

Biology 2



lab Packet



for



Practical 4



CLASSIFICATION:**Domain: Eukarya****Supergroup: Unikonta****Clade: Opisthokonts****Kingdom: Animalia****Phylum: Chordata – Chordates**

Subphylum: Urochordata - Tunicates

Subphylum: Cephalochordata - Lancelets

Subphylum: Vertebrata – Vertebrates

Superclass: Agnatha

Class: Cephalaspidomorpha – Lamprey

Class: Myxini – Hagfish

SuperClass: Gnathostomata – Jawed Vertebrates

Class: Chondrichthyes - Cartilaginous Fish

Subclass: Elasmobranchii

Order: Selachiformes - Sharks

Order: Batiformes – Skates and Rays

Subclass: Holocephali - Ratfish

Class: Sarcopterygii – Lobe-finned fish

Subclass: Coelacanthimorpha - Coelocanths

Subclass: Dipnoi – Lungfish

Class: Actinopterygii – Ray-finned Fish

Infraclass: Holostei

Order: Lepisoteriformes - Gars

Order: Amiiiformes – Bowfin

Infraclass: Teleostei

Superorder: Osteoglossomorpha

Order: Osteoglossiformes - Arrowana

Superorder: Elopomorpha

Order: Anguillidae - Morey eels

Superorder: Clupeiformorpha

Order: Clupeiformes

Superorder: Ostariophysii – Ostariophysians

Order: Cypriniformes - Loaches

Order: Characiformes – Piranha

Order: Cymnotiformes - Knifefishes

Order: Siluriformes - Catfish

Superorder: Protacanthopterygii

Order: Salmoniformes – Salmon, Trout

Order: Esociformes - Pike

Superorder: Stomiati

Order: Osmeriformes – Smelt

Order: Stomiiformes – Dragonfish

Superorder: Scopelomorpha

Order: Myctophiformes – Lantern Fish

Superorder: Acanthopterygii

Order: Mugiliformes - Mullet

Order: Atheriniformes - Silversides

Order: Cyprinodontiformes –Pupfish

Order: Stephanobercyiformes - Ridge

Order: Gobiocystiformes – Clingfish

Order: Gasterosteiformes Sticklebacks

Order: Synganthiformes - Sea Horses

Order: Tetradontiformes - Porcupine

Order: Pleuronectiformes - Halibut

Order: Scorpaeniformes - Sculpin

Order: Perciformes – 40% of fish

Class: Amphibia – Amphibians

Order: Urodela - Salamanders

Order: Anurans – Frogs/Toads

Order: Apodans - Caecilians

Class: Testudines – Turtles

Class: Sphenodontia – Tuataras

Class: Squamata – Lizards/Snakes

Lizards

Family – Agamidae – Old World Lizards

Family – Anguidae – Glass Lizards

Family – Chamaeleonidae – Chameleons

Family – Corytophanidae – Helmet Lizards

Family - Crotaphytidae – Collared Lizards

Family – Helodermatidae – Gila Monster

Family – Iguanidae – Iguanids

Family – Phrynosomatidae – NA Spiny Lizards

Family – Polychrotidae – Anoles

Family – Geckkonidae – Geckos

Snakes

Family – Boidae – Pythons and Boas

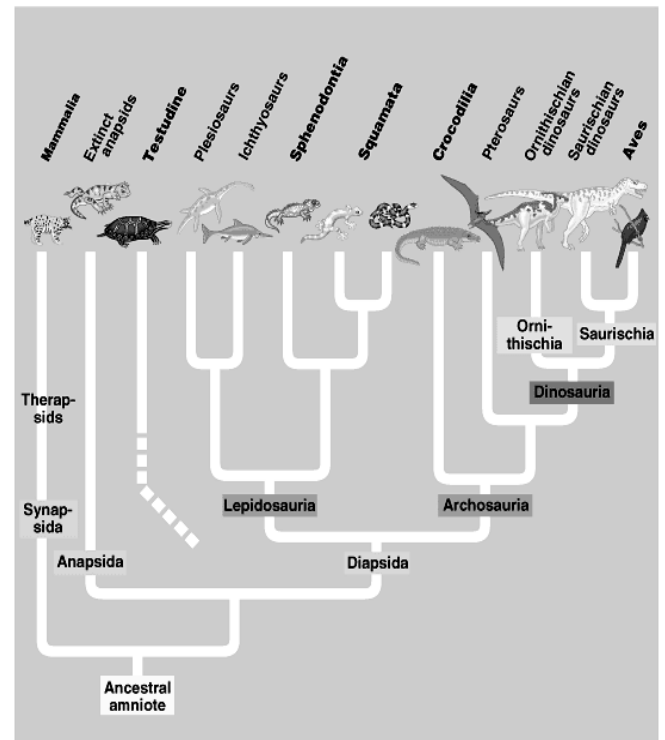
Family – Colubridae – Colubrids

Family – Elapidae – Elapids

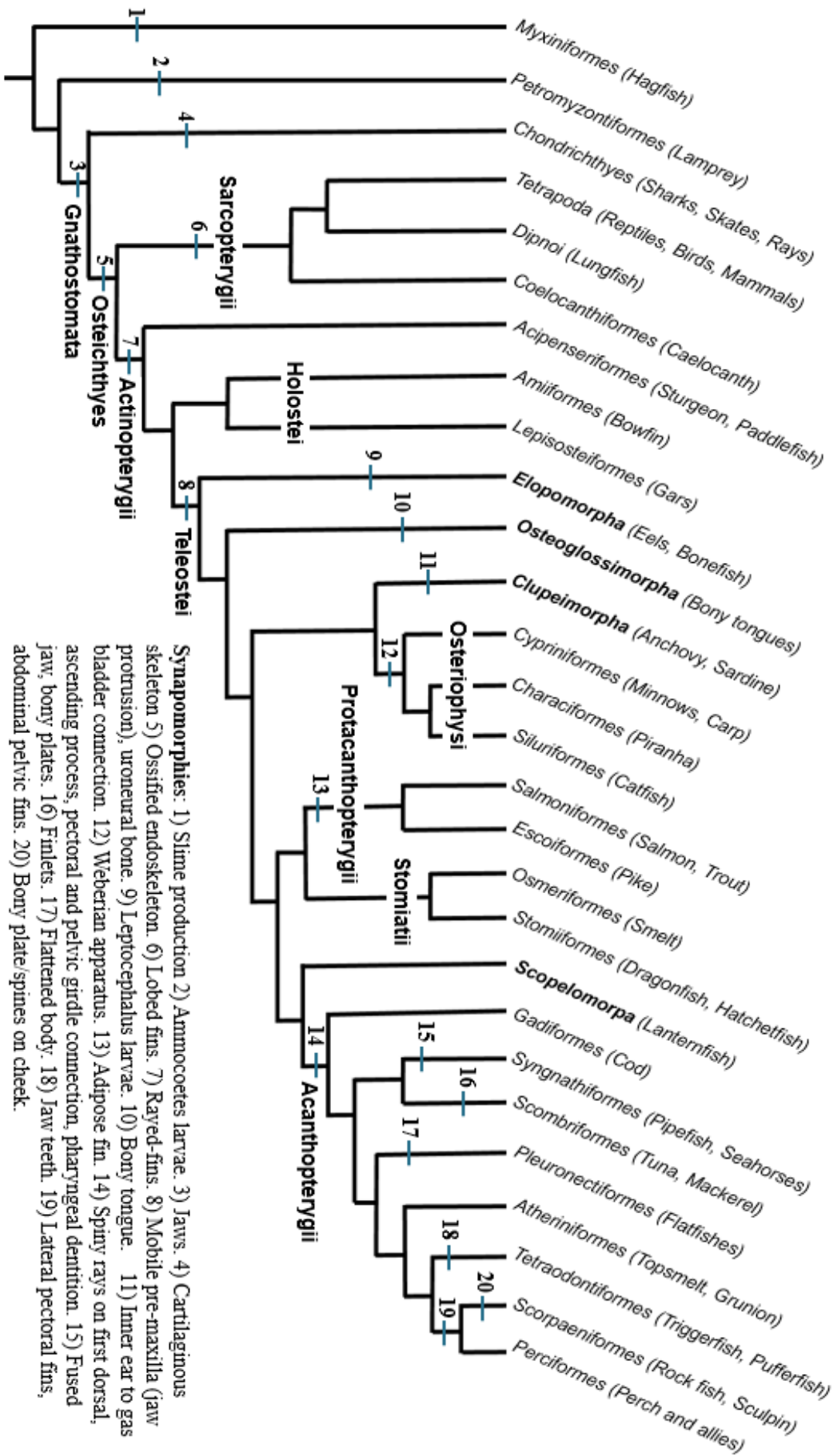
Family – Hydrophilidae – Sea Snakes

Family - Viperidae - Viperids

Class: Crocodylia – Crocodylia



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Introduction – Phylum Chordata

Although chordates vary widely in appearance, they are distinguished as a phylum by the presence of four anatomical features that appear sometime during their life time. They exhibit deuterostome development and bilateral symmetry. Chordates only comprise 5% of the animal species but may be the most commonly known phylum. They comprise of both invertebrates and vertebrates.

Station 1 – Phylum: Chordata

1. What four characteristics are shared by all chordates and what are their functions?

2. What are the three subphyla included in this phylum?

Station 2 – Subphylum: Urochordata. Be able to recognize the examples at this station.

1. What are the chordate characteristics found in the adults in this subphylum?

2. What type of lifestyle do they demonstrate?

Station 3 – Subphylum: Cephalochordata. Be able to recognize the examples at this station.

1. What are the chordate characteristics found in the adults in this subphylum?

