

Science in the Elementary and Middle School Years Checklist:

This is a list of some of the science units and topics we'll cover in elementary and middle school. We will return to these topics more than once, each time going into more depth. We spend as much time as needed (and while interest lasts). I know we'll cover the topic again in a few years.

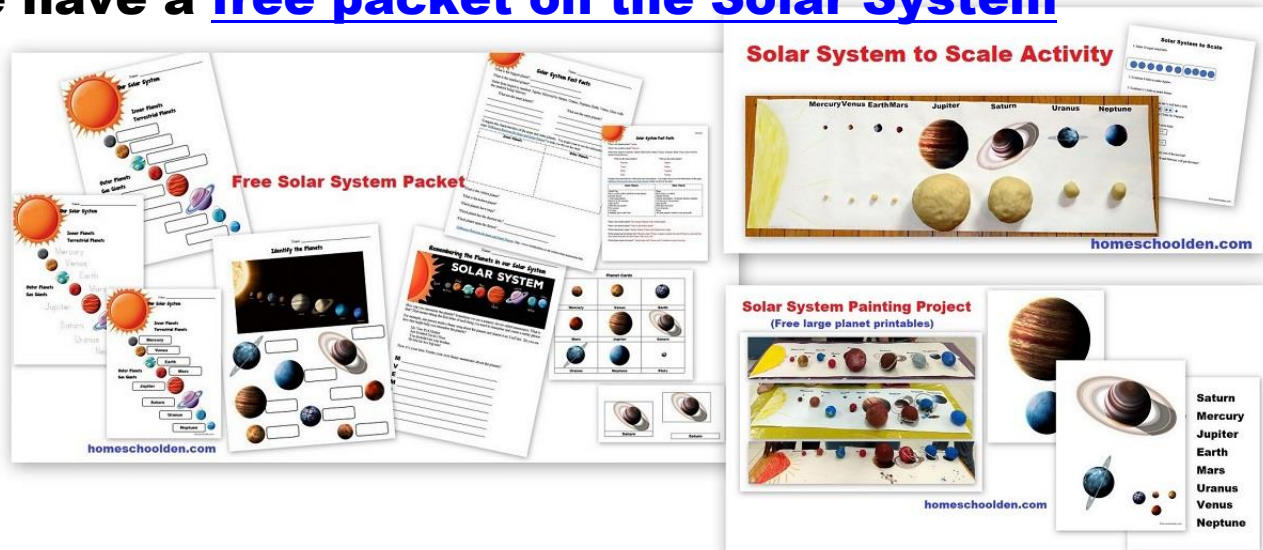
The Human Body	
	Cells
	Tissues
	Nervous System
	Skeletal, Muscular and Integumentary Systems (skin, etc.)
	Circulatory and Respiratory Systems
	Digestive and Excretory Systems
	Endocrine and Reproductive Systems
	Immune System and Disease
Biology	
	Plants and Animal Cells
	Cell structure and Process
	Cell Function (chemical reactions inside cells)
	Prokaryotes vs. Eukaryotes, Plant vs. Animal Cells
	Cell Division DNA-RNA, Genetics
	Life Cycle and Reproduction
	Plants
	Growth
	Photosynthesis
	Genetics
	Animals
	Unit on animal adaptations, animal habitats, animal homes, animal characteristics, migration, camouflage, animals and their young, vertebrates/invertebrates, herbivores/carnivores/omnivores, herbivores/carnivores, conservation - extinct vs. endangered animals, [This is a carryover from the science we covered in the preschool years (ages 4-6)... and there is a separate checklist for that!]
	Animal anatomy and physiology
	Classification, taxonomy
	Kingdom, phylum, class, order, family, genus, species
	Offspring names
	Group names
	Levels of organization
	Biosphere, ecosystem (biome), community, population, organism, groups of cells, cells, molecules
	Microorganisms - bacteria, viruses, protists, fungi
	Biomes (ecosystems)
	Ocean Life
	Ecology - interdependence of organisms and their environment, food chain
	Population Dynamics
Chemistry	
	Atoms, Molecules
	States of Matter & Changes in the states of matter

	Physical and Chemical Properties of Matter
	Mixtures & Solutions
	Acids & Bases
	Atomic structure - periodic table
	Common elements, chemical bonds, chemical reactions
	Building molecules, Valence Electrons, Bohr diagrams, Lewis Diagrams
	Molecular Chains
Astronomy	
	Solar System Inner and outer planets, asteroid belt
	Moon
	Gravity
	Kinds of Stars
	Galaxies
Earth Science	
	Geology - history of the Earth
	inside Earth – geosphere
	Rocks & Minerals - sedimentary, metamorphic, igneous rocks
	Earth systems (geosphere, biosphere, hydrosphere, atmosphere)
	Atmosphere
	The Magnetosphere - Earth's Magnetic Field
	Earth's movement – changes to Earth's surface
	plate movement
	what changes landforms
	Faults – Waves what causes mountains, volcanoes, earthquakes
	how has Earth's surface changed
	Weather
	Water
	Freshwater
	Underground water
	Oceans, Tides, Currents – The Hydrosphere
	Cycles
	Water Cycle
	Oxygen Cycle
	Nutrient Cycle
	Nitrogen Cycle
	Carbon Cycle
	Sulfur Cycle
	Phosphorus Cycle
	Rock Cycle
	Renewable and Nonrenewable Energy
Physics	
	Simple Machines
	Magnets, Magnetic Fields, the Magnetosphere
	Speed, force, energy, motion, power, heat, heat transfer, conduction, convection, radiation
	Light and optics
	Electricity
	Sound - vibration, waves, speed, frequency, wavelength, amplitude

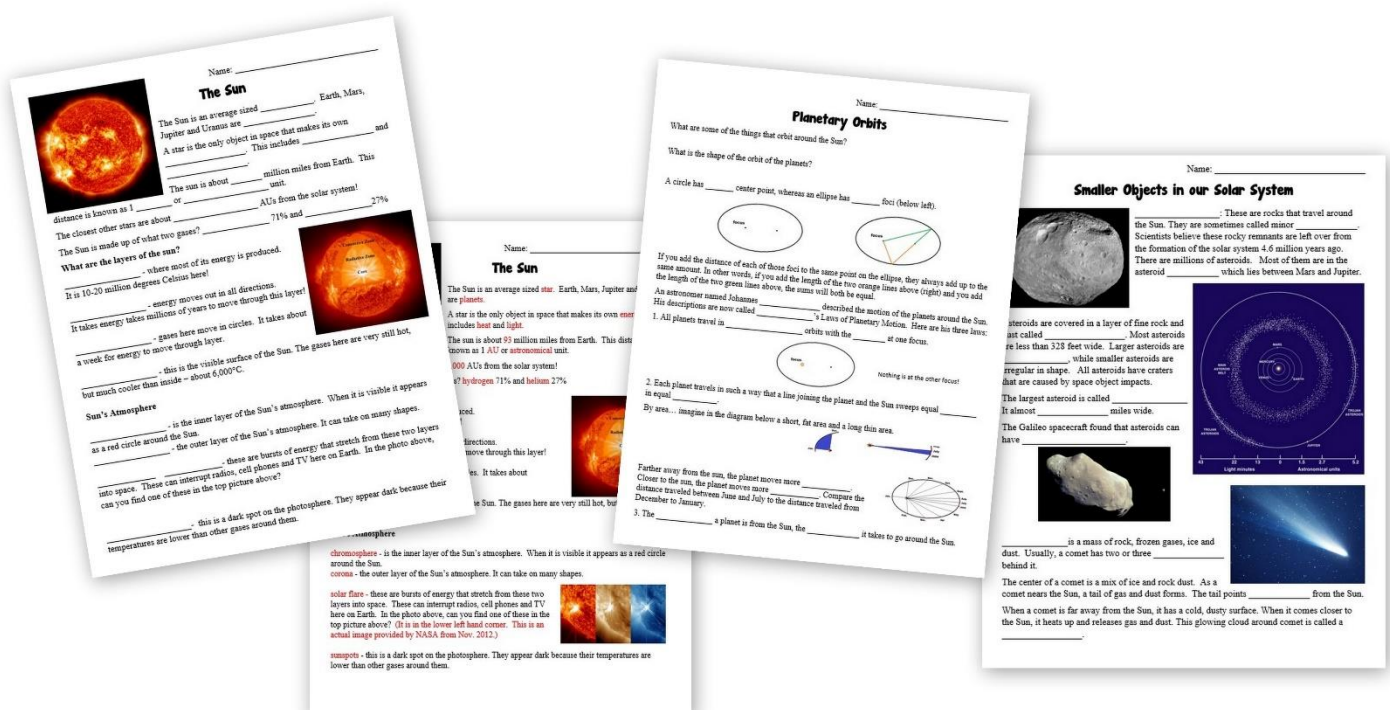
Our Packets – visit our store: HomeschoolDen.com/store

You might want to check out some of the packets we have available. They range in length from 30 to more than 150 pages and include notebook pages, worksheets, interactive notebook activities, hands-on activity ideas (with photographs) and more!

We have a [free packet on the Solar System](#)



Plus we have some free notebook pages on [Astronomy](#) for Middle School Students as well.



Earth Science Packet (150 pages)



*Earth and the Solar System

* Layers of the Earth

* Pangaea, Plate Tectonics

* Faults

* Earthquakes

* Mountain Making

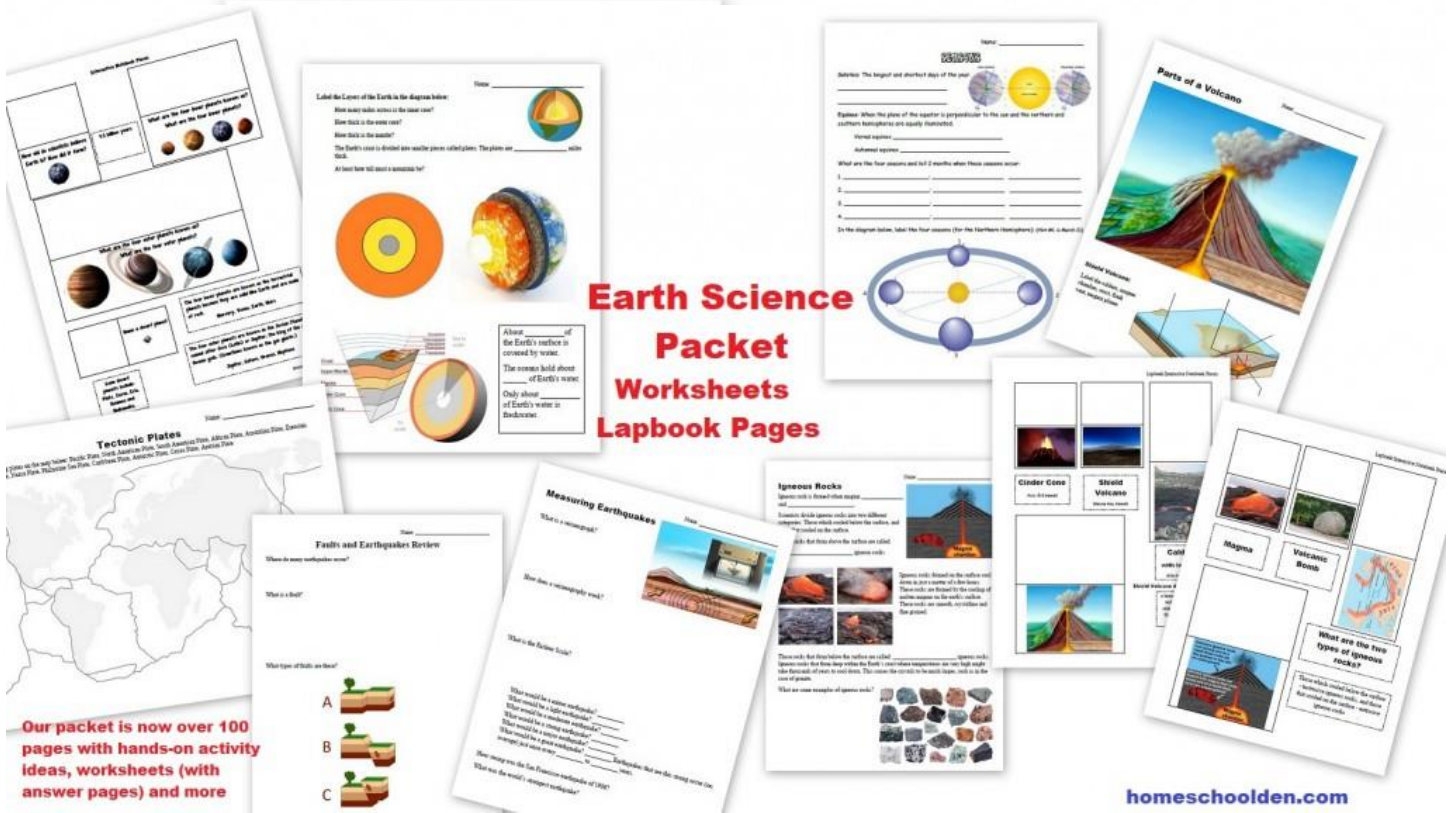
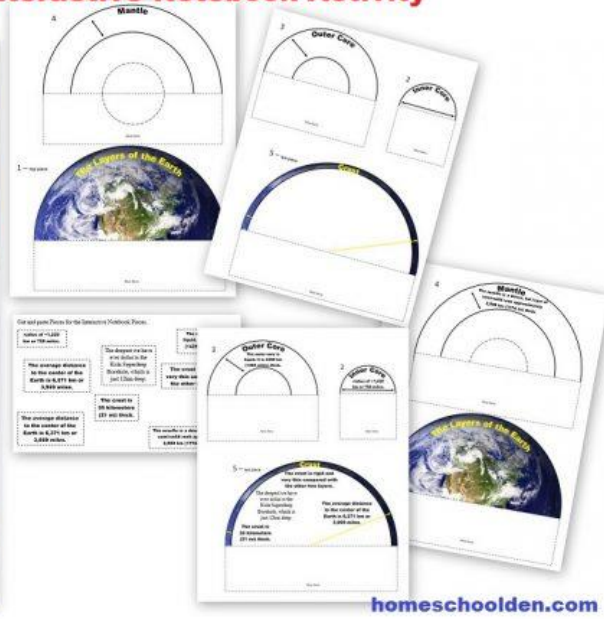
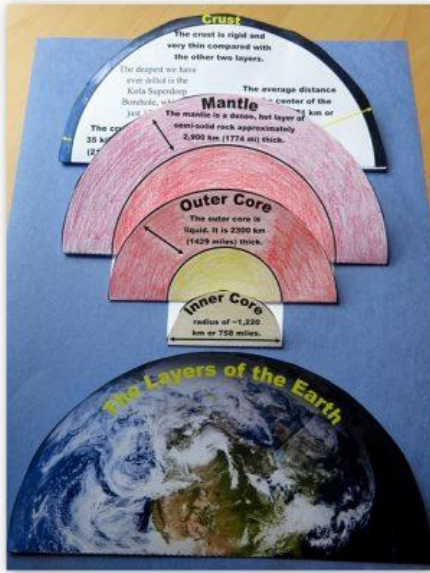
***Volcanoes... and more**

Volcanic mountains:

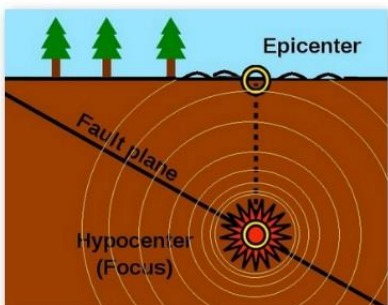


Earth Science Packet (more pictures of what's included...)

