take in water very fast?

Cactus

Tell about one desert animal and how it has adapted to live in the desert.

Elf Owls eat bugs that provide water for them. Those owls are cool inside cacti and they're nocturnal.

(4) The Polar Habitat

Which photograph shows a polar habitat?

Point to the two places on the globe that have polar habitats.

North pole and south pole, on the top and on the bottom.

Name one animal that lives in a polar habitat.

Walruses! Narwhals!

Yes or No: Tall trees grow in the polar habitat.

No

Yes or No: Lichen, which forms crusty patches on soil and rocks, is food for caribou and musk oxen.

Yes

How does the layer of fat called blubber help some animals survive in polar habitats?

Because it keeps them warm.

(5) Grasslands Habitat

Which photograph shows the grasslands?

What is the most common type of plant in the grasslands?

Grass

Name an animal that lives in the African grassland habitat.

Lion.

Do grazers eat grass or hunt for food?

They eat grass

Do predators hunt for food or eat grass?

Hunt for food

Think back to the investigation in which David measured the grass.

Did David correctly measure the grass and record the results?

Grass grows quicker than trees

(6) Rainforest Habitat

Which picture shows the canopy?

Animal Habitat Tests

Which picture shows the forest floor?

Name one item you found in your home that is made from a rain-forest plant.

Philodendron

Describe a rain-forest habitat.

It rains a lot, and it's warm, and there are lots of plants and animals there.

(7) Wetlands Habitat

Which photograph shows the wetlands habitat?

Why is this habitat called the wetlands?

Because it's wet and covered with water.

Name one wetlands animal and one wetlands plant.

A blue heron and cattails.

Think back to the investigation where David made his model of the wetlands.

He correctly identified how the spongy wetlands reduces the effects of erosion.

(8) Underground Habitat

Yes or No: An underground habitat helps protect animals from both hot and cold weather.

Yes

Name an animal that lives underground.

Prairie Dogs

Name a habitat that has underground animals.

Grasslands

(9) Unit Test

A habitat is a place where animals and plants_____.

Answer

Which habitat is drier--a forest or a desert?

Desert

Name the habitat where mostly grass grows.

The savan--uh--Grasslands

Which habitat is always warm and wet because of regular rainfall--a tropical rain forest or grassland?

A tropical rainforest

Which would you find in a forest habitat--large open grassy areas or many tall trees?

Lots of tall trees

Which habitat is very cold and has plenty of ice--a desert habitat or polar habitat?

Polar

Name a habitat that has underground animals.

Grassland

Why did John Muir want to save land--to build homes there or to turn it into national parks?

Turn it into National Parks.

DAVID

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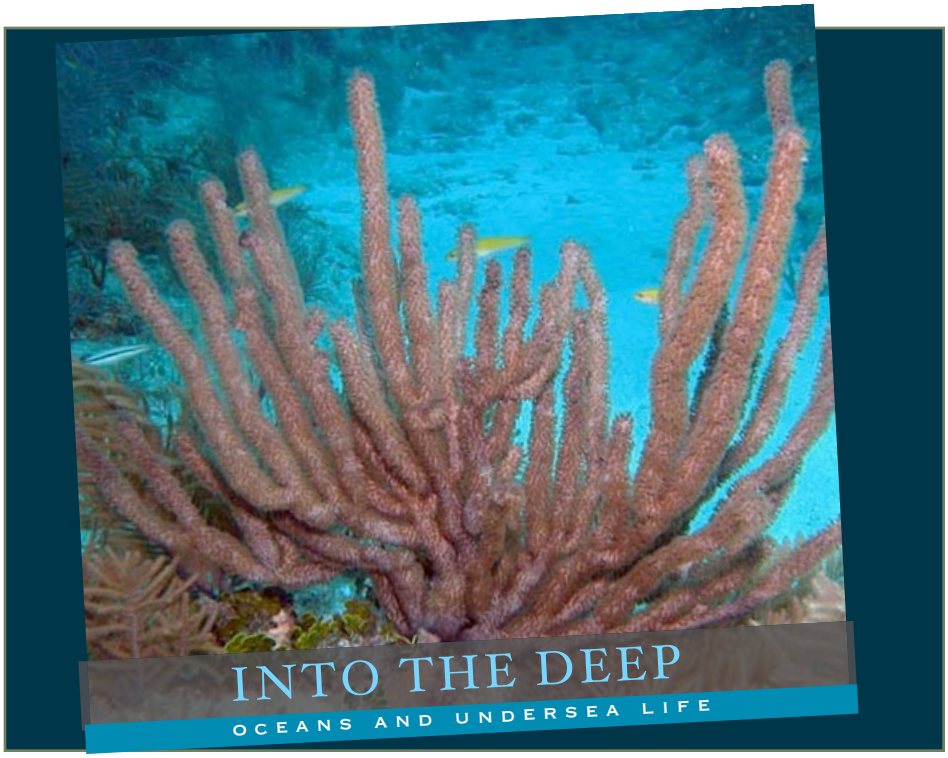