2. What type of lifestyle do they demonstrate?

Station 4 - Subphylum: Vertebrata

1. What are the chordate characteristics found in the adults in this subphylum?
2. What type of lifestyle do they demonstrate?

Station 5 – Fish

1. What is a “fish”?
2. What are the four major groups of fish?

Station 6 – Fish Scales

Be able to recognize the examples at this station.

1. What are the four types of fish scales, and what groups typically have each kind of scale?
2. How do fish scales differ from reptile scales?

Station 7 - Superclass: Agnatha – Hagfish

Be able to recognize the examples given at this station.

1. What do all fish in this superclass lack?
2. How do hagfish differ from lampreys?
3. What type of feeding behavior is found in the hagfish? How do they find their prey?
4. What do they hagfish produce?
5. What can they do to their bodies and what is the function of this behavior?

Station 8 - Superclass: Agnatha – Lamprey Be able to recognize the examples given at this station.

1. What type of feeding behavior is found in some lamprey species? How do they accomplish this?
2. Where do they typically live and where do they spawn? What is this term for this type of lifestyle?
3. What are the larvae called? Where are they found and how do they obtain food?
4. What must happen to lamprey larvae before it becomes an adult?

Station 9 – Superclass: Gnathostomata

1. What characteristic do the organisms within this superclass have?
2. What did the jaws likely develop from?
3. What did the development of jaws allow for? How was this significant to vertebrate evolution?

Station 10 – Class: Chondrichthyes. Be able to recognize the examples at this station.

1. What is the chondrichthyan skeleton made of? Is this a primitive characteristic?
2. What distinguishing characteristics are found in chondrichthyans?
3. What is the name of the specialized sensory organ found in many chondrichthyans? What does it sense?
4. What are the two subclasses found in this class? What are their characteristics?

Station 11 – Shark Reproduction Be able to recognize the examples at this station.

1. How do you tell the difference between males from female chondrichthyans?
2. What are the three types of reproduction found in sharks? Know the definition of each.

Station 12 – Sharks

Be able to recognize the examples at this station and know their characteristics.

Order Lamniformes – Great white shark

1. How big do great whites get?
2. What type of reproduction do great white sharks have?
3. What do they eat?
4. Where are they found?
5. In the last 100 years, more people have been killed in the U.S. by what animal over this shark?

Order Carcharhiniformes**Hammerhead shark**

1. How big do hammerhead sharks get?
2. What type of reproduction do hammerhead sharks have?
3. What do they eat?
4. Where are they found?
5. What does the hammer head do for the animal and how many more times effective is it than other sharks?

Leopard shark

1. What size are they?
2. What do they eat?
3. Where are they found?
4. How do the adult differ from the juveniles?

Order Orectolobiniformes – Whale shark

1. What size are they?
2. What do they eat?
3. Where are they found?
4. How much water can they filter in an hour?

Station 13 – Orders: Rajiformes and Myliobatiformes: Skates and Rays

Fill out the following table – Be able to recognize the pictures and/or specimens of these organisms.

Characteristic	Skate	Ray
Caudal Fin		
Stinging Spines		
Pelvic Fins		
Reproduction		

Station 14 – Order Rajiformes – Skates Be able to recognize the examples at this station

Big skate

1. How big do big skates get?
2. Where are they found?
3. What do they eat?
4. What type of reproduction do they have? What are their eggs often called?