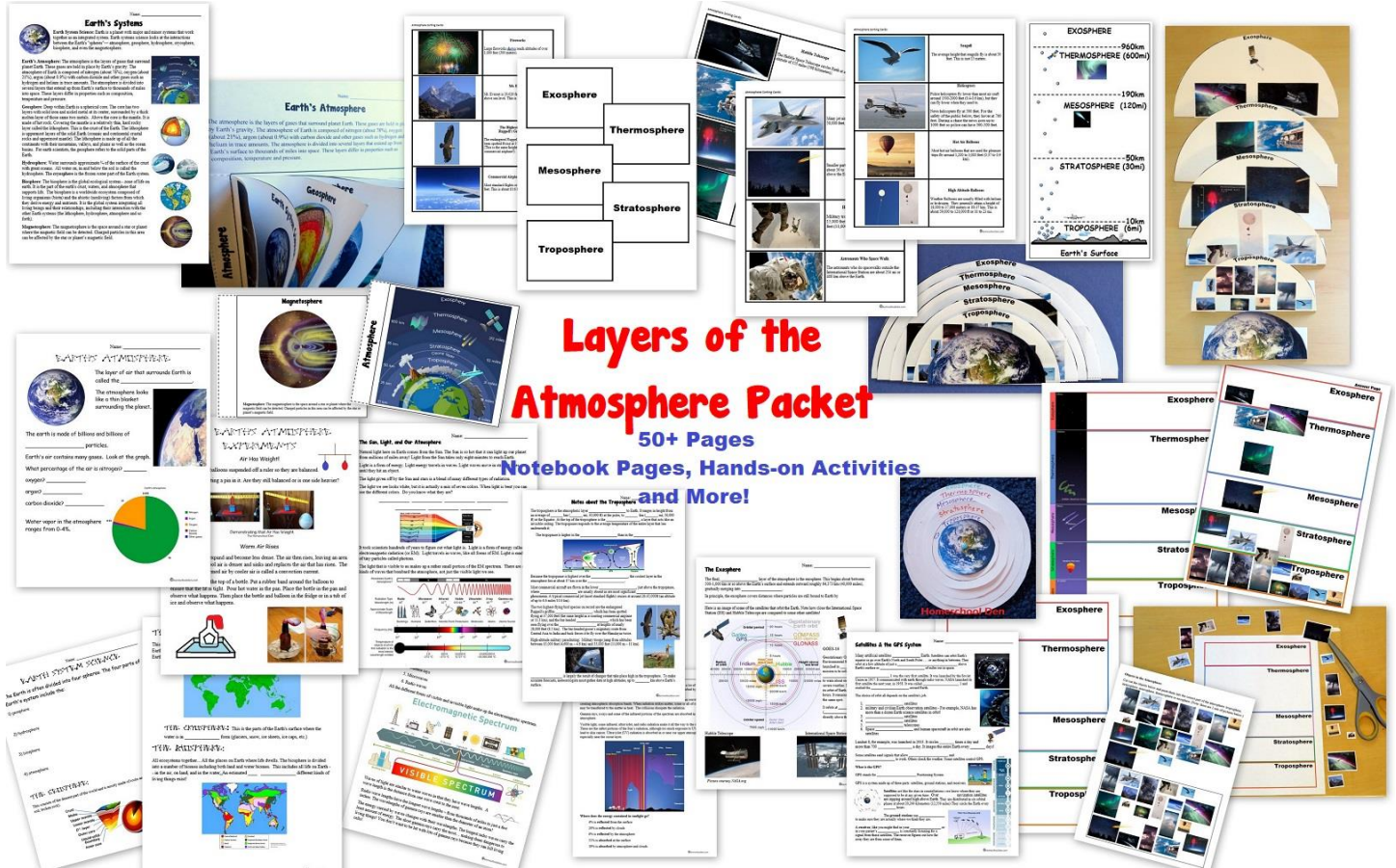
Layes of the Earth - Interactive Notebook Activity



Earth Science: Learning about Earthquake Vibrations



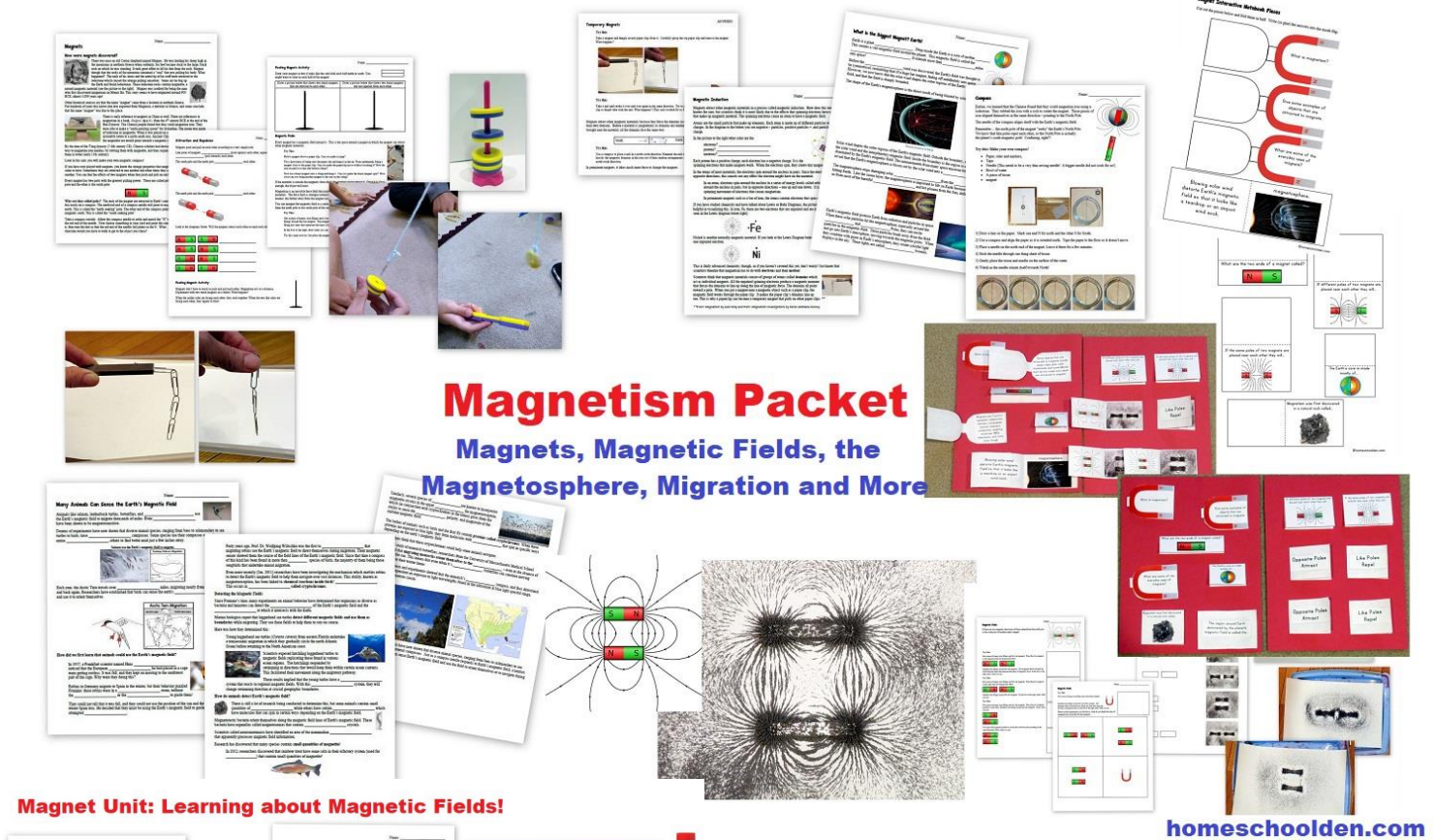
Layers of the Atmosphere Packet



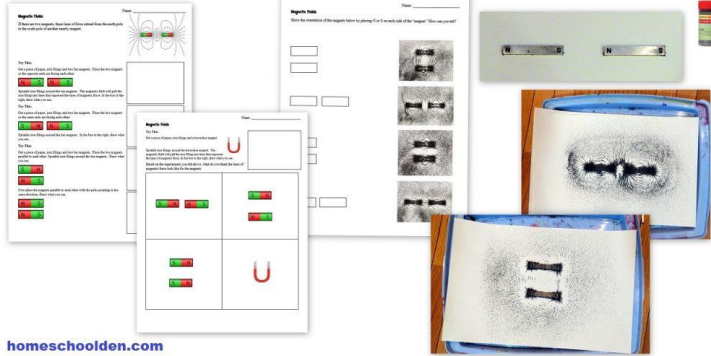
Earth's Atmosphere Packet, 50+ pages



Magnet Packet: Magnetic Fields, The Magnetosphere, and Animal Migration

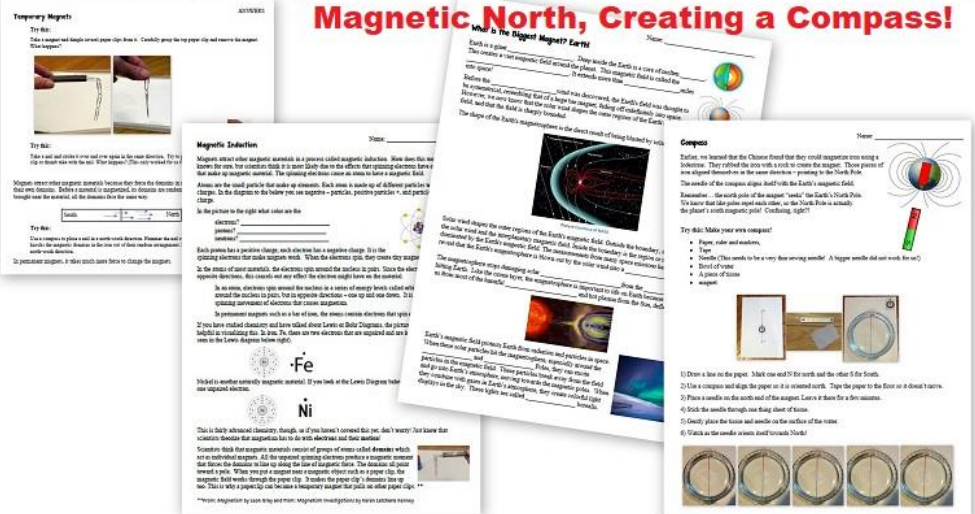


Magnet Unit: Learning about Magnetic Fields!



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Magnet Unit: Magnetic Induction, The Magnetosphere, Magnetic North, Creating a Compass!



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Simple Machines Packet (30 pages)

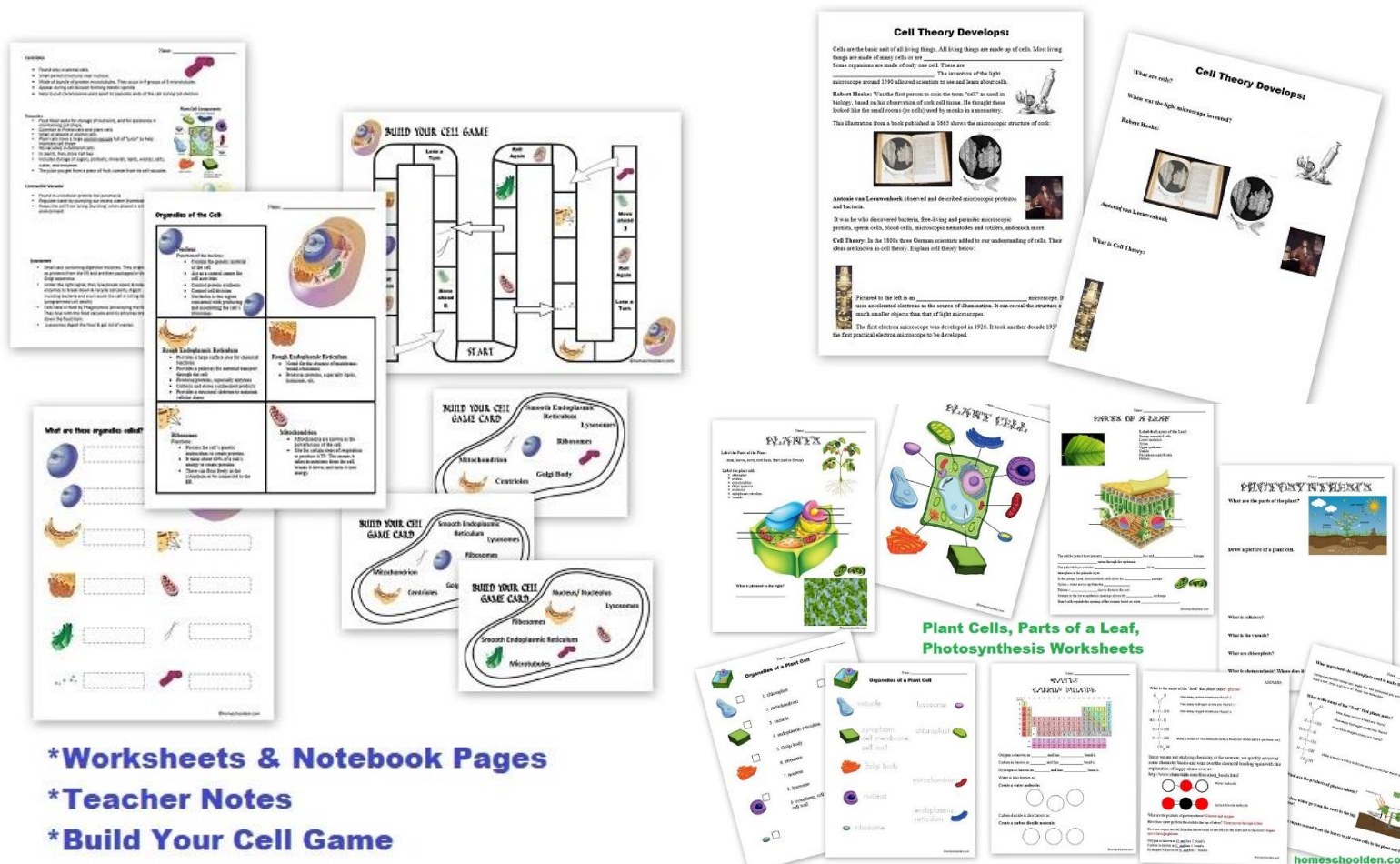
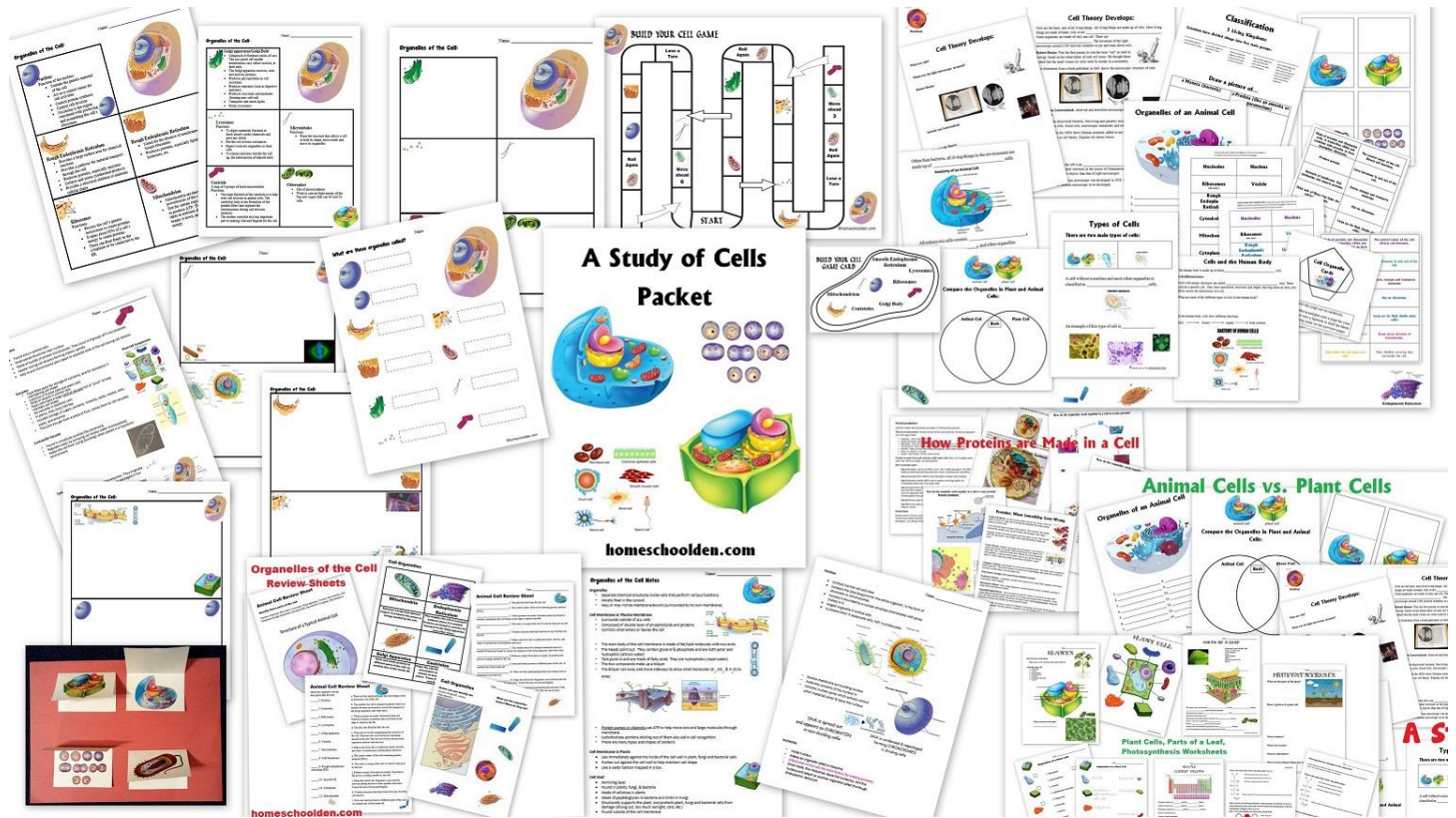