Ocean Waves, Tide Pools, Kelp Forest

Explore the waves, tides, and currents of the world's oceans. Visit a kelp forest, coral reef and tide pool. Travel in a submersible to the bottom of the ocean, and take a look at the strange and wonderful animals that live there. Meet Jacques Cousteau and read about his contributions to oceanography.

Student Vocabulary

- saltwater
- freshwater
- coast
- tide
- tide pool
- kelp
- coral reef
- stem
- xylem
- fibrous root
- SCUBA

April 2009

Video

Blue Planet
Although not part of the official curriculum, parts of the Blue Planet series were used to demonstrate the types of creatures found in the extreme depths of the ocean.

Special emphasis was placed on the concept of the ocean becoming darker as the depth increases, as well as the increase of pressure found in the deep waters.

Also discussed were hydrothermal vents and the ecosystems they sporadically maintain; the mid-Atlantic ridge and the volcanic activity there, and the subduction of parts of the the earth's crust in such places as the Mariana Trench.

Ocean Waves and Currents

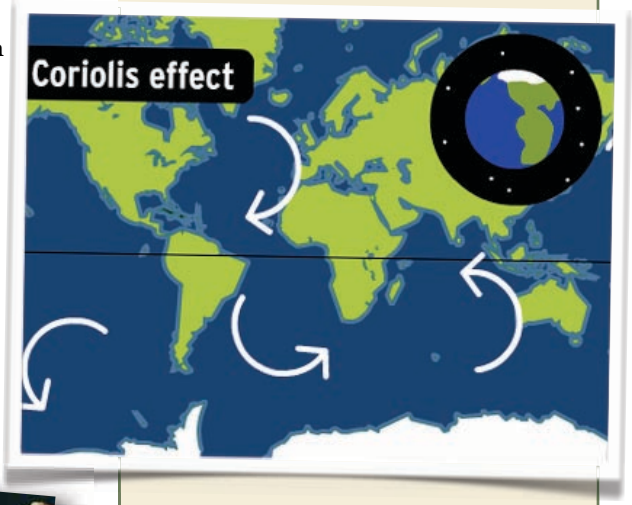
David traced a route around the globe staying on the oceans, to understand how all of the world's oceans are interconnected.

He covered ocean waves and how the ocean in always moving. He learned that waves are caused by the wind, and learned about ocean currents.

He covered the differences between saltwater and freshwater

An experiment on the behaviors of saltwater versus freshwater was done to reinforce the ideas that (a) ocean water is saltwater and is always moving. The water in lakes, ponds and streams has barely any salt in it, and is called freshwater. (b) Waves form when wind blows on the surface of the water. (c) Light winds form small waves and strong winds form large waves. (d) Currents are like a flowing river or stream of water in the ocean. (See below)

Extra materials utilized (see sidebar).



David watched **Ocean Currents** from **brainpop.com**, as well as the DVD films **OCEAN** and **Into the Deep (IMAX)** to serve as an introduction to the topic of oceans and undersea life.

How does saltwater look and taste different from freshwater?

This one (salt) looks more dirtier than this (fresh). The freshwater tastes a lot more better. This one tastes gickier.

What happened wen you blew on the water?

It makes waves. When I blow medium it makes small waves and when I blow big, it makes big waves.