Shovelnose guitarfish

1. How are guitarfish different from other rays?
2. Where are they found?
3. Where do they eat and what do they eat?
4. What adaptation do they have that allows them to breathe while buried in the sand?

Station 14 – Myliobatiformes – Rays Be able to recognize the examples at this station.

Round ray

1. Where are they found?
2. What do they eat as juveniles? As adults?
3. What adaptation do they have to protect themselves from predators?

Bat ray

1. Where are bat rays found?
2. How big do bat rays get?
3. What are they considered? What does this term mean?
4. What do they eat? What adaptation do they have to eat this kind of prey?

Manta ray

1. How big do manta rays get?
2. Where are they found?
3. What did they likely evolve from? How do they feed?

Station 15 – Order: Chimaeriformes – Chimaeras. Be able to recognize the example at this station.

1. How do chimaeras differ from sharks, skates and rays?
2. What are the common names for these species?
3. Where are they usually found? What do they eat?

Station 16 – Osteichthyes – Bony fish

1. What is their skeleton made of?
2. What type of scales do they have?
3. What two other adaptations do they have?
4. What two classes has this group been divided into? What are their characteristics?

Station 17 – Class Sarcopterygii – Lobe-finned Fish

Be able to recognize the pictures and/or specimens of these organisms.

Subclass Coelacanthiformes – Coelacanths

1. What is unique about the coelacanth fins?
2. What specialized adaptation do they have that helps them detect prey?
3. Where are they found?
4. What do they eat?

Subclass Dipnoi - Lungfish

1. What type of fins do lungfish have?
2. What are they best known for?
3. Where are they found?
4. What adaptation do they have that allows them to survive desiccation?
5. What do they eat?

Station 18 – Class Actinopterygii – Order Acipenseriformes – Sturgeon and Paddlefish

Be able to recognize the pictures and/or specimens of these organisms

1. Sturgeon and paddlefish are the most primitive members of which group?
2. What characteristics do they share with chondrichthyans?
3. What do they eat? Where do they feed?
4. Why have some species of sturgeon being threatened?
5. What is the difference between the two paddlefish species?

Station 19 –Class Actinopterygii – Infraclass: Holostei

Be able to recognize the pictures and/or specimens of the organisms in this infraclass.

1. What do adaptation do bowfin and gars have that allows them to live in brackish conditions?
2. What two orders are within the infraclass Holostei?

Order Lepisosteiformes - Gars

1. Where are gars typically found?
2. What type of scales do they have?
3. How do gars obtain oxygen when in oxygen poor water?

Order Amiiformes - Bowfin

1. Where is the single species of bowfin found?
2. How are bowfins similar to gars?
3. What type of scales do bowfin have?
4. What characteristics make bowfin unique?
5. What do these fish typically eat?

Station 20 - Infraclass: Telostei

1. What percentage of fish are considered teleosts?
2. Where are teleost fish found?
3. What are the two adaptations found in teleost fishes and how are they beneficial to the success of teleosts?
4. What are the main characteristics for each of the 8 teleost superorders?

Superorder: Elopomorpha

Superorder: Osteroglossomorpha

Superorder: Clupeomorpha

Superorder: Ostariophysi

Superorder: Protacanthopterygii

Superorder: Stomiati

Superorder: Scopelomorpha

Superorder: Acanthopterygii

Station 21 - Superorder: Osteoglossomorpha

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. How do the fish in this superorder use their “bony tongue”?
2. Where are bony tongues typically found?
3. What is unique about the reproduction process in arowana?
4. What are elephant fish able to do and how does it benefit them?

Station 22 – Superorder: Elopomorpha – Order: Anguilliformes

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. What characteristic is shared by all elopomorphs?
2. Where is the California moray eel typically found?
3. Why is the moray eels mouth always open?
4. What adaptation do they have that helps them hold on to their prey?

Station 23 - Superorder: Clupeomorpha – Order: Clupeiformes

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. What adaptation is found in clupeids? What does this allow them to do?
2. How do most clupeids feed? What adaptation do they have that helps them capture prey?
3. How can you tell the northern anchovy and pacific sardine apart?

Station 24 – Superorder: Ostariophysi

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. What are the two adaptations found in ostariophysians and how are they beneficial?
2. What are the four orders within superorder Ostariophysi?

Order Cypriniformes – Common carp

1. Where are most North American carp species originally from?
2. How does the feeding behavior of the common carp alter the freshwater ecosystem?
3. Why is the vegetation in shallow areas important to native fish species?

Order Characiformes – Red-bellied piranha

1. Where are red-bellied piranha found?
2. How big do they usually get?
3. Do they typically pose a threat to humans? Why or why not?
4. What ability do they have that is similar to sharks?

Order Siluriformes - Catfish

1. What characteristic gives catfish their name? How do they use them?
2. Do catfish have scales? What are the two types of catfish?
3. What adaptations do catfish have to protect them from predators?
4. What is the size range found in catfish?

Order Gymnotiformes – Knifefish

1. Where are they found?
2. What do they produce?
3. What do they use this for?

Station 25 – Superorder: Protacanthopterygii

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. What characteristics are found in protacanthopterygians?
2. What are the two orders within the superorder Protacanthopterygii?

Order Salmoniformes

Salmon

1. What is unique about the life cycle of many salmon? What is the term used to describe this life cycle?
2. How do salmon species swim up a river that is blocked with dams?

Trout

1. What is unique about the fins of trout and salmon?
2. Where are trout typically found?
3. Why has the introduction of rainbow trout become a problem in the U.S? What is the term used to describe this problem?

Order Escoiformes - Pike

1. What body shape do pike have? How are pike different from other protacanthopterygians?
2. What do they eat? How much of their diet includes other pike?
3. Because of their size and their lack of respect, what are they apt to do?

Station 26 – Superorder: Stomiatii

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. What has led to the formation of the new superorder Stomiatii?
2. What are the two orders within the superorder Stomiatii?

Order Osmeriformes – Smelt

1. Where are most smelt species found? What type of life cycle do they have?
2. What are smelt eggs called? What are they often used for?
3. Where are delta smelt found?
4. Why has the conservation of the delta smelt been so controversial?

Order Stomiiformes

Dragonfish

1. Where are dragonfish typically found?
2. What do they have that makes them similar to other deep-sea fish? How do they differ from other deep-sea fish?
3. What is unique about the different dragonfish sexes? What is the male dragonfishes purpose in life?