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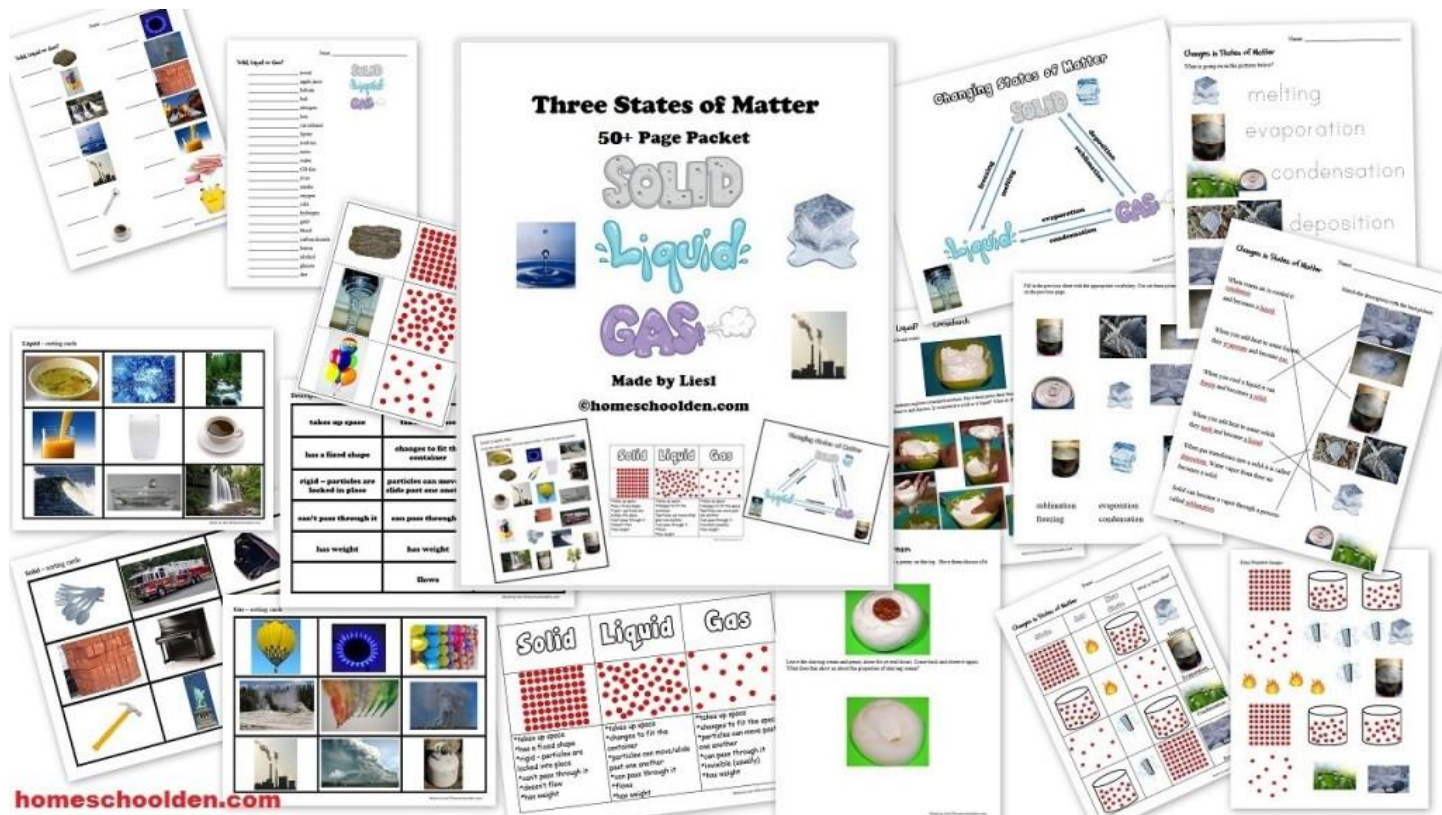
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A Study of Cells (100 pages)

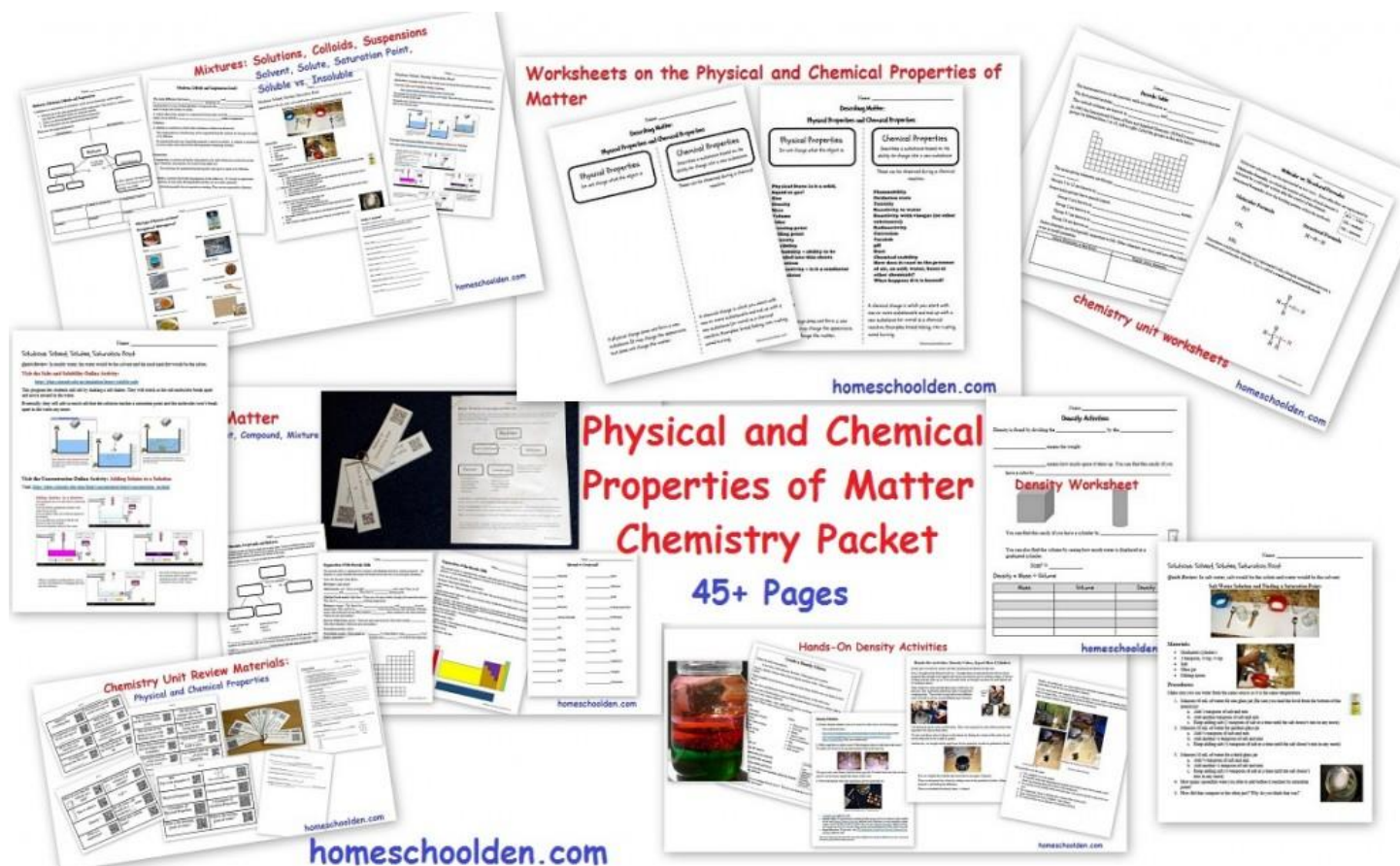


- *Worksheets & Notebook Pages
- *Teacher Notes
- *Build Your Cell Game

States of Matter



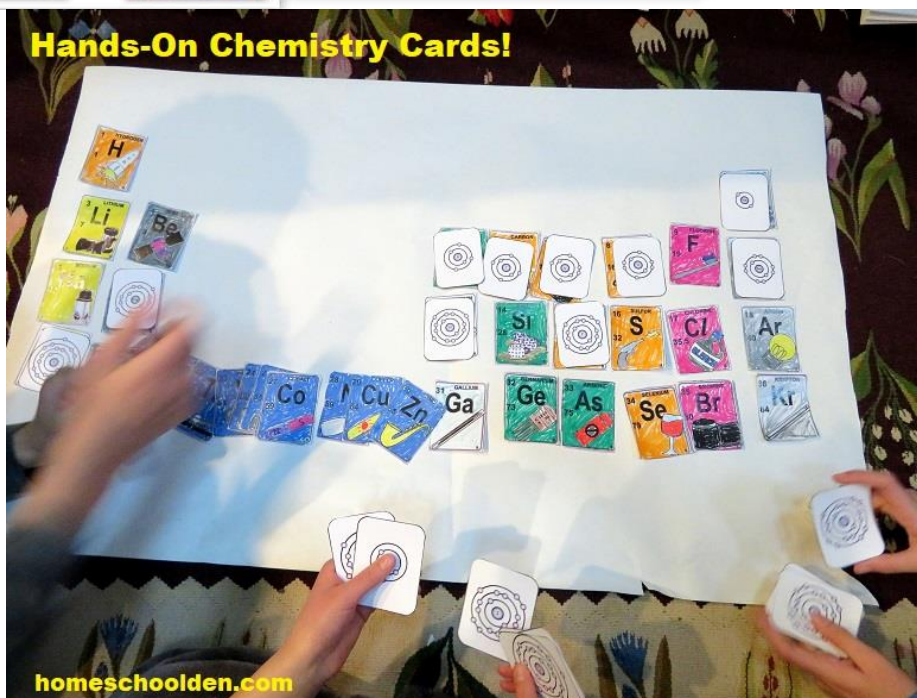
Physical and Chemical Properties of Matter



Chemistry Packet Learn about the periodic table, the elements & their groups, valence electrons, Bohr Diagrams, Lewis Diagrams and more!



Hands-On Chemistry Cards!



Electricity and Circuits Packet Hands-On Activities

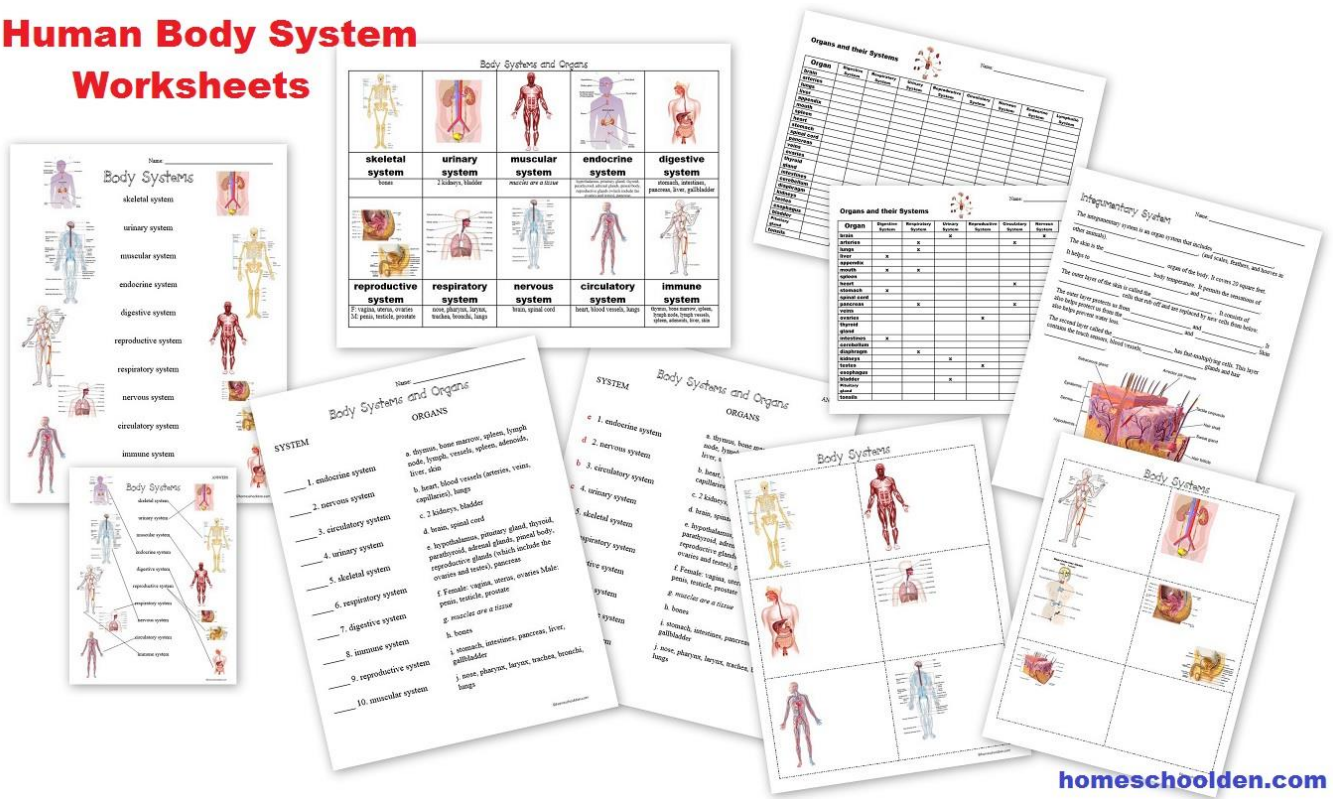
Electricity and Circuits Unit: Making Simple Circuits

Hands-On Activities in our Electricity and Circuits Unit

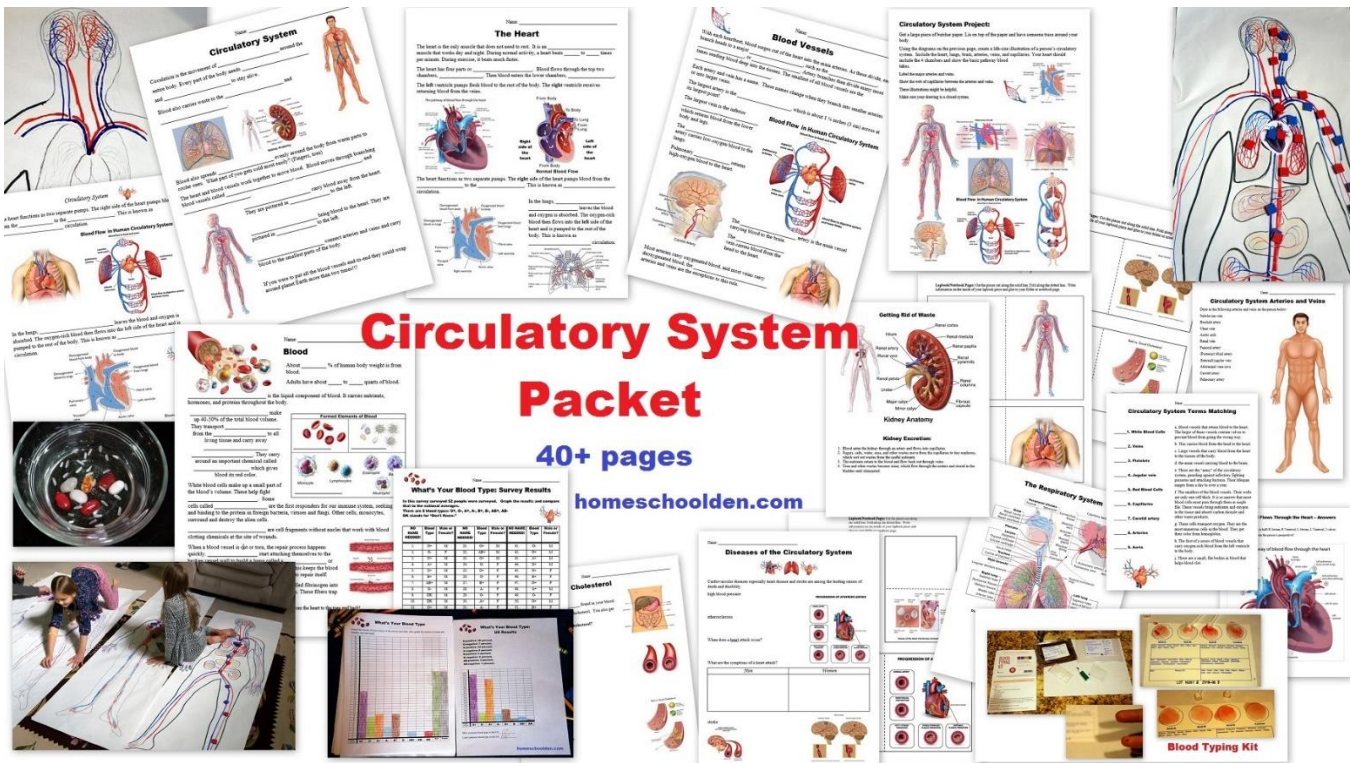
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Human Body Systems (25 pages)

Human Body System Worksheets



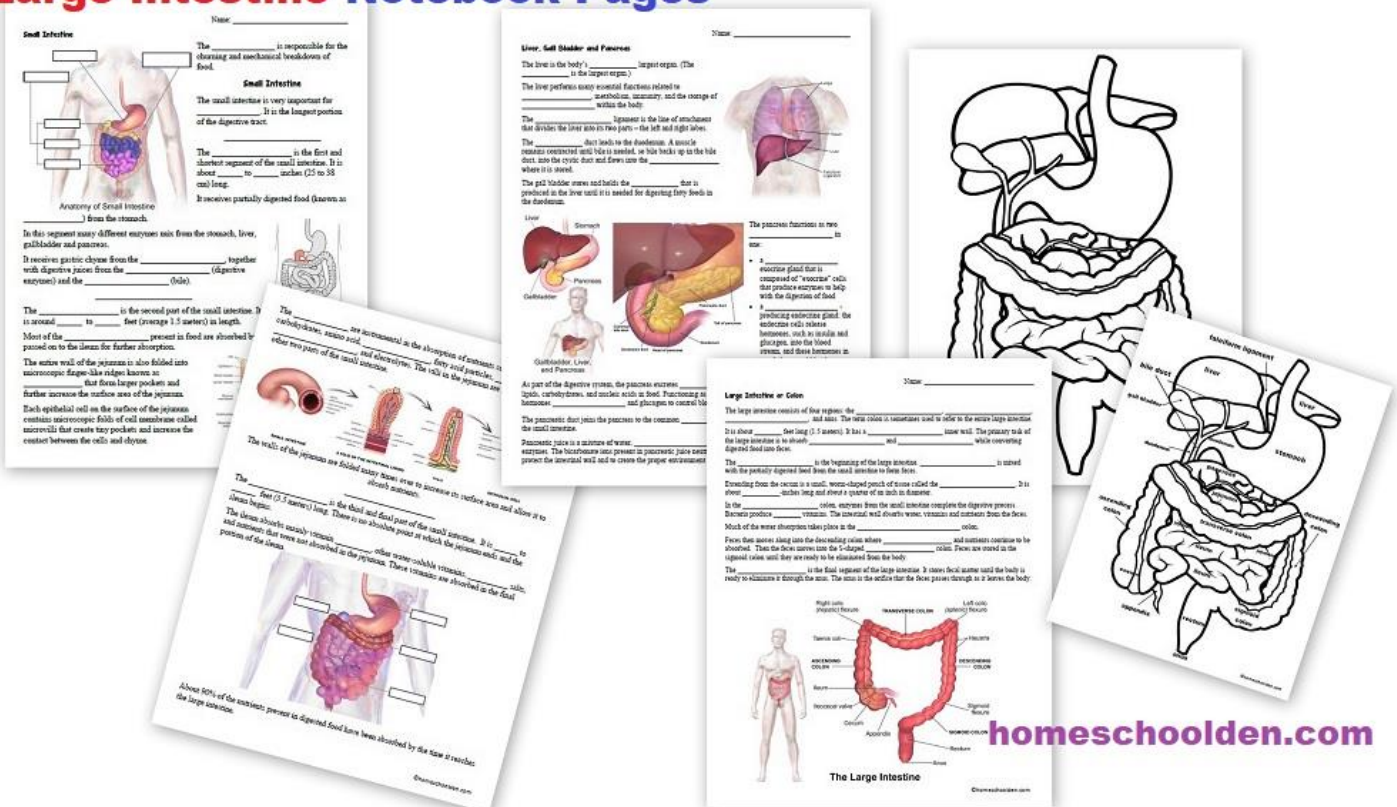
Circulatory Packet (40 pages)