How to waves form in the ocean?

By wind.

Is the ocean always in motion?

Yup, it's always in motion.

MAKING AND MOVING SALTWATER

making waves

OCEAN MODEL

97 ml of water was measured into the graduated cylinder and enough salt added to reach 100 ml. Saltwater was compared with 100 ml of freshwater.

Saltwater was poured into a baking dish and wind created by having David blow on the surface of the water from one side of the pan.

(Of note: The saltwater tastes salty and looks cloudy compared to the freshwater. Ocean water is 3.5 percent salt. Ocean water also contains other elements, such as calcium, that many ocean animals use to make their shells.)

Where the Ocean Meets the Land

David reviewed concepts from the last lesson, then read the k12.com-provided Reading Room on the ocean and tide pools. He also watched **Tides** from **Brainpop.com.**

An experiment was done so David could make his own tide pool and observe the rise and fall of water.

Using a paint tray, David used the bottom of a plastic cup (about 2 cm high) to make a tide pool, and clay to make different-sized rocks and some marine animals. The rocks surrounded and cemented the pool to the bottom of the tray; animals were attached to the rocks using broken toothpicks, and the deep end of the paint tray was filled with water. (See inset, right.)

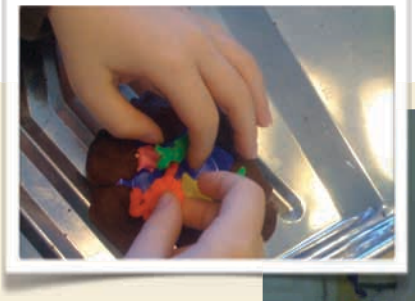
What did you notice about the tide pools when you demonstrated high tide the first time?

All the rocks actually got wet and it got the tide pool just a little wet.

What did you notice about tide pools when you demonstrated low tide?

It didn't even touch anything...the water. Not the rocks, the tide touched nothing at all.

David also read the book **One Small Place By the Sea**.



(*above*) David places marine plants and animals made of Play-Doh into the model tide pool.

(*right*) When the paint tray is full of water at the deep end and gently tipped, the water level rises up and spills over the edge of the model rocks and into the tide pool. As end of the tray is lowered again, the water recedes from the shallow end of the tray, but the model tide pool remains full.

David has expressed a distinct like for cuttlefish. As a topic of interest, we used them as a research subject and crafted a brief report, presented at right.

Sources: NOVA (*Kings of Camouflage*) and Octopuses, Squids and Cuttlefish, by Trudi Trueit.

CUTTLEFISH

They can change into any color and any shape.

People hunt them alot.

Their cousins are squid and octopuses.

The like to eat crabs and shrimp.

There is a big one that can grow up to three feet long, and you can find the big cuttlefish in Australia. A regular cuttlefish can grow up to 18 inches. Girl cuttlefish lay black eggs and then die immediately when the girl lays the eggs. A month later, the little cuttlefish hatch out, and they hide out in the sand so they don't get eaten.

They have over one thousand colors. Their brains are pretty big because if they can do over 1 million things over anything they need a sophisticated brain in order to hide from people who want to hunt them down. Sometimes big cuttlefish are known to bite scuba divers.

They live in the Eastern Atlantic Ocean and the North Sea.

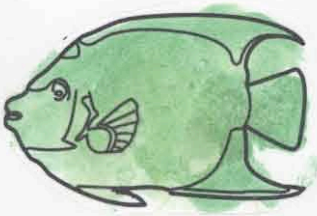
Drifters, Swimmers and Crawlers

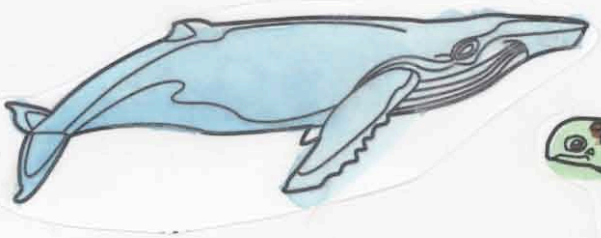
David covered three of the major ways sea animals move; drifting, swimming and crawling. He then used the Ocean Explorer segment from k12.com in order to explore animals in the kelp forests, deep ocean and coral reef areas, and classify them by their method of movement.