Hatchetfish

1. Where are hatchetfish typically found?
2. How did they get their name?
3. What do they have that is similar to other deep-sea fish? What is this process known as?
4. What is the advantage of having photophores that point downward?

Station 27 - Superorder: Scopelomorpha – Order: Myctophiformes

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. Where are lanternfish typically found?
2. How are they similar to other deep-sea fish? How are they different?
3. How much of the deep-sea biomass do lanternfish makeup?
4. What do they perform at night and why do they do it?

Station 28 – Superorder: Acanthopterygii

Be able to recognize the pictures and/or specimens of the organisms in this superorder.

1. What percentage of fish are in the superorder Acanthopterygii?
2. What adaptations are found in the fins of fish in the superorder Acanthopterygii? How are the pectoral and pelvic fins positioned?
3. What feeding adaptations are found in Acanthopterygians?

Station 29 – Superorder: Acanthopterygii - Order: Mugiliformes – Mullet

Be able to recognize the pictures and/or specimens of the organisms in this order

1. Where are mullet typically found?
2. What morphological characteristics are typically found in mullet?
3. How have mullet been important throughout human history?

Station 30 – Superorder: Acanthopterygii - Order: Atheriniformes – California grunion

Be able to recognize the pictures and/or specimens of the organisms in this order

1. What are antherinids commonly known as?
2. Where do California grunion spawn?
3. How do the California grunion reproduce?
4. When do California grunion spawn? How does this coincide with the tides?

Station 31 – Superorder: Acanthopterygii - Order: Beloniformes – Flying fish

Be able to recognize the pictures and/or specimens of the organisms in this order

1. Where are flying fish typically found? What is the name of the zone they are found in?
2. What adaptation do flying fish have and what does it allow them to do? What is the purpose of this adaptation?
3. How far can flying fish glide?

Station 32 – Superorder: Acanthopterygii - Order: Cyprinodontiformes

Desert pupfish and Mosquitofish

Be able to recognize the pictures and/or specimens of the organisms in this order

1. Where are most cyprinodont fishes found?
2. What characteristics are typically found in cyprinodont fishes?
3. Where is the desert pupfish found? What factors have led to its decline and listing as an endangered species?
4. What adaptation do desert pupfish have that allows them to survive in the desert ponds and streams?
5. How have mosquitofish become one of the most widespread freshwater fish on earth?
6. What are mosquitofish known as and why?

Station 33 – Superorder: Acanthopterygii - Order: Stephanoberyciformes - Ridgehead

Be able to recognize the pictures and/or specimens of the organisms in this order

1. Where are ridgeheads typically found? What is the term for pelagic fish with an uneven distribution?
2. What characteristics do they have that gave them their common name?

Station 34 – Superorder: Acanthopterygii - Order: Gobiesociformes - Clingfish

Be able to recognize the pictures and/or specimens of the organisms in this order

1. Where are clingfish typically found?
2. What is unique about the pelvic fins of clingfish?
3. What adaptations do clingfish have to hide from predators?

Station 35 – Superorder: Acanthopterygii - Order Syngnathiformes**Seahorses and Pipefish**

Be able to recognize the pictures and/or specimens of the organisms in this order

1. What distinguishing characteristics are found in pipefish and seahorses?
2. What are syngnathids known for? How does the male seahorse carry the eggs? How are they deposited there?
3. What type of specialized feeding is found in pipefish and seahorses? How does it work?

Station 36 – Superorder: Acanthopterygii - Order Pleuronectiformes - Halibut

Be able to recognize the pictures and/or specimens of the organisms in this order.

1. What type of body plan do flatfish have when they hatch? What happens during their development?
2. How big can the Pacific halibut get? What is their nickname?

Station 37 – Superorder: Acanthopterygii - Order Scombriformes – Tuna and Mackerel

Be able to recognize the pictures and/or specimens of the organisms in this order.

1. What are the distinguishing characteristics of fish in the order Scombriformes?
2. What adaptation is found in some Scombrids? What is this adaptation called? What does this allow them to do?
3. What two factors help maintain the elevated temperatures in the red muscle?

Station 38 – Superorder: Acanthopterygii - Order: Scorpaeniformes**Rockfish and Sculpin**

Be able to recognize the pictures and/or specimens of the organisms in this order.

1. What is the distinguishing characteristic found in all fish in the order Scorpaeniformes?
2. Where are most scorpaenids found?
3. What is unique about the pectoral fins of sculpin? What does this adaptation help them do?
4. How long can some rockfish live?

Station 39 – Superorder: Acanthopterygii - Order: Perciformes

Be able to recognize the pictures and/or specimens of the organisms in this order

1. What percentage of fish species are perciforms?
2. How are the pelvic fins oriented in perciforms? What does this allow them to do?
3. What is unique about the dorsal and anal fins in most perciform fishes?
4. What type of scales do most perciform fishes have?

Sticklebacks

1. What do all sticklebacks lack? What do some species have instead? What characteristic gives them their common name?
2. What is the reproductive behavior of male sticklebacks?
3. Why are sticklebacks important in the study of animal behavior?

Wrasses – California Sheephead

1. Where are most wrasse species found? Where are California sheephead found?
2. What do California sheephead eat?
3. What is unique about the sexes of most wrasses? What happens when the dominant male dies?

Garibaldi

1. Why are garibaldi protected from being taken for sport or commercial purposes?
2. Where are garibaldi found?
3. What is unique about the sexes of garibaldi?
4. What do male garibaldi do to prepare for breeding season?
5. What have male garibaldi been known to do?

Clownfish

1. What is the other common name for clownfish? What are they known for?
2. What does each species get out of the symbiotic relationship?
3. What adaptation do clownfish have that keeps them from getting stung by the anemone?
4. What is unique about the sexes of clownfish?

Marlin

1. Where can marlin be found?
2. Where do billfish get their common name? What is it used for?
3. How big can black marlin get?
4. What adaptation do they have for maximum speed?
5. How fast have black marlin been recorded?

Station 40 – Superorder: Acanthopterygii – Order: Tetraodontiformes

Be able to recognize the pictures and/or specimens of the organisms in this order

Porcupine fish

1. What characteristics are found in most fish in the order Tetraodontiformes? Where do the fish in this order get their name?
2. How are porcupine fish and puffer fish similar? How are they different?
3. How do porcupine fish inflate their bodies? Why do they inflate their bodies?
4. Besides spines, what other adaptation do some porcupine fish have to help them avoid predation?