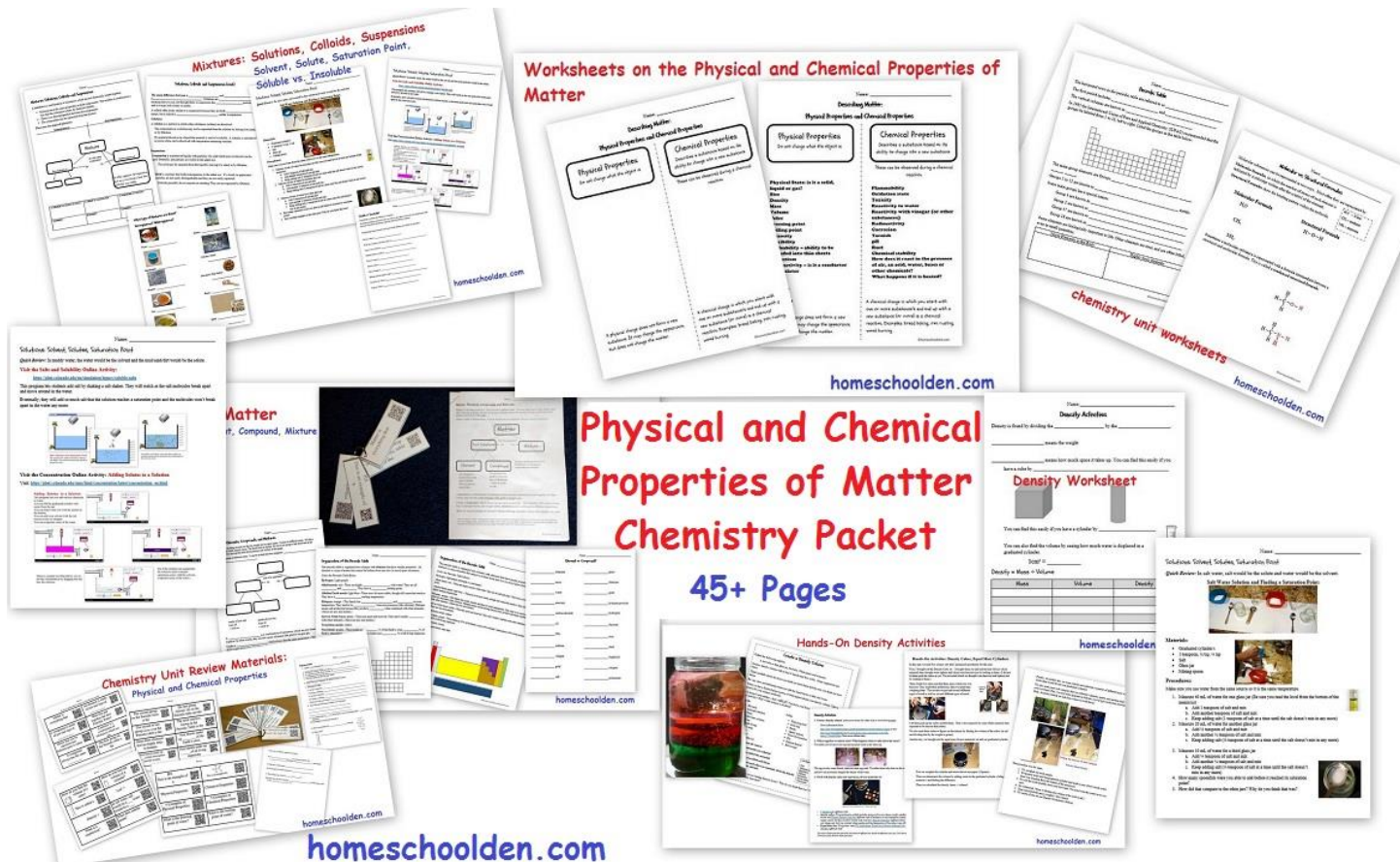
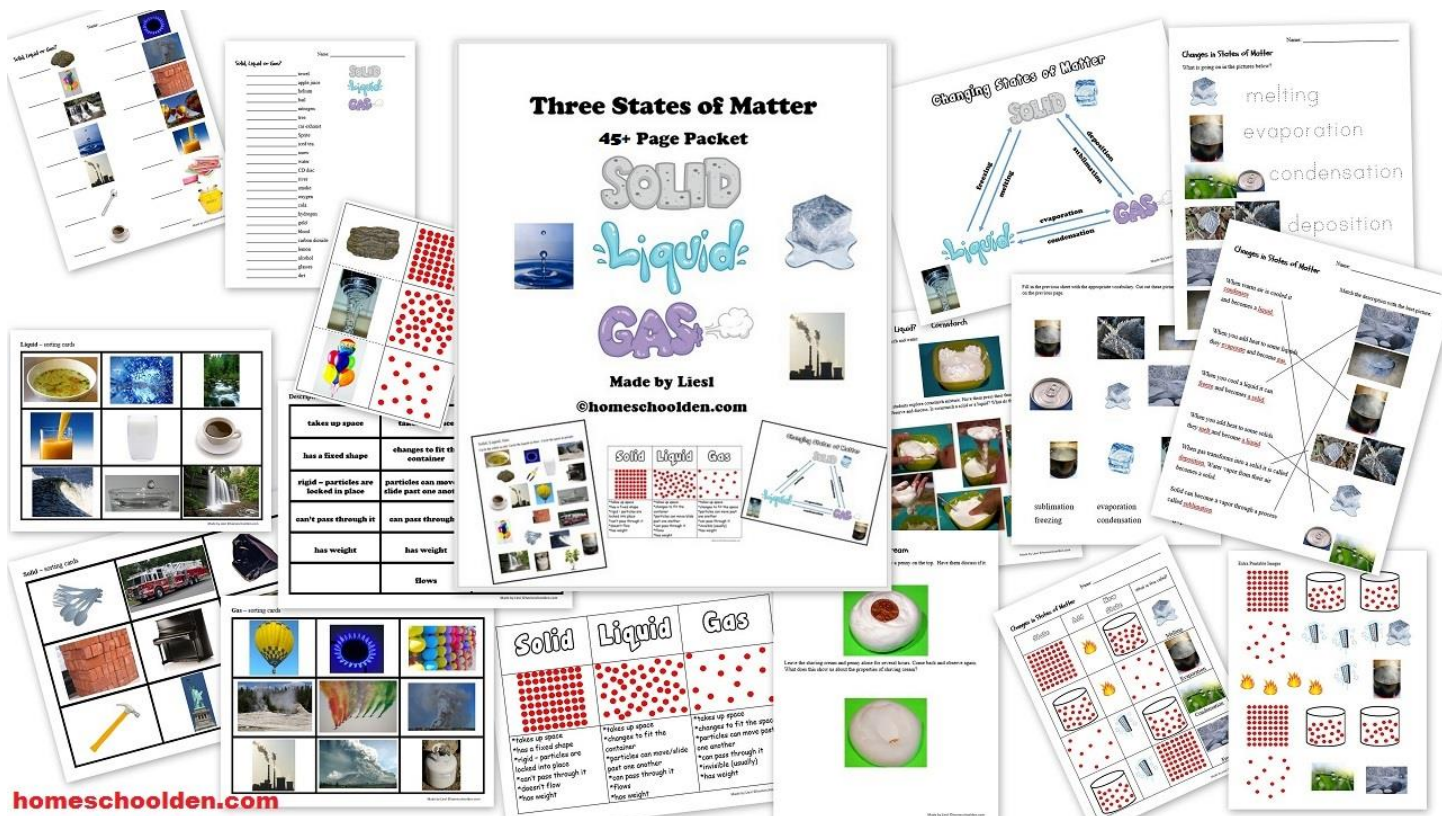


Digestive System Packet (75+ pages)

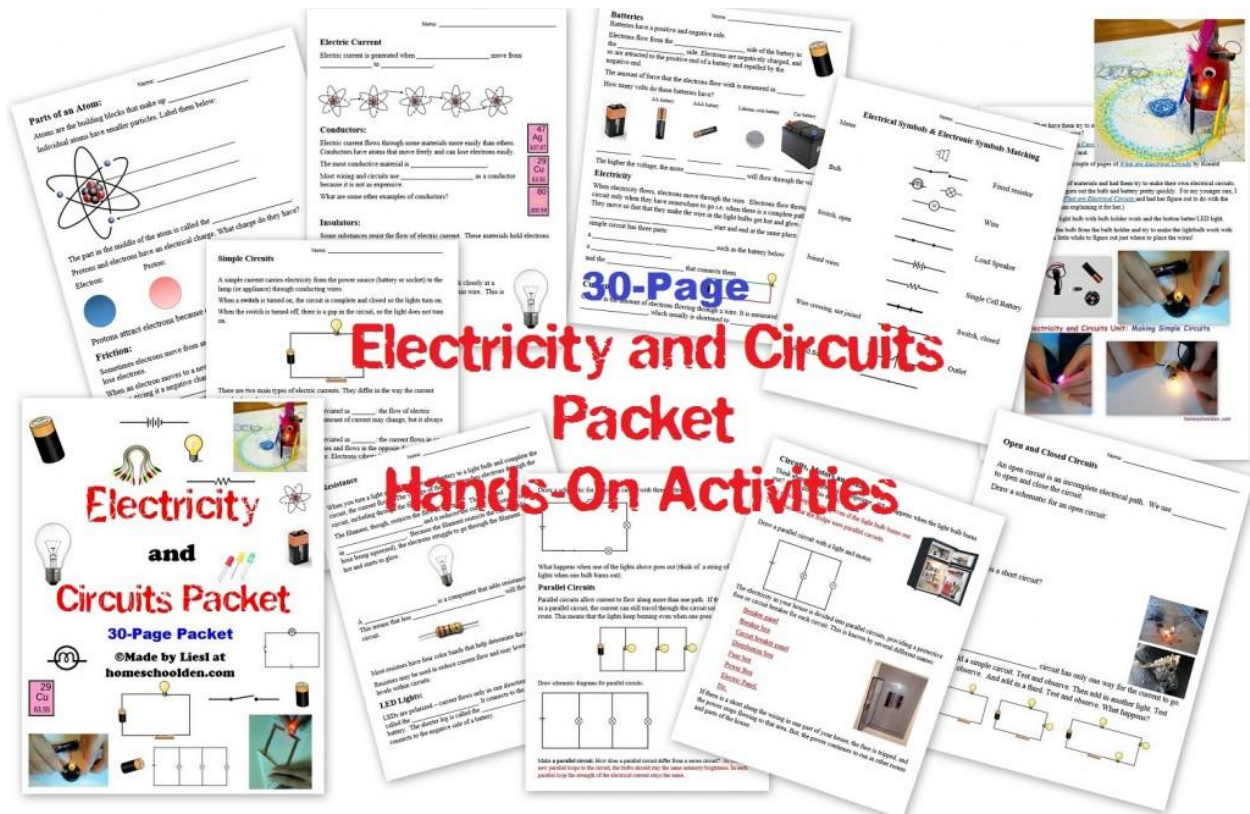


Small Intestine, Liver, Gall Bladder & Pancreas, Large Intestine Notebook Pages





STEM: Electricity and Circuits Unit (30 pages)



Electricity

and Circuits Packet

30-Page Packet

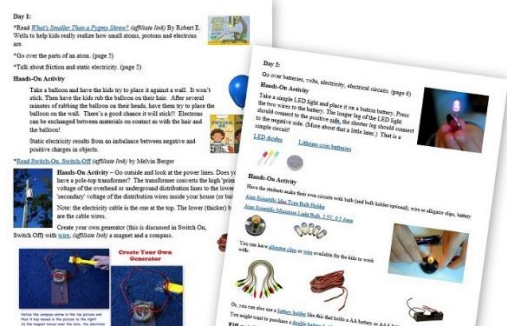
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Electricity and Circuits Packet Hands On Activities

Topics in this 30-page Unit

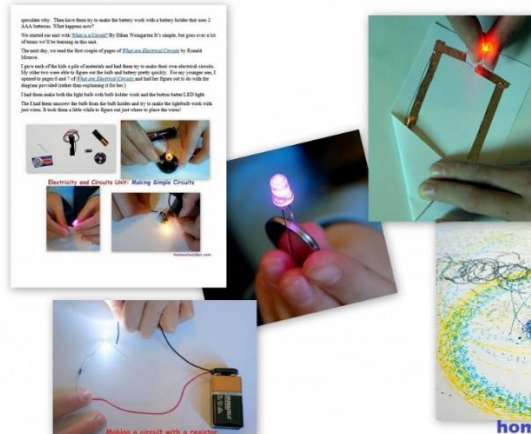
The parts of an atom
Electric currents
Conductors and insulators
Parts of a light bulb
Batteries
Volts, amps, ohms
Electrical circuits: Power source, load, conductor
Simple Circuits
Direct and Alternating Current (DC and AC)
Resistance, Resistors and How they work.
Anode, cathode
Electrical Symbols
Open and closed circuits
Short circuits
How to draw basic electrical schematics
Series circuits
Parallel circuits
Motors
Circuit breakers and the power grid

Here is a small sampling of the worksheets in the Electricity and Circuits Unit.



Electricity and Circuits Unit
Daily Plans - with worksheets, books, hands-on activity instruction, and materials needed

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Hands-On Activities in our Electricity and Circuits Unit

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Big Animal BUNDLE



The **Big Animal BUNDLE** includes 5 packets. 1) Animal Unit, 2) World Animals Packet, 3) Rainforest Packet, 4) Life Cycles Packet, 5) Winter Packet.

You can scroll down below to see more pictures or click on the “Quick Preview” links below.

Quick Previews

- Animal Packet [Quick Preview](#)
- World Animal Packet [Quick Preview](#)
- Rainforest Packet [Quick Preview](#)
- Life Cycle Packet [Quick Preview](#)
- Winter Packet and Hibernation Unit [Quick Preview](#)

The **Animal Unit** is 100+ pages. It covers basic animal classification, animal characteristics, body coverings: feathers, fur, scales or skin, vertebrate groups, invertebrate groups, herbivores vs. carnivores, domesticated vs. wild animals, animals and their tracks, nocturnal vs diurnal animals, animal homes and shelters and more!

The **World Animal Packet** is 75+ pages. It covers animals of the 7 continents. There is a new section all about African animals of the savanna.

The **Rainforest Packet** is 50+ pages. Here’s the table of contents for this packet:

- Amazon Rainforest Facts – Notebook pages and answers pp. 3-4
- Amazon Rainforest Biodiversity and Deforestation pp. 5-6
- Map Work –South America – Brazil pp. 7-8
- Amazon River Notebook Page and answers pp. 10-11

- Average Rainfall in Temperate vs. Tropical Climates (Activity) pp. 12-13
- Amazonian Animals Montessori 3-Part Cards pp. 14-18
- Amazonian Animals Matching Page and answer sheet pp. 19-20
- Animals of the Amazon Blank Research Cards pp. 21-31
- Amazon Animal Fun Fact Tracing Pages pp. 33-35
- Insects of the Amazon pp. 36-37
- Insects of the Amazon, Montessori 3-Part Cards pp. 38-39
- Insects of the Amazon Matching Page and Answer Sheet 40-41
- Insects of the Amazon blank research cards pp. 42-44
- Layers of the Rainforest Activities pp. 45-58

The **Life Cycles Packet** is 50+ pages. It helps kids become familiar with the different stages in the life cycles of the chicken, sea turtle, frog, mosquito, butterfly, dragonfly, bee, mouse, and ladybug.

The **Winter Packet** is 100+ Pages. It also includes the **Hibernation Unit**. The first part covers Growing Crystals, Months/ Seasons, Earth's Axis and the Seasons, Arctic vs. Antarctica, Polar Animals, Penguins, Seals, Whales, about a dozen PreK Activity Pages. The Hibernation Unit covers: why animals hibernate, terms such as torpor, brumation, estivation, diapause, endotherms vs. ectotherms. Plus, it covers where animals spend the winter and the dangers of hibernation. It includes various activities such as notebook pages, interactive notebook/lapbook pieces, matching and tracing pages.

These packets can be purchased here at the [Big Animal BUNDLE](#) page or in [Our Store](#).