A craft was done to reinforce the idea of animals moving differently. Line drawings of different animals were provided, along with photographs of the animals represented. David painted them with watercolors and pasted them next to the correct poetry verse.

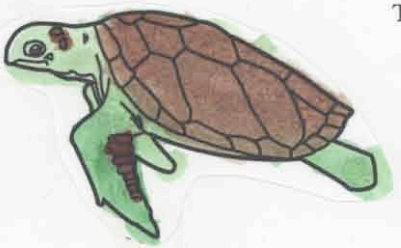
A Moving Story:

There are many animals that live in the sea
They don't move like you and me.
Swimmers swim in many ways,
Fins, flippers, flukes—they are all O.K.





Fish move their fins side to side
The fluke of a whale is what helps it to glide.



Sea turtles swim with their flippers and
They also use them on the land.

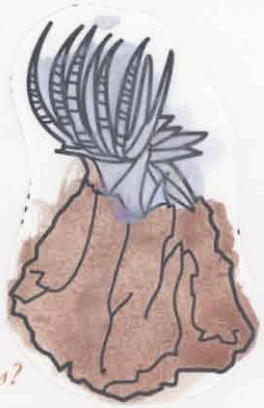
Tides and waves move drifters, you'll find.
The jellyfish is only one kind.
Tiny animals that drift in the sea
Are important food for big fish, you'll agree.

Crawlers move slowly along the sea floor,
In the deepest sea or on the shore.
Crabs have ten legs to crawl and pinch
They move along inch by inch.

Sea stars have tiny suction feet,
They use them to move and to eat.

Snails slide along on their slippery foot.
Other animals just stay put.

Barnacles never move to feed.
The ocean brings them what they need.



Animals move differently in the oceans.Now can you name all of their motions?

Oceans and Undersea Life Tests

(I) Ocean Waves and Currents

Is the water in the ocean saltwater or freshwater?

Saltwater.

Yes or No: Ocean water is always in motion.

Yes

Which picture shows waves made by a strong wind?

Which picture shows waves made by a light wind?

(II) Coasts: Where the Ocean Meets the Land

What do we call the place where the land meets the ocean--the tide or the coast?

Coast

What do we call the rise and fall of the ocean--the tide or tide pool?

Tide

What brings tide pool plants and animals the things they need to survive--the wind or the tides?

The tides

(III) Drifters, Swimmers, and Crawlers

What are some of the different ways ocean animals move?

They crawl, swim, and drift.

Which animals have to rely on the moving ocean to get them from place to place--swimmers or drifters?

Drifters

(V) The Kelp Forest

Does kelp grow in any body of water, or just in the ocean?

Just the ocean.

Yes or No: The canopy, understory, and ocean floor are the different layers of the kelp forest.

Yes

(VI) The Coral Reef

Is coral a plant or an animal?

An animal

Do coral polyps use their tentacles to move from place to place or to catch food?

To catch food.

(VII) The Deep Ocean

Is the deep ocean very bright or very dark?

Very dark.

Do any animals live at the bottom of the ocean?

Yes, like a sea cucumber

Think back to the investigation.

Was David able to compare the features at the bottom of the ocean with familiar landforms such as mountains, valleys, and plains?

Yes

(VIII) Unit Test (and Jacques Cousteau)

What kind of water does the ocean contain--saltwater or freshwater?

Saltwater

A jellyfish is a type of ocean animal that is carried by the moving ocean, going wherever the currents, tides, or waves take it. Are jellyfish swimmers, drifters, or crawlers?

Drifters

What is the name for the place where the ocean meets the land--the deep sea or the coast?

The coast.

Yes or No: Kelp is a type of seaweed that grows in saltwater.

Yes.

What does wind blowing across the surface of the ocean make--tides or waves?

Waves

Is a coral an animal or a plant?

Animals

Are the underwater places of the oceans mostly dark or light?

Mostly dark.

What is the name for the mountains under the oceans--seamounts or deep-sea trenches?

Seamounts, definitely.

Yes or No: Animals live only at the surface of the ocean where it is light.

No.