Cowfish

1. What characteristics give cowfish their common name?
2. What are cowfish also known as? Why do they look like this?
3. What fins do cowfish use to swim?
4. What can happen if you scare a cowfish?

Mola mola or Ocean sunfish

1. What are mola molas known for? How much can they weigh?
2. What fins do mola molas use to swim?
3. What do molas eat?
4. How many eggs can a female mola produce at one time?

Station 41 – OSTIECHTHYES – EXTERNAL FEATURES (Handout)

1. What shape does it exhibit and why?
2. What type of scales do they have?
3. Note the location of the eyes. Does this animal have binocular vision? Does the animal have eyelids?
4. Note the lateral line. What is its function?
5. Be able to identify the following features: **operculum, the pectoral, pelvic, anal, dorsal, and caudal fins.**
6. How flexible is the skeletal system of the fish?

Station 42 – OSTIECHTHYES – INTERNAL FEATURES

Know the parts and their functions listed in each section below.

System	Structure	Function
Muscular System	Myomeres	
Digestive System	Stomach Pyloric ceca Intestine Liver Pancreas Spleen	
Excretory System	Kidney	
Circulatory System	Sinus venosus Atrium Ventricle Bulbous arteriosus	
Respiratory System	Gills	
Nervous System	Brain Spinal cord	
Reproductive System	Ovaries or Testes	
Swim Bladder	Swim Bladder	

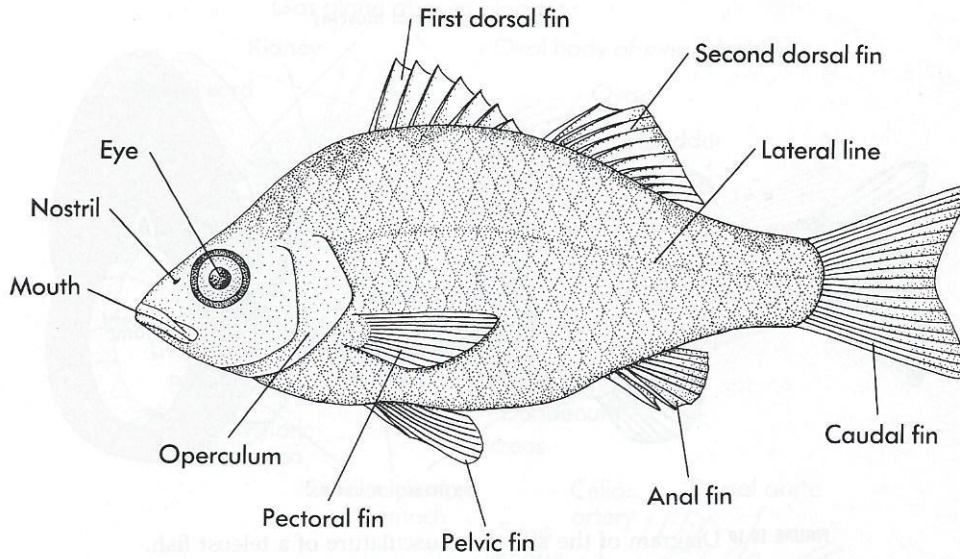


FIGURE 19-9 Yellow perch, external features.

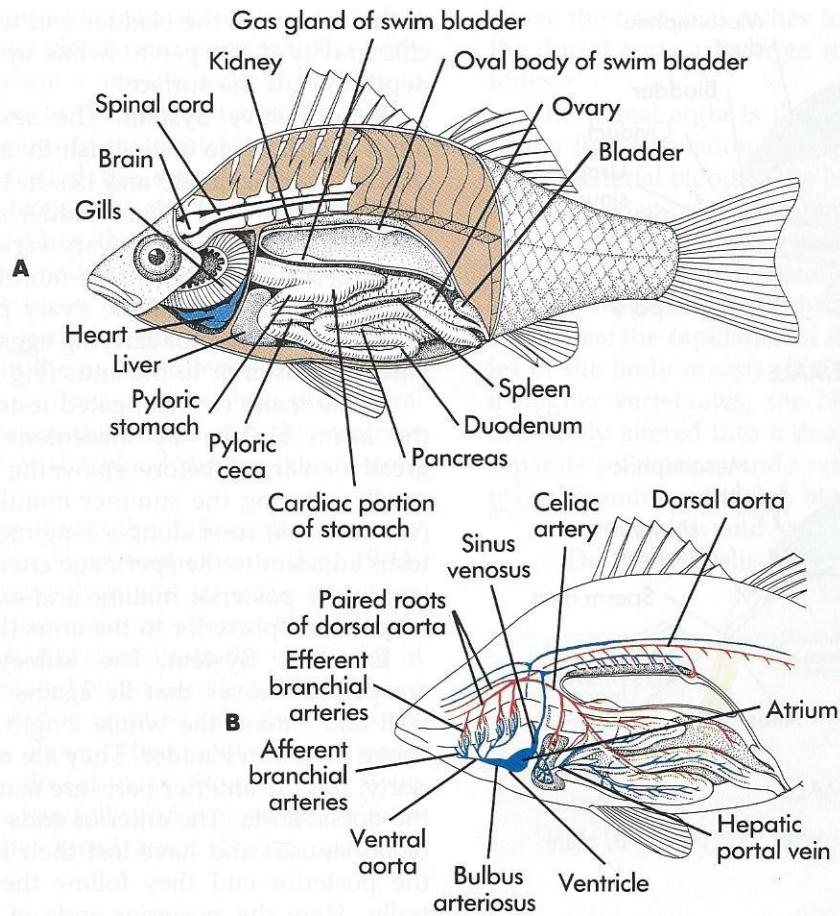


FIGURE 19-11 Yellow perch. A, Internal anatomy. B, Principal vessels of the circulatory system.

Introduction – Phylum Chordata

Although chordates vary widely in appearance, they are distinguished as a phylum by the presence of four anatomical features that appear sometime during their life time. They exhibit deuterostome development and bilateral symmetry. Chordates only comprise 5% of the animal species but may be the most commonly known phylum. They comprise of both invertebrates and vertebrates. This lab will be looking at the vertebrate animals that moved onto land. We will explore the living amphibian and reptile clades.

Station 1 – Tetrapods

1. What were three physical differences tetrapods evolved to accommodate their new way of life when they emerged onto land?
2. When do tetrapods appear in the fossil record? What was the name of the extinct group of lungfish that lead to the tetrapods?
3. What type of habitat did the first tetrapods evolve in?