More pictures of what is included in this Bundle:

1) Animal Unit (100+ pages)

Animal Unit
100+ Page Packet

Feathers, Fur, Scales, Skin
Animal Characteristics
Types of Animals
Vertebrate Groups
Invertebrate Groups
Domesticated vs. Wild Animals
Animals and their Tracks
Nocturnal vs. Diurnal Animals

Classification of Animals

Animal Classification Activity

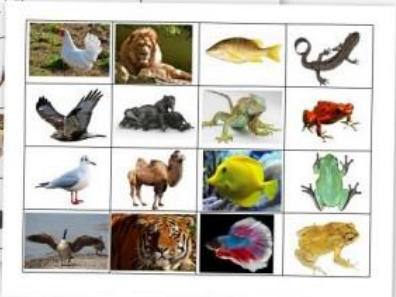
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Animal Body Coverings

Feathers, Fur, Scales or Skin?

Part of the 50+ page
Animal Packet



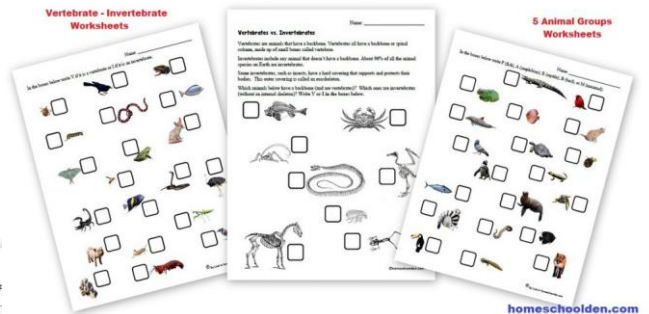
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5 Animal Groups

What am I? Worksheets



Vertebrate - Invertebrate Worksheets



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Herbivores, Carnivores, Omnivores

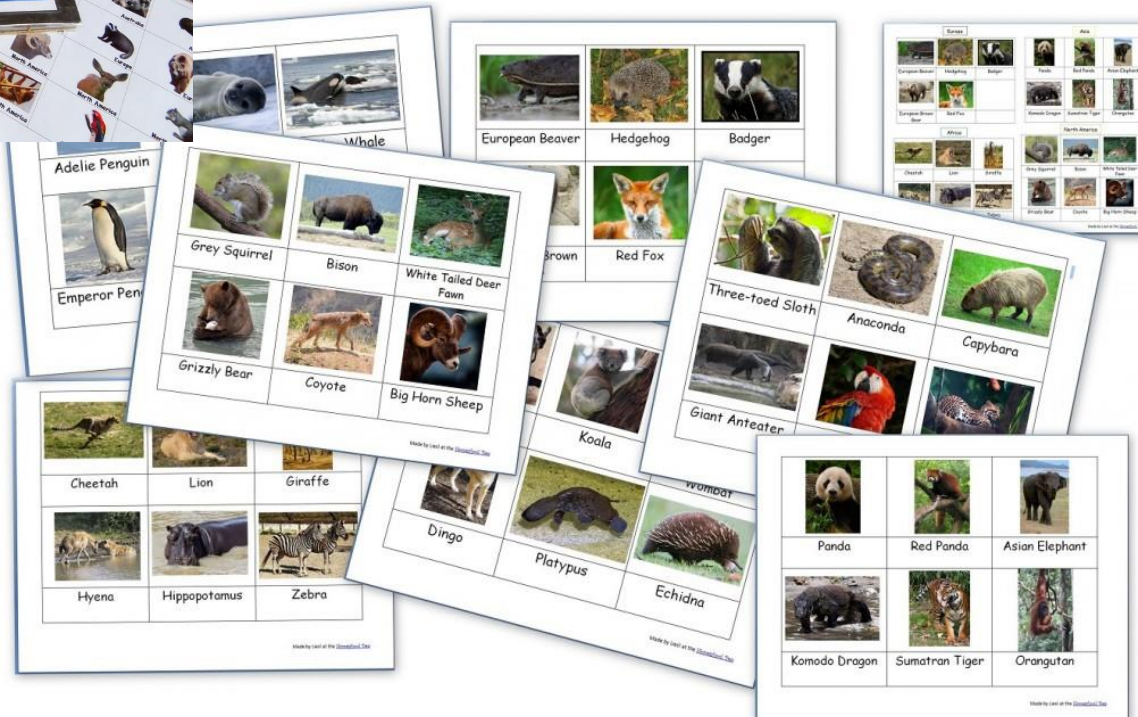
Worksheets and Activities

Animal Homes & Shelters



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2) World Animal Packet – Animals around the world – from the 7 Continents (75+ pages)



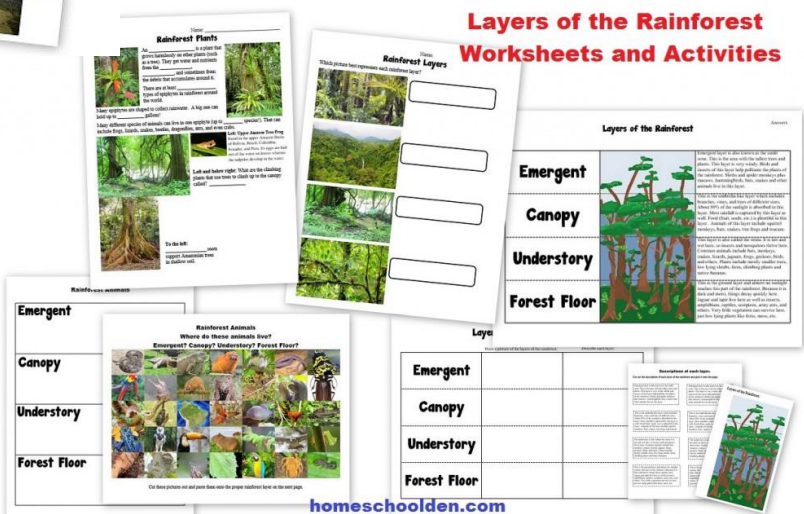
3) Rainforest Unit (50+ pages)



Amazon Rainforest Packet



Layers of the Rainforest Worksheets and Activities



Rainforest Insects

Name: _____

Rainforest Insects

The rainforest is where the greatest abundance of species of insects can be found. Insects are almost everywhere because _____.

Many insect species only live on a few acres range which makes them vulnerable to _____.

The Amazon rainforest may house as many as _____ species of insects, although only a tiny fraction of this number has been described by scientists. Some scientists estimate that _____ % of the animal biomass of the Amazon Basin is made up of _____.

One tree may house more than _____ different species of beetles!

There are _____ species of 'mammals' in the rainforest compared to _____ in the temperate zone.

Titans Beetles (Pictured right) Is the largest of all beetles. It can grow to be more than _____ inches. It can fly, but it can't get into the air from the ground. It has to climb trees and launch itself into the air.

Goliath Bird-eating Spider Goliath is the largest spider in the world. It is one of the _____.

Golden Poison Dart Frog Golden Poison Dart Frog is the _____.

Name: _____

Insects of the Rainforest

- ☐ Goliath Bird-Eating Spider
- ☐ Tropical Skimmer Dragonfly
- ☐ Jewel Beetle
- ☐ Army ants
- ☐ Titan Beetle
- ☐ Scorpion
- ☐ Archaeoprosopa meander butterfly
- ☐ Mosquitoes
- ☐ Leaf Cutter ants

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Animals of the Amazon

Name: _____

Animals of the Amazon

Sloth **Capybara**

Howler Monkey **Caiman** **Caecilian**

Toucan **Emerald Tree Boa**

Name: _____

Animals of the Amazon

Yellow-Banded Poison Dart Frog **Kinkajou** **Amazon River Dolphin**

Jaguar **Iguana** **Golden Lizard**

Name: _____

Animals of the Rainforest

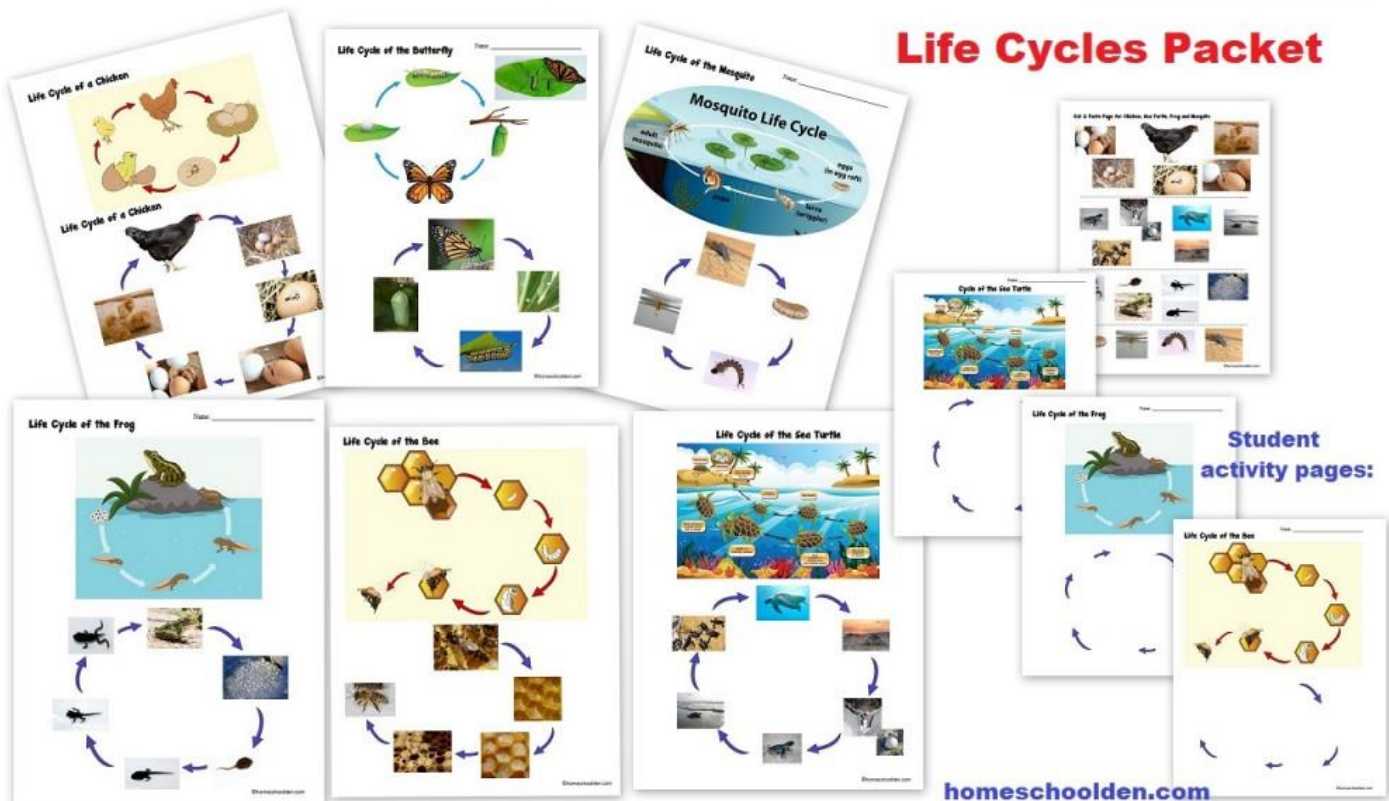
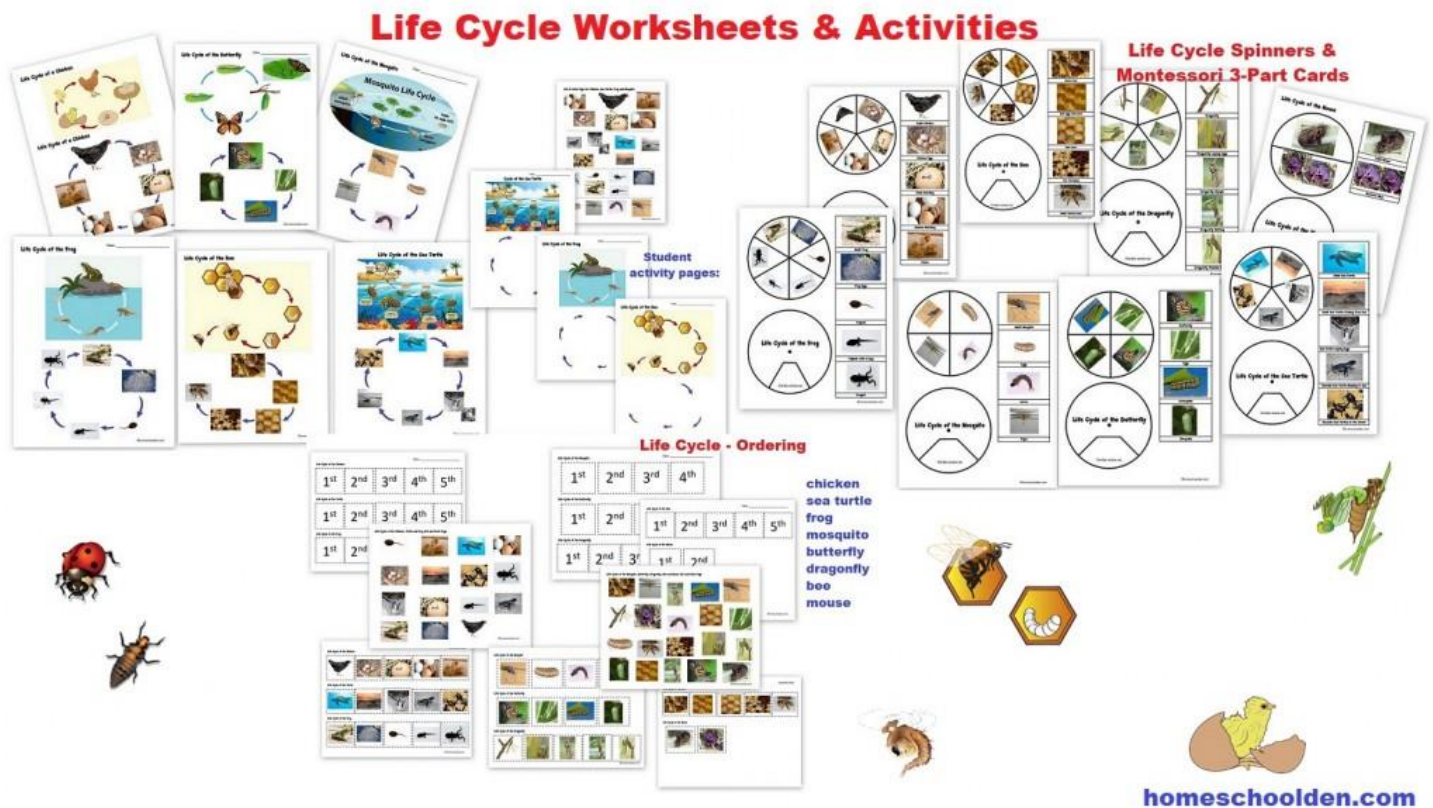
- ☐ Giant Anteater
- ☐ Kinkajou
- ☐ Caiman
- ☐ Capybara
- ☐ Jaguar
- ☐ Cornutus tassari
- ☐ Anacardis
- ☐ Red-bellied Piranha
- ☐ Howler Monkey
- ☐ Yellow-banded poison dart frog
- ☐ Macaw
- ☐ Sloth
- ☐ Iguana
- ☐ Brown basilisk (Jesus Lizard)
- ☐ Golden lion tamarin
- ☐ Spider monkey
- ☐ Toucan
- ☐ Amazon River Dolphin
- ☐ Caiman

Trees in the Rainforest grow to be almost twice as tall as trees in a temperate forest.

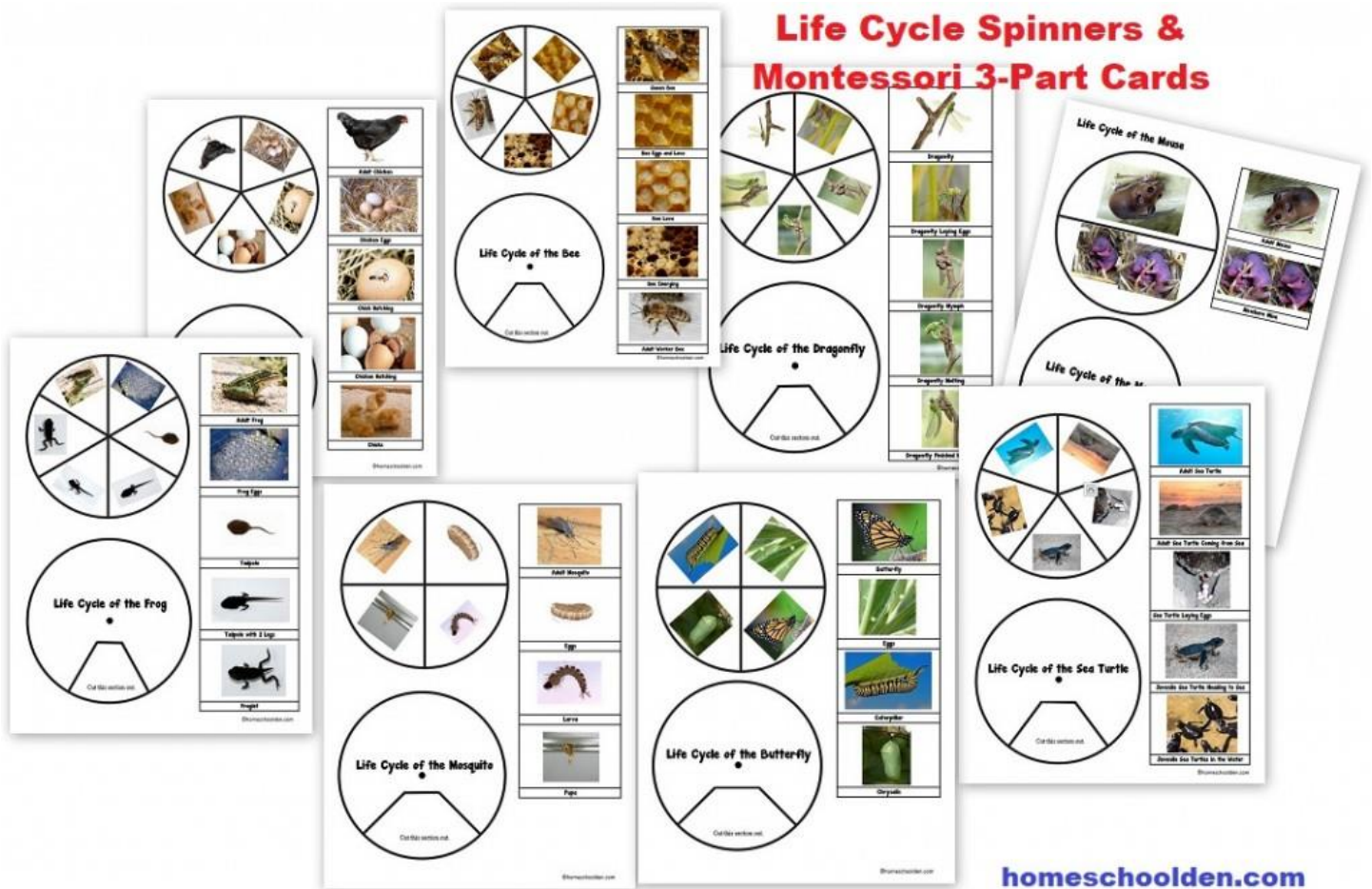


4) Life Cycles Worksheets and Activities (50+ pages)

This 50+ page Life Cycles Packet helps kids become familiar with the different stages in the life cycles of the chicken, sea turtle, frog, mosquito, butterfly, dragonfly, bee, mouse, and ladybug.

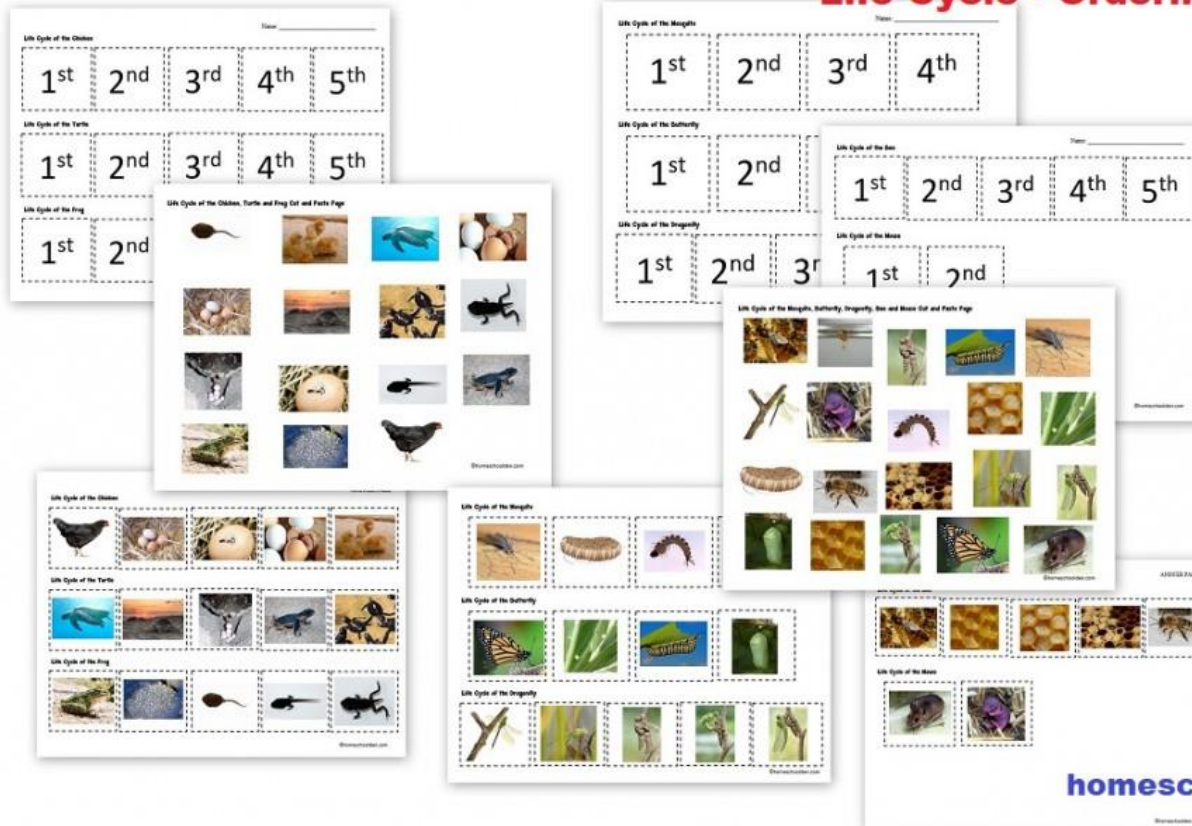


Life Cycle Spinners & Montessori 3-Part Cards



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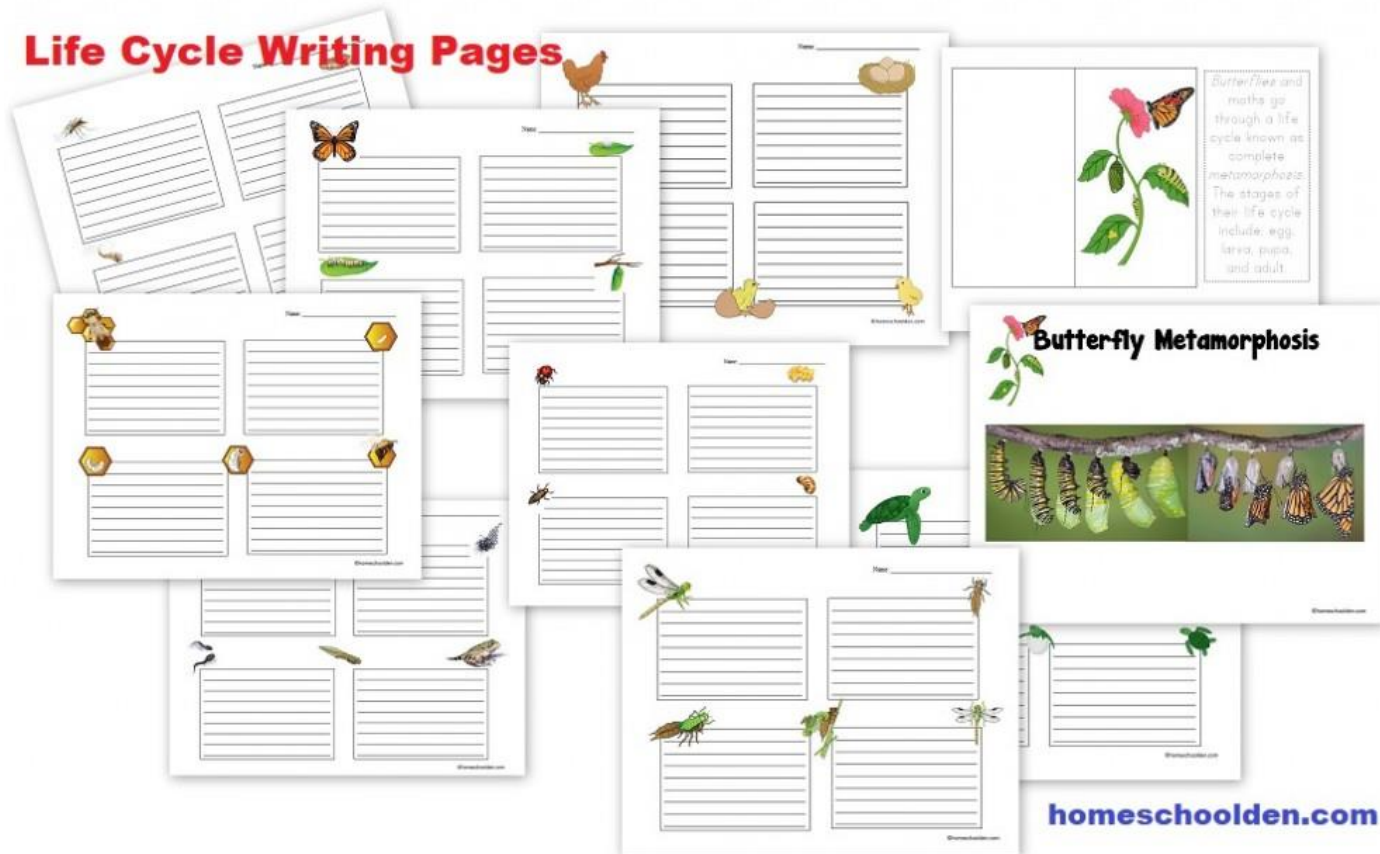
Life Cycle - Ordering



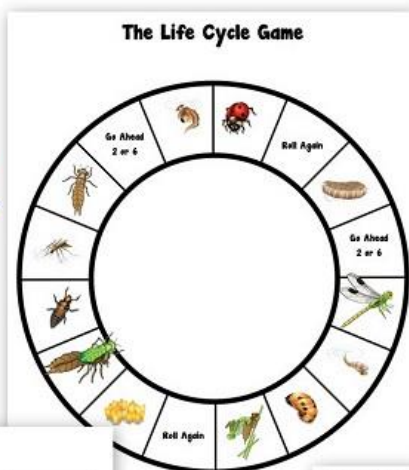
chicken
sea turtle
frog
mosquito
butterfly
dragonfly
bee
mouse

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Life Cycle Writing Pages



Life Cycle Game
Be the first player
to fill your life
cycle card!



Mosquito Player Card



Dragonfly Player Card



Ladybug Player Card

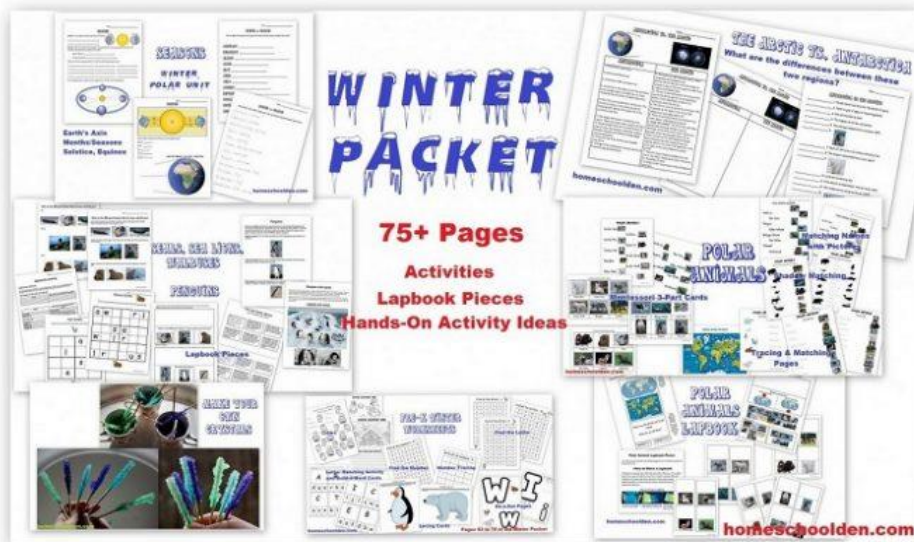


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Hibernation Unit (100+ pages)

5) Winter Packet and

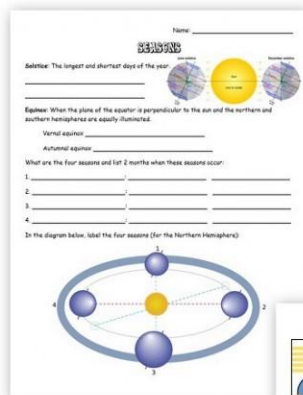
The **Winter Packet** is now 100+ pages because it has been updated to include the **Hibernation Unit**.



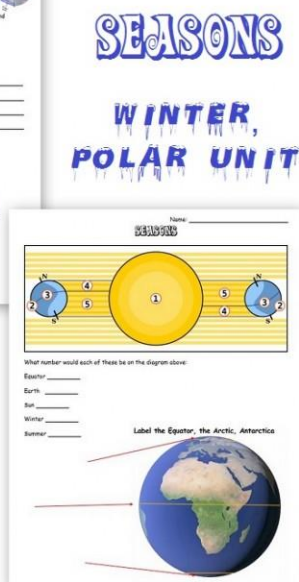
What is included in the Winter Packet?

- * Earth's axis and how/why the tilt of the Earth creates the different seasons
- * major differences between the Arctic and Antarctica
- * Polar Animals
- * The differences between seals, sea lions, and walruses
- * Hands-on activity ideas about whales & Lapbook pieces
- * Hibernation Unit

Hibernation Topics Include: why animals hibernate, terms such as torpor, brumation, estivation, diapause, endotherms vs. ectotherms. Plus, it covers where animals spend the winter and the dangers of hibernation.



**Earth's Axis
Months/Seasons
Solstice, Equinox**



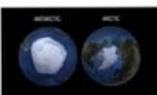
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THE ARCTIC VS. ANTARCTICA

What are the differences between these two regions?

NAME: _____

ANTARCTICA VS. THE ARCTIC

ANTARCTICA	THE ARCTIC
1. Antarctica is a continent.	1. The Arctic is a semi-enclosed ocean, almost completely surrounded by land.
2. Land surrounded by sea.	During much of the year, the Arctic Ocean is covered in sea ice that can exceed six feet thick.
3. Antarctica is 98% covered in ice.	2. Sea surrounded by land.
4. Antarctica is the highest of all the continents at an average height of 2,300m (or 1.4 miles). Temperatures are colder at higher elevations.	3. The sun is continually above the horizon from around the March equinox to the September equinox. From September to March it is continually below the horizon.
5. Plant life is not as plentiful in Antarctica. The Antarctic has only a few mosses, lichens, and flowering plant species. Only about 1% of the continent is ice free.	4. The Arctic is not as cold as the Antarctic. This is because of the water in the Arctic (The temperature never goes below -47°).
6. The largest land animal in Antarctica is an insect! There are a great many animals that feed in the sea though come onto the land for part or most of their lives: penguins, seals (Fur, leopard, Weddell), elephant and orcas (killer whales), birds such as albatrosses.	5. There is more plant life on the tundra of the Arctic (about 1,700 species of plants).
7. Antarctica has never had any native people living there.	6. Large land animals: The Arctic has many large land animals including reindeer, musk ox, lemmings, arctic hares, arctic terns, snowy owls, squirrels, arctic foxes and polar bears. As the Arctic is a part of the land masses of Europe, North America and Asia, these animals can migrate south in the winter and head back to the north again in the more productive summer months.
8. Average winter temperature: has such as low as minus 135 degrees Fahrenheit.	7. There are many indigenous people who have lived in the Arctic. People have lived in the Arctic for thousands of years.
	8. Average winter temperature: minus 40 degrees Fahrenheit.

NAME: _____

ANTARCTICA VS. THE ARCTIC







ANTARCTICA

THE ARCTIC

NAME: _____

ANTARCTICA OR THE ARCTIC?

- People have lived here for thousands of years.
- Home to just 3 types of flowering plants.
- Sea surrounded by land.
- The highest of all the continents.
- The average temperature is around -40°F.
- 
- Much of this area is an ocean covered by ice.
- The largest land animal here is an insect!
- 
- Land surrounded by sea.
- From March to September, the sun never sets!
- The temperature can go as low as -135°F.
- 

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POLAR ANIMALS

POLAR ANIMALS

Arctic Tern

Caribou

Arctic Fox

Musk ox

Snowy owl

Arctic Hare

Reindeer

Arctic Wolf

Polar Bear

Matching Names with Pictures

Walrus

Sea Lion

Penguin

Killer Whale

Beluga Whale

Sea Otter

Weasel

Wolverine

Shadow Matching

Arctic Tern

Caribou

Arctic Fox

Musk ox

Snowy owl

Reindeer

Arctic Wolf

Polar Bear

Tracing & Matching Pages

Penguin

Walrus

Weasel

Arctic Fox

Polar Bear

Killer Whale

Beluga Whale

Sea Lion



ARCTIC COVERED THE GLOBE

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What are the differences between Seals, Sea Lions, and Walrus?

Seal

Sea Lion

Walrus

What are the differences between Seals, Sea Lions, and Walrus?

Seal

Sea Lion

Walrus

SEALS, SEA LIONS, WALRUSES

PENGUINS

Penguins

Penguins are flightless birds that live almost exclusively in the Southern Hemisphere. They have a unique shield-shaped flipper which helps them also move forward from predators. The white underbelly makes them less visible from underwater predators. Instead of wings they have flippers. There are between 18 and 27 different species of penguins.

Emperor penguin: This is the tallest and heaviest of all living penguin species and lives in Antarctica.

Chinstrap penguin: They live in the Southern Pacific and the Antarctic Ocean. Like many penguins they eat fish, shrimp, and squid.

Fairy penguin: The smallest of all penguins is also called the Blue Penguin. They live along the coasts of southern Australia and New Zealand.

Penguin Life Cycle

The female emperor penguin lays one egg. The male rolls the egg on the tip of his foot. It has a flap of skin that keeps the egg in place and helps to keep it warm. The egg stays there until it hatches two months later. The male penguin comes to bring a new egg.

Place a cup of rice in a Ziploc bag. Place the Ziploc bag into a bowl. Put your feet together with the palm of your feet. The hands across the bowl without letting the bowl spill the top of your feet.

Hands-On Activity

Underwater Mammals

One of the best features of mammals is that they breathe oxygen. They can hold their breath for a long time and can stay underwater for a long time. How long can you hold your breath?