Station 2 – Tetrapods – General Characteristics – Oxygen Content

1. To breath air, the lung developed from what?
2. What does a double circulatory system allow for?
3. Bony fish have 4 external nares (2 on each side) which allow water to run across the olfactory tissue. What do tetrapods have? What does this allow them to do?

Station 3 – Tetrapods – General Characteristics – Body Density

1. The limbs developed in shallow water. How much less buoyant is air over water? What are the homologous structures between fins and limbs?
2. In fish, the pectoral girdle is attached to the skull. What did tetrapods develop? What happened to the pelvic girdle to increase the force that can be generated by the hind legs?
3. What did the vertebrae develop to help support the spine in the absence of buoyant water? What did they also develop to protect the lungs?
4. The skull has been shortened and the snout elongated. The head separated from the body by a neck to allow for what? Why was a second vertebrae added?

Station 4 – Tetrapods – General Characteristics – Temperature Regulation

1. What is the current theory of why tetrapods evolved?
2. What does an increase of 10 degrees Celsius allow for?

Station 5 – Evolutionary History

1. What is the name of the fossil called a “Fishapod”?
2. What fish characteristics does it have?
3. What tetrapod characteristics does it have?

Station 6 – Class: Amphibians

1. What does the word “amphibian” mean?
2. What type of egg do they have?
3. What type of skin do they have? What does allow for?
4. When did amphibians appear in the fossil record? When did modern amphibian fossils appear?
5. What are amphibians found?

Station 7 – Class: Amphibians – General Characteristics

1. What is the difference between poisonous and venomous?
2. What does poisonous mean?
3. What does venomous mean?

Station 8 – Order: Urodela

1. What does the word Urodela mean? What does this clade consist of?
2. How are their legs positioned?
3. What do they eat?
4. When did salamanders appear in the fossil record?
5. Where are salamanders found?

Station 9 – California Newt

1. How is a newt different than a salamander? What is a terrestrial juvenile called?
2. Are California Newts venomous or poisonous? What is the name of the toxin they produce? How harmful is it?
3. Where are they located?
4. What type of habitat are they found in?

Station 10 – *Ensatina*

1. What is unique about their breeding locations?
2. Where are they located?
3. What type of habitat are they found in?

Station 11 – California Slender Salamander

1. What type of salamander are they? How does this species breathe?
2. What are they considered due to their limited range?
3. Where are they primarily located?
4. What type of habitat can they be found in?

Station 12 – Order Anura

1. What does the word anura mean? What does this clade consist of?
2. When does the oldest “protofrog” appear? When does the molecular clock date them?
3. Where is the greatest concentration of species diversity of anurans?

Station 13 – Anura – General Characteristics

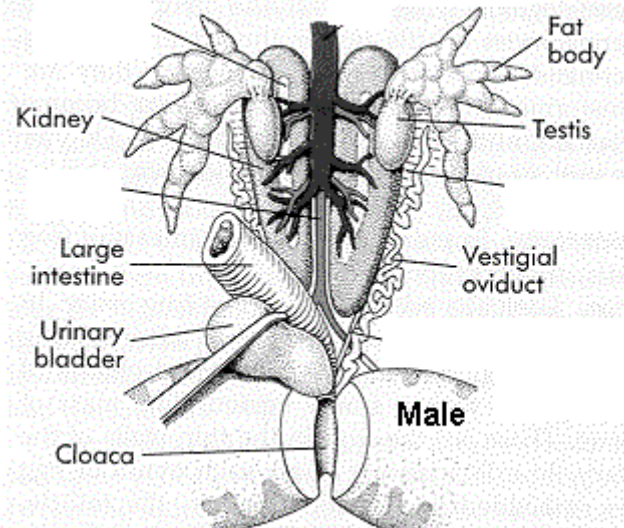
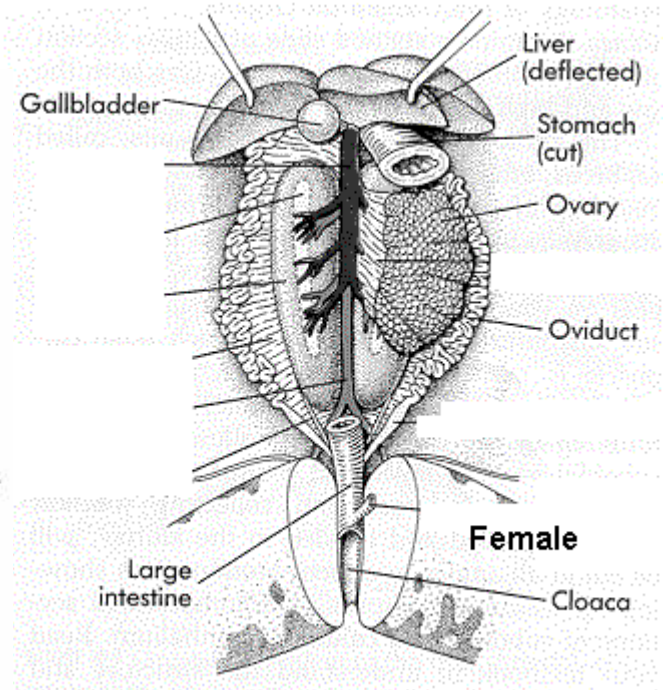
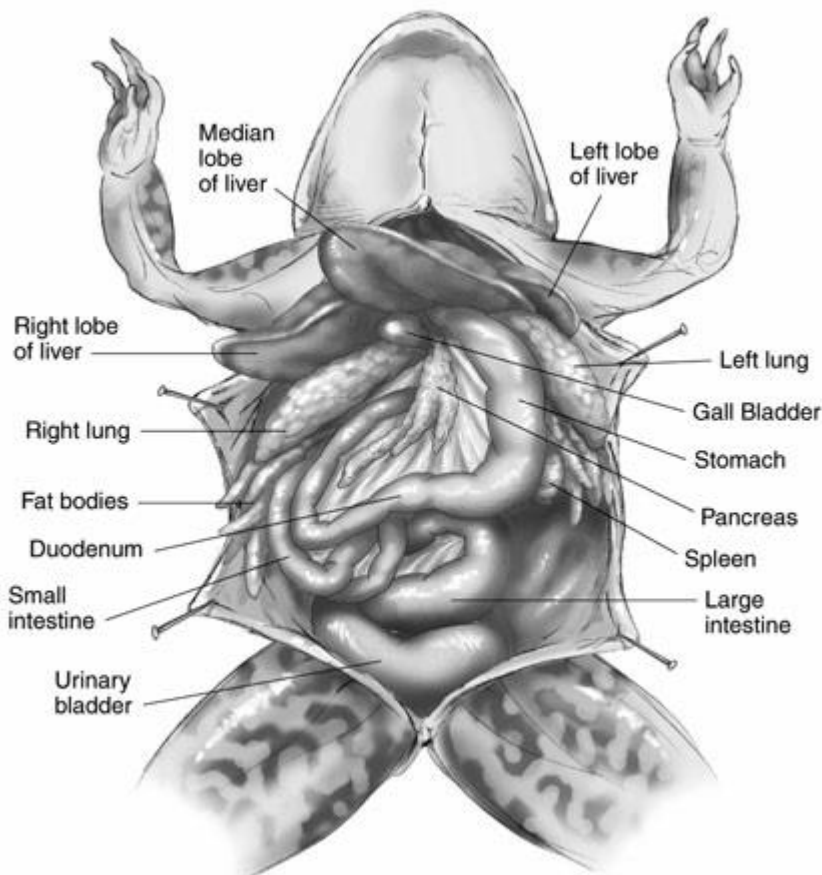
1. What does the term “frog” usually refer to?
2. What does the term “toad” usually refer to?

Station 14 – Other Anura – General Characteristics – Defense

1. What is the toxic substance on frogs called?
2. What is the name of the poison glands on toads?
3. What do poison dart frogs secrete? Where do they get this poison? What is the term for them advertising their toxicity?

Station 15 – Order Anura – General Characteristics – Features

1. Where is the tongue attached? What acts like an eardrum? What is the name of the transparent membrane?
2. Note the skeleton and the preserved specimen of the frog. What are the three functions of the skull?
3. Is the skeleton as flexible as the fish skeleton? Why?
4. What is the function of the pectoral girdle?
5. What is the function of the pelvic girdle? Do frogs have ribs?



Station 16 - CLASS AMPHIBIA – INTERNAL FEATURES

System	Structure	Function
Muscular System	What is the one function of the muscles?	
Digestive System	Stomach Intestine Liver Gall Bladder Pancreas Spleen	
Excretory System	Kidneys Urinary Bladder	
Circulatory System	Atria (2) Ventricle (1) Double Circuit system (whole system)	
Respiratory System	Lungs	
Nervous System	Cerebrum Olfactory lobe Optic lobe Medulla Oblongata Spinal chord	
Reproductive System	Ovaries or Testes	

Station 17 – Animal Sounds – Frogs This Week you are responsible for the following animals calls:

California Tree frog

Pacific Tree Frog

California Toad

American Bullfrog

Western Spadefoot Toad

Station 18 – Western Spadefoot Toad

1. What type of frog are they similar to?
2. What makes them unique?
3. Where are they located?
4. What type of habitat are they found in?

Station 19 – Red-Spotted Toad

1. What characteristic is used to identify them?
2. Where are they located?
3. What type of habitat are they found in?

Station 20 – California Tree Frog

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?

Station 21 – Pacific Tree Frog

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?

Station 22 – American Bullfrog

1. What makes them easy to identify?
2. What is it considered to be? What is the concern?
3. Where are they native to?
4. What type of habitat are they found in?

Station 23 – Order: Apodans

1. What does the order name actually mean? Why is this called a secondary adaptation?
2. Where are they found?
3. What do they typically eat?

Station 24 - Amniotes

1. What are amniotes? What group of amniotes are mammals found in? What group of amniotes are reptiles and birds found in?

2. When did the first amniotes appear?

Station 25 – Amniotes – General Characteristics – Amniotic egg

1. What does this egg allow them to do?

Station 26 – Amniotes – General Characteristics – Skull Development

1. What type of skull did the first reptiles have?

2. What type of skull is seen with one temporal opening? What did the opening allow? What did this line evolve into?

3. What type of skull is seen in the “True Reptiles”?

Station 27 – Reptiles – General Characteristics

1. When did Reptiles originate?

2. Where are they found?

1. What are the four Classes that make up the clade Reptiles?

Station 28 – Class Testudines

1. What are they characterized by and what did it develop from?
2. When did they evolve?
3. Where are they found?

Station 29 – Class Testudines

1. In general, what is the difference between a turtle and a tortoise?
2. From a biological perspective, what is a tortoise?

Station 30- Class Testudines - Turtle Skulls

1. What type of skull are turtles believe to have now?
2. Why do they appear to be an anapsid?

Station 31 – Class Testudines – General Characteristics

1. What is the name of the upper part of the shell? What is the name of the lower part of the shell? What is the name of the horny scales that cover the shell?
2. What do turtles use on the beaks instead of teeth?
3. How do they use their tongues? What can't they do that other reptiles can?
4. What are the two main turtle lineages?

Station 32 – Green Sea Turtle

1. Where are they located?
2. What are the three habitat types of their life stages?
3. What do they eat?

Station 33 – Leatherback Sea Turtle

1. How are they different than other sea turtles?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 34 – Desert Tortoise

1. Why can they live in desert areas that exceed 140 degrees Celsius?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 35 – Western Pond Turtle

1. Where are they located?
2. What type of habitat are they found in?
3. What do they eat?

Station 36 – Red-eared Slider

1. What are they known for?
2. Where are they originally from?
3. Why have they spread? What is it outcompeting?
4. What habitat are they found in?
5. What do they eat?

Station 37 –Spiny Soft shelled Turtle

1. Where do they get their name?
2. Where are they located?
3. What habitat are they found in?
4. What do they eat and what do they have to do to swallow?

Station 38 – Mata Mata

1. What does the Mata Mata resemble?
2. Where are they located?
3. What type of habitat are they found in?
4. How does it capture prey? Because of its mouth's structure, what can't they do?

Station 39 – Class: Sphenodontia

1. What characteristics make them different from lizards? What is unusual about their “third” eye?
2. What geological time are these “lizards” dated back to?
3. Where are they located?

Station 40 – Class Squamata

1. How is this class distinguished?
2. When do they appear in the fossil record? What does mitochondrial evidence suggest?
3. Where can they be found?

Station 41 – Class: Squamata – General Characteristics

1. What characteristics are found in lizards?
2. What characteristics are found in snakes?

Station 42 – Class: Squamata - Tail Autotomy

1. What is caudal autotomy?
2. How do lizards achieve this?

Station 43 - Family: Agamidae

1. What is the example for this family? What will they do when threatened?
2. How are they unique?
3. Where are they located?