Time

1st	2nd	3rd	4th	5th

Seal Sudoku

Every row, every column and every square must contain the words walrus!

Walrus Sudoku

Every row, every column and every grid must contain the words walrus!

a	w			r	l

Lapbook Pieces

What are the differences between a seal, sea lion and walrus?

Describe these penguins

Cut-and-Paste Option

(Write the names of the penguins)

Emperor penguin: This is the tallest and heaviest of all living penguin species and lives in Antarctica.

Chinstrap penguin: They live in the Southern Pacific and the Antarctic Ocean. Like many penguins they eat fish, shrimp, and squid.

Fairy penguin: The smallest of all penguins is also called the Blue Penguin. They live along the coasts of southern Australia and New Zealand.

Hand-On Activity about Baleen Whales

Take some paper and sprinkle it over the water. This represents the tiny krill. Try to pick up the paper with your fingers. (It's never able to get very much.) Then take a toothbrush (no hair) and scrub the water with it. (It's never able to get out large bits of the krill.)

WHALES

Toothed vs. Baleen Whales, Hands-On Activity Ideas Lapbook Pieces

Toothed vs. Baleen Whales

Baleen whales are considerably larger than toothed whales. Baleen whales have two blow holes. Baleen is made of keratin.

Toothed Whales

Sperm whale - largest toothed whale 29-60 feet

Orcas

Dolphins

Baleen Whales

Blue Whale - largest baleen whale 33-60 feet

Humpback Whale

Gray Whale

Finback

Hands-On Activities about Whales!

How whales breathe in the water

Whales are able to breathe in the water. They have a special organ called a blowhole. The blowhole is located on top of the whale's head. When the whale breathes, air comes out of the blowhole. This creates a splash of water. The splash is called a blow. The blow is made of air and water. The blow is made of air and water. The blow is made of air and water.

Toothed vs. Baleen Whales

Take three pictures and glue them into the correct column on the following paper.

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Hands-On Activities about Whales!

How whales breathe in the water

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Hibernation Unit

[illegible]

Where Do Animals Hibernate?

A warm, safe place for animals to hibernate is called a hibernaculum. The place is hibernaculum.

Types of hibernacula

Burrows

Some animals dig water homes with rooms for sleeping or storing food. They hide the entrances under rocks, trees or bushes.

Many animals dig their burrows deep below the frostline—the deepest point in the ground which soil freezes.

They will often line their burrows with grass, dry leaves, moss and animal fur for warmth.

Some examples of animals that use burrows:

- Ground squirrels
- Woodchucks (groundhogs)
- Mice
- Chipmunks

Here is a hard burrow in a groundhog (Marmota flaviventris) during hibernation.

Under dirt, leaves, logs, stones or bark

Above: Left: Lethbridge shrews hibernate under a tree. Right: Ground Squirrel (Citellus richardsoni) hibernating in a dead nest. Right: European Brown bear hibernating in a dead nest.

Many creatures find their way under dirt, leaf litter, in rotting logs, and beneath bark and moss. When snow falls, they live on their stored food behind a sealed entrance.

Wood frogs and box turtles crawl under rocks, logs or piles of leaves.

Skunks—many skunks hibernate together. They crawl deep underground and curl up with thousands of other skunks.

Leaf-toads find a place to hibernate in the spaces of tree bark. Some cluster around the trunks of hawthorn. Others several cluster together in one spot.

Caves and crevices, abandoned mines, storm sewers & cellars

Caves provide the kind of protection, safe shelter that bats need.

Thousands of hibernaculum have built inside in caves.

Thousands of hibernaculum have built inside in caves.

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Thousands of hibernaculum have built inside in caves.

Underwater mud

Many creatures will bury themselves fully or partially in the mud at the bottom of a pond, stream or lake. Some at the bottom of a pond is not as cold as on the surface.

Animals that bury themselves must be able to take in oxygen through their skin.

To prepare for winter, frogs, toads, and salamanders eat large amounts of food.

Crayfish—bury themselves in the mud at the bottom of a pond.

Turtles—a number of turtles also bury themselves in mud for months at a time.

Where Do Animals Hibernates?

Types of hibernacula

Some hibernates in dens.

Some hibernates in burrows.

Some spend the winter on or under the mud.

Some spend the winter under roots, leaves, rocks.

Some hibernates in caves.

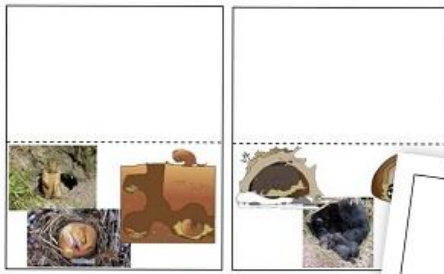
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Where do animals hibernate:

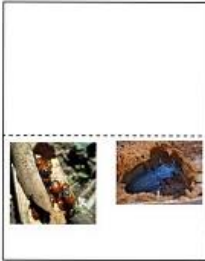
interactive notebook activity

matching page

tracing pages



Where do Animals Spend the Winter?



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Biology BUNDLE of 3

We also have a **Biology BUNDLE of 3**: 1) Biology Unit (Biomes, habitats, food chains/webs, feeding relationships) 2) Scientific Classification & Taxonomy Packet 3) Ocean Unit & Layers of the Ocean/Ocean Zone Activities

- [Biology Packet Quick Preview](#)
- [Scientific Classification and Taxonomy Quick Preview](#)
- [Ocean Packet Quick Preview](#)

After our family did the Animal Unit, we went on to study the biosphere. We talked about the different biomes, animal feeding relationships and more.

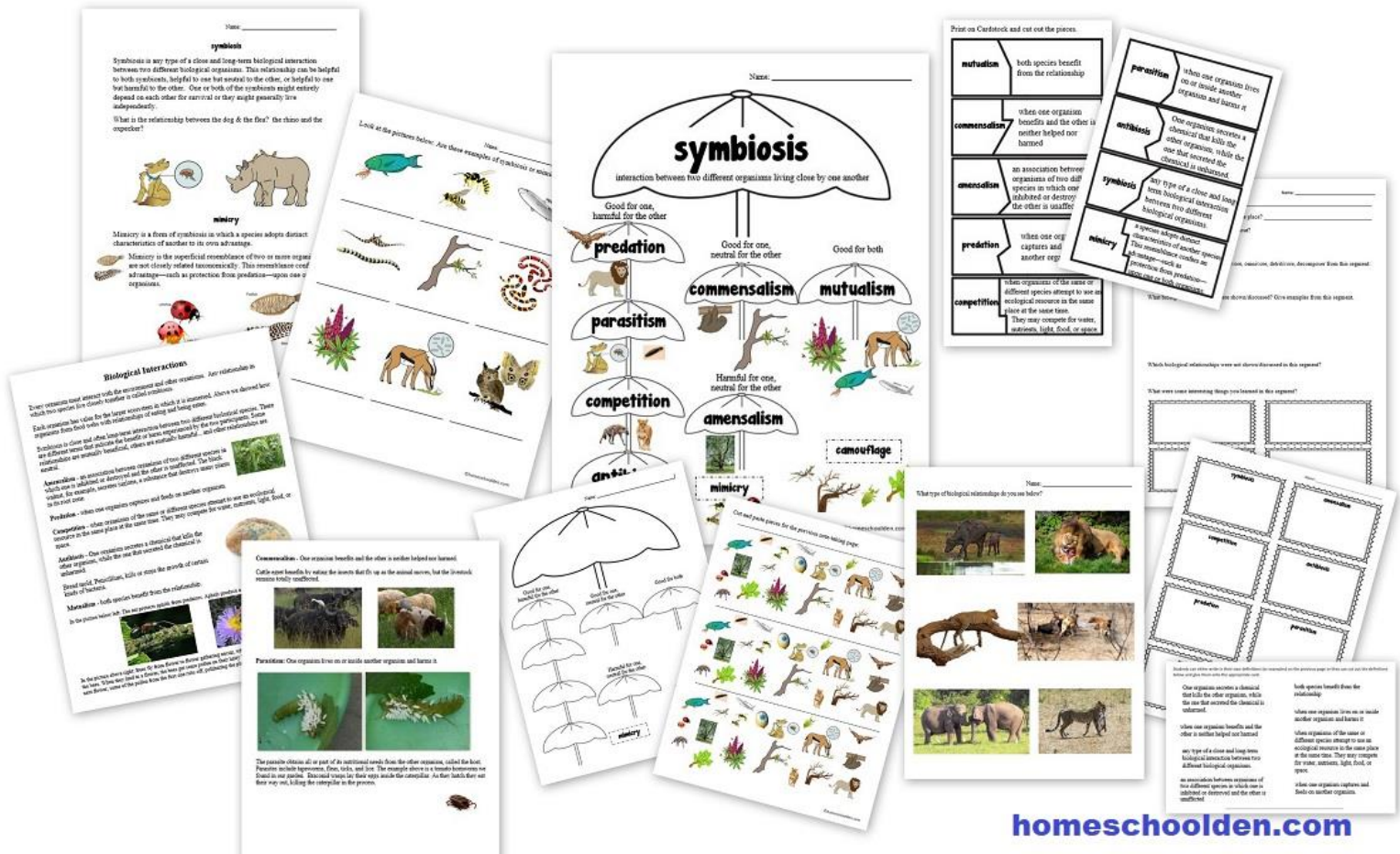
Biology Unit: Biomes, habitats, ecosystem, biological interactions (symbiosis, mutualism, amensalism, etc.), feeding relationships (70 pages)

The collage features several educational resources:

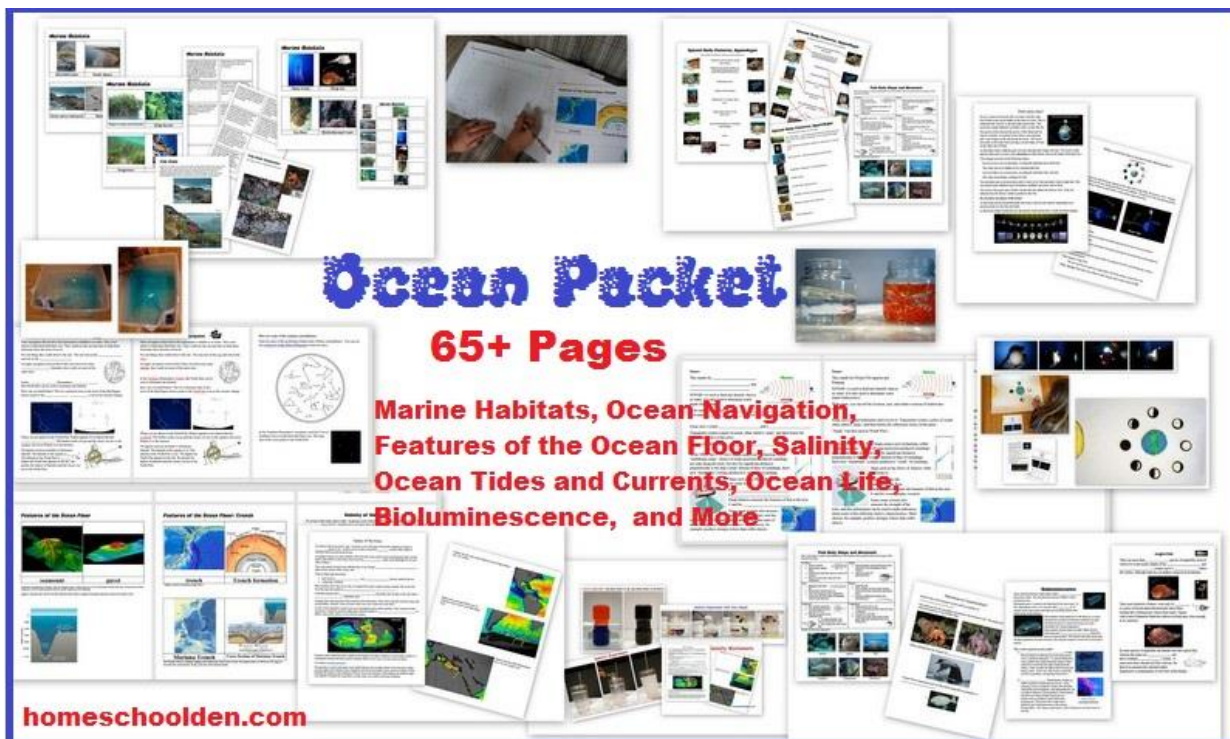
- The Biosphere Levels of Organization:** A diagram showing the hierarchy from Individual to Population, Community, Ecosystem, and Biosphere.
- Climate Zones:** A map of the world divided into Polar, Temperate, and Tropical zones, with corresponding climate icons.
- Food Chains:** A diagram illustrating the flow of energy from producers to various levels of consumers.
- Energy Pyramid:** A diagram showing the flow of energy from producers at the base to various levels of consumers.
- Biological Interactions:** A diagram showing various types of interactions between organisms, including mutualism, commensalism, and parasitism.
- Biomes:** A map of the world showing the distribution of major biomes: Tropical Savanna, Desert, Chaparral, Grassland, Temperate Deciduous Forest, Temperate Boreal Forest, and Arctic and Alpine Tundra.
- Biome Matching:** A matching exercise between biome names and their corresponding images.
- Feeding Relationships:** A diagram showing the flow of energy from producers to various levels of consumers, including herbivores, carnivores, omnivores, and decomposers.
- What is a habitat?** A definition of a habitat as a place where an organism lives and grows.
- Feeding Relationships:** A diagram showing the flow of energy from producers to various levels of consumers, including herbivores, carnivores, omnivores, and decomposers.

Biology Unit:
This 70-page packet covers the biosphere:
Biomes, Ecosystems, Habitats, Food Chain/Food Webs, Feeding Relationships, Energy Pyramid, Biological Interactions: symbiosis, mutualism, amensalism, etc.

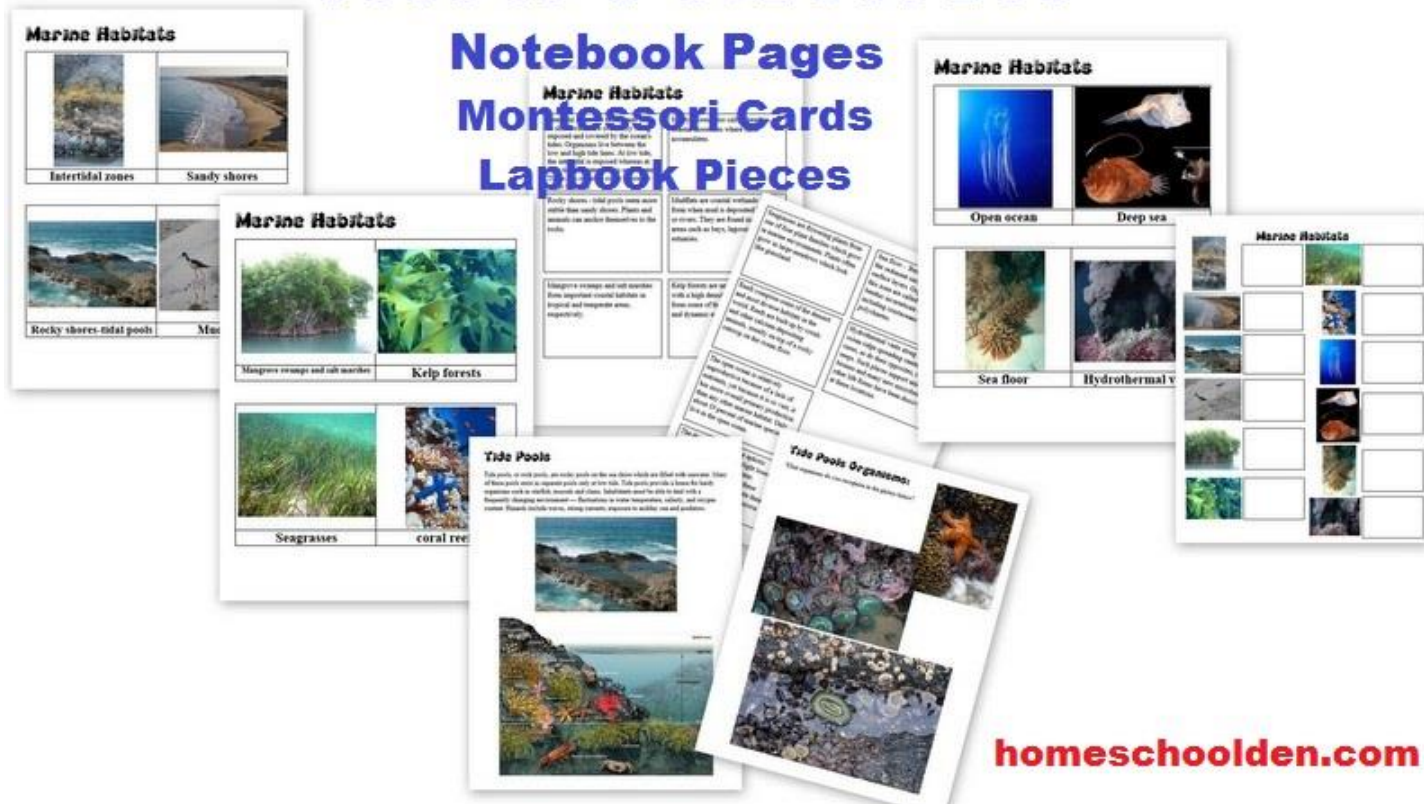
Biology Unit (continued):



Ocean Unit – Layers of the Ocean/Ocean Zone



Marine Habitats



Fish: Special Body Features

Special Body Features, Appendages

Find examples of each below. Some can be used more than once.

- venomous dorsal spines along their backs
 -  Arowana
- barbel (These look like whiskers, but are feeling and tasting organs near the mouth. They help the fish find food.)
 -  European Catfish
- bioluminescence
 -  Pufferfish
- strange mouth shapes
 -  Crab Jelly
- "fishing lure" to attract their prey
 -  Wolf Snout (aka Egg Eater)
 -  Puffblower (Pomoxis)
- sharp spines all over for protection
 -  Copperhead Hammerhead
- arms and tentacles for catching and holding
 -  Octopus
- claws
 -  Squid
- electricity
 -  Lionfish

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Fish Body Shape and Movement

Fish's body shape is a result of specialization in its environment. There is great diversity in the shapes of fish and their body parts.

Fastest	Slippery
<ul style="list-style-type: none"> Fastest of all fish Streamlined, torpedo shape Powerful tails help them chase prey and avoid predators Many live in the open ocean and swim continuously 	<ul style="list-style-type: none"> When threatened, these fish fill their bodies with water or air, becoming too big to swallow Some have spines for added protection
Flat	Ribbon
<ul style="list-style-type: none"> Elongated, arrow-like These hunters ambush their prey They first motionless until a smaller fish swims near, then they lunge with lightning speed to seize their prey 	<ul style="list-style-type: none"> Snake-like fish Slow swimmers, but move easily through rocks and crevices, under rocks and around plants Secretive, hiding from predators and ambushing prey
Depressed	Compressed
<ul style="list-style-type: none"> Flat, pancake-shaped fish Use camouflage instead of speed for survival Flap fins up and down and swim like a bird To escape predators, they burrow into the sand or mud Many change the color of their skin 	<ul style="list-style-type: none"> Flattened from side to side When viewed from the front, these fish seem to disappear Common on coral reefs Compressed bodies allow them to make quick, sharp turns and dart in and out of hiding places

Identify the fish body shape below:

barbels,
spines,
bioluminescence,
claws,
etc.

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Fish Body Shape & Movement

Bioluminescence

Many midwater fish have light organs called _____ that produce light. This biological production of light is called bioluminescence.

Bioluminescence is common and important in the open ocean. In fact, (depending on how you count it) nearly _____% of animals in the open waters emit light (not including animals that dwell on the ocean bottom).

Most animals on this planet live in the deep sea, so some scientists have pointed out that more creatures use light (bioluminescence) to communicate than use sound (including A _____).

Some animals _____ bioluminescent _____ which they house in black pouches. The bacteria emit light all the time, but these organisms can open and closing, allowing the creature to control how much light is emitted.

Why would organisms produce light?

- _____ to hide. Many predators in midwater have upward-pointing eyes to search for silhouettes. To protect themselves, some creatures have light-producing organs on their undersides to match the dim light coming from the surface. Many can dim the light as they descend into deeper waters. In this way, they become somewhat invisible to predators viewing them from below.
- _____ Bright flashes of light can startle a predator causing them to hesitate. Some organisms (such as ctenophores, shrimp, tube-dwelling seahorse fish, and ctenophores, and siphonophores) will use light to distract or divert predators. Some animals will shoot out clouds of light which acts as a smoke screen so predators cannot follow the escaping prey. The picture above right shows defensive open bioluminescence in the shrimp, Parapandalus. The vampire squid emits a cloud of luminous secretions.

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body parts to lure and attract prey. Some organisms use lighted that dangle in front of their mouths. Anglerfish has "fishing lures" and of their tail, it is thought they use this light to attract prey to its mouth.

Right: The bioluminescent lure of the barbeled deepfish, Eustomia pacifica. Organism image courtesy of www.nationalgeographic.com. Below: anglerfish.

patterns, specific to a certain sex. Anglerfish and lantern fish are both thought to produce light to attract a mate.

In the Bathypelagic Zone (Midnight Zone), bioluminescence is as prevalent as in the Mesopelagic Zone (Twilight Zone), however in the complete darkness of this zone, there is no need for counterillumination.

Bioluminescence can be found in many organisms:

- Dinoflagellates (marine plankton) and radiolarians (protozoa - zooplankton)
- Various jellyfish
- Cnidarians (corals, anemones, etc.)
- Annelids (worms)
- Mollusks (such as gastropods)
- Cephalopods - Squid have at least 70 luminous genes
- Echinoderms (such as brittle stars, sea stars, sea cucumbers)
- Fish - one family of sharks (lantern shark) and in 42 families of bony fish
 - Anglerfish, Pufferfish, Lantern fish, Hatchet fish, Dragon fish

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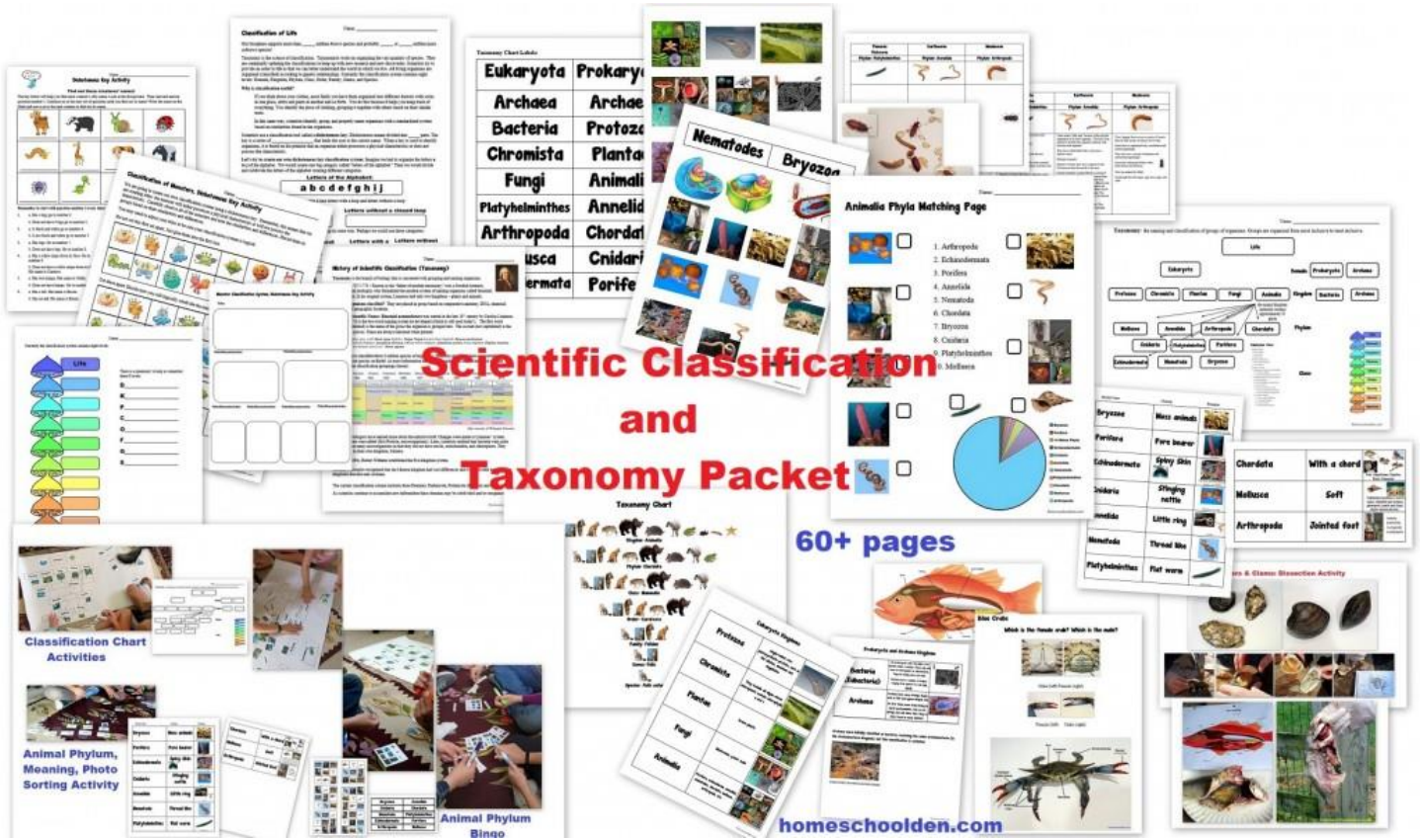
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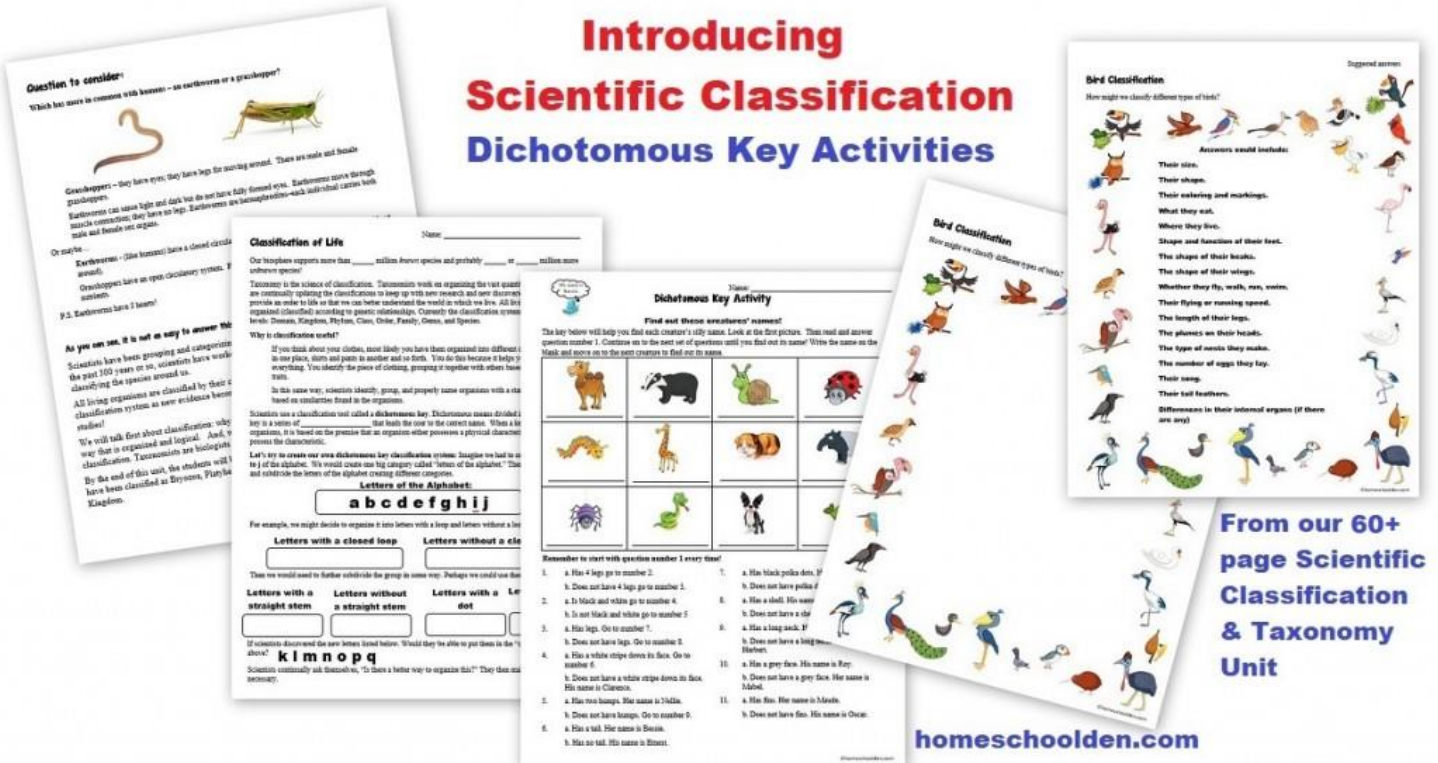
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Scientific Classification and Taxonomy Packet



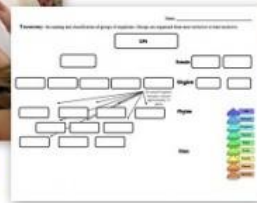
Introducing Scientific Classification Dichotomous Key Activities



Taxonomy & Scientific Classification Unit



**Classification Chart
Activities**



**Animal Phylum,
Meaning, Photo
Sorting Activity**

Phylum Name	Meaning	Example
Bryozoa	Mass animals	
Porifera	Pore bearer	
Echinodermata	Spiny Skin	
Cnidaria	Stinging nettle	
Annelida	Little ring	
Nematoda	Thread like	
Platyhelminthes	Flat worm	

Chordata	With a chord	
Mollusca	Soft	
Arthropoda	Jointed foot	



Bryozoa	Annelida
Cnidaria	Chordata
Nematoda	Platyhelminthes
Echinodermata	Porifera
Arthropoda	Mollusca



**Animal Phylum
Bingo**

World Facts Packet Do your kids know the 4 largest countries? Which countries have the most people? The longest river? This packet covers basic world and U.S. facts. Plus, it covers geographic features, landforms, world landmarks, topographic maps, and more! This packet also includes geographic features, landform words, deserts of the world, topographic maps and more!

World Facts Packet
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PAGES INCLUDE:

- * Largest countries
- * Population facts
- * Major world religions
- * Facts about the US:
- largest/smallest state, capital,
- highest mountain, longest river, rivers & lakes sheet,
- largest cities, neighbors
- * Blank fact sheet pages for: Canada, United Kingdom, Australia, South Africa
- * Famous world landmarks

The image displays a collage of various fact sheets from the 'World Facts Packet'. These sheets include:

- World Facts:** Questions about the largest country, most people, and life expectancy.
- What Do You Know About Their Countries?:** Focuses on the USA, Canada, and the United Kingdom, including maps and population data.
- More World Facts:** Includes a world population map and a list of famous world landmarks with small images.
- Facts About the U.S.A.:** Covers the largest state, longest river, and other US-specific facts.
- Geographic Features and Landform Words:** A section defining various landforms like arches, plateaus, and glaciers.

Geographic Features Landform Words
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This section of the packet provides definitions and visual examples for various geographic features and landforms. The words listed include:

- Archipelago
- Bay
- Cape
- Channel
- Coastline
- Delta
- Glacier
- Island
- Key
- Peninsula
- Plateau
- Reef
- Straits
- Terrace
- Valley
- Volcano
- Wetland
- Yield

 Each word is accompanied by a small photograph or map illustrating the feature.

World Facts Packet (cont.)

Can you identify these famous World Landmarks?

- Eiffel Tower
- Pyramids of Giza
- Leaning tower of Pisa
- St. Basil's Cathedral
- Angkor Wat
- Sistine Chapel
- Dome of the Rock
- Big Ben
- Temple of the Emerald Buddha
- Machu Picchu
- Sydney Opera House
- Parthenon
- Colosseum
- Taj Mahal
- Great Wall of China
- Stonehenge
- Sphinx
- Chichen Itza
- Hagia Sophia
- Palace of Versailles
- Masjid al-Haram, Mecca
- Moscow Kremlin

Famous World Landmarks

World Landmark Bingo 1

World Landmark Bingo 3

World Landmark Bingo 5

8 Bingo Cards

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World Landmark Bingo 1

Hagia Sophia

Great Wall of China

St. Basil's Cath.

Parthenon

Big Ben

Temple of the Emerald Buddha

Moscow Kremlin

The Sphinx

Leaning Tower of Pisa

Sistine Chapel

Sydney Opera House

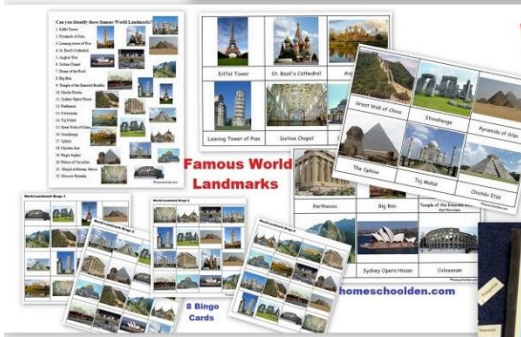
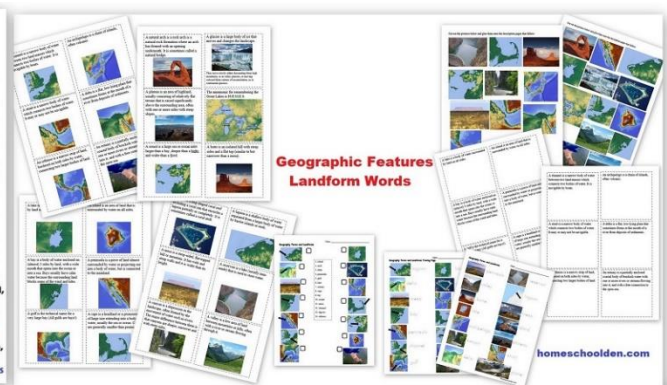
Colosseum

World Landmark Bingo 2

Can you identify these famous World Landmarks?

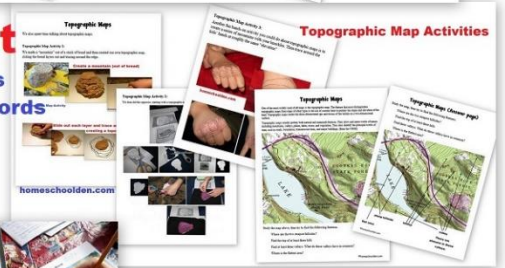
1. Eiffel Tower
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18. Chichén Itzá
19. Hagia Sophia
20. Palace of Versailles
21. Masjid al-Haram, Mecca
22. Moscow Kremlin

[illegible]



World Facts Packet

- +World Fact Pages, USA Fact Pages
- +Geographic Features, Landform Words
- +World Landmarks
- +Deserts of the World
- +Topographic Map Activities



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