Station 44 - Family: Chameleonidae

1. What chameleon adaptation is made to their toes?
2. What adaptations have been made to their eyes?
3. What adaptations have been made to their tongue?
4. What function does color changing provide them?
5. Where are they located?

Station 45 - Family: Polychrotidae

1. What is their common name? What is the name of the throat fan? What is it used for?
2. What are they often incorrectly called? Why are they called this?
3. Where are they located? Why have they become widespread?

Station 46 - Family: Geckonidae

1. What are they well known for?
2. What do they lack? What do they have instead? How do they keep it clean?
3. Where are they located?

Station 47 - Family: Corytophanidae

1. What is this lizard's nickname and how did it get its name?
2. Where are Basilisk Lizards found?

Station 48 - Family: Scincidae

1. What can most skinks do to avoid predators?
2. What is unique about Juvenile Western Skinks?
3. Where are Western Skinks located?
4. What do they eat?

Station 49 - Family: Iguanidae

1. What is this group of lizards main characteristic?
2. What type of lifestyle do they have?

Station 50 – Chuckwalla

1. How do Common Chuckwallas escape from predators?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 51 – Desert Iguana

1. What is unique about Desert Iguanas thermoregulation?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 52 – Green Iguana

1. Why have they been introduced to other areas?
2. Why are they called a disposable pet?
3. Where are they located?
4. What type of habitat are they found in?
5. What do they eat?

Station 53 – Marine Iguana

1. What does their dark tones allow them to do?
2. Where are they found? Why are they unique today?
3. What do they eat?

Station 54 - Family: Phrynosomatidae

1. What is this family adapted for?
2. Where are they located?

Station 55 – Zebra-tailed Lizards

1. How will they stand at the hottest parts of the day?
2. What will they do when threatened?
3. Where are they located?
4. What habitat are they found in?
5. What do they eat?

Station 56 – Western Fence Lizard

1. What are these lizards also known as?
2. Where are they located?
3. What habitat are they found in?
4. What do they eat?

Station 57 – Side-blotched Lizard

1. Where are they located?
2. What habitat are they found in?
3. What do they eat?

Station 58 – Horned Lizard

1. What were they called before?
2. What behavior do some Horned Lizards have for escaping from predators?
3. What do Horned Lizards eat and what adaptations do they have to allow them to do this?
4. What is rain harvesting?
5. Where are they located?
6. What habitat are they found in?
7. What do they eat?

Station 59 - Family: Anguidae – The Southern Alligator Lizard

1. Where are they located?
2. What habitat are they found in?
3. What do they eat?

Station 60 - Family: Anniellidae - California Legless Lizard

1. How can you tell they are not snakes?
2. How is their basking different than other lizards?
3. What habitat are they found in?
4. What do they eat?

Station 61 – Family: Crotaphytidae - Blunt-nosed Leopard Lizard

1. Why is this species disappearing?
2. Where are they located?
3. What do they eat?

Station 62 – Family: Teiidae - Western Whiptail Lizard

1. What sexual behavior are they known for?
2. Where are they located?
3. What habitat are they found in?
4. What do they eat?

Station 63 – Family: Helodermatidae

1. How are their venom glands different than snakes? What do they lack?
2. What is the venom used for? How do they get it into their victims?
3. What are the two venomous lizards in this family?
4. What is the other venomous lizard?

Station 64 - Class: Squamata (Snakes)

1. What do these organisms usually lack?
2. What adaptation is seen in their skulls?
3. What did they probably evolve from and when
4. Where are they located?

Station 65 - Snakes – General Characteristics

1. What is the function of the Jacobsen's organ?
2. What is the function of the Loreal Pits?

Station 66 – Family Elapsidae

1. What does this family include?
2. What are they characterized by?
3. What type of toxins do they have?
4. Where are they located?
5. How do they hunt?

Station 67 – King Cobra

1. What is this species known for?
2. A typical bite can kill how many people?
3. What does it do when it is confronted?
4. Where are they located?
5. What habitat are they found in?
6. What do they eat?

Station 68 – Taipan

1. What is this species known for?
2. A typical bite can kill how many people?
3. Where are they located?
4. What habitat are they found in?
5. What do they eat?

Station 69 – Sea Snakes

1. What is this species known for?
2. How are they adapted for a life at sea?
3. Where are they located?
4. What habitat are they found in?
5. What do they eat?

Station 70 - Family: Boidae

1. Are they venomous?
2. What large snakes are included in this family?
3. What makes them unique?
4. Where are they located?
5. What do they eat?

Station 71 – Rosy Boa

1. What do they do when they are disturbed?
2. Where are they located?
3. What habitat are they found in?
4. What do they eat?

Station 72 – Family: Colubridae

1. Are they venomous?
2. What makes them unique?
3. When did they show in the fossil record?
4. Where are they found?

Station 73- Ring-necked Snake

1. Are these snakes venomous?
2. What are these snakes known for?
3. Where are they located?
4. What habitat are they found in?
5. What do they eat?

Station 74 – Coachwhips

1. What are these snakes known for?
2. Where are they located?
3. What habitat are they found in?
4. What do they eat?

Station 75 – Western Shovel-nosed Snake

1. What are these snakes known for?
2. Where are they located?
3. What habitat are they found in?
4. What do they eat?

Station 76 – King Snake

1. Why are these snakes called King snakes?
2. Where are they located?
3. What habitat are they found in?

Station 77 – Gopher Snake

1. What are these snakes mistaken for?
2. How can you tell them apart?
3. Where are they located?
4. What habitat are they found in?
5. What do they eat?

Station 78 – Family: Viperidae

1. What type of fangs do they have? How do they “bite”?
2. Which type of snake is more dangerous?
3. When do they first appear in the fossil record?
4. Where are they located?
5. What two categories is the venom placed in?

Station 79 – Western Diamondback

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 80 – Red Diamond Rattlesnake

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 81 – Speckled Rattlesnake

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 82 – Western Rattlesnake

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 83 – Sidewinder

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 84 – Mohave Rattlesnake

1. What makes them unique?
2. Where are they located?
3. What type of habitat are they found in?
4. What do they eat?

Station 85 – Class: Crocodilia

1. What are the four groups of crocodilia?
2. What are they closely related to?
3. When do they appear in the fossil record?
4. Where are they located?

Station 86 – Class: Crocodilia

Be able to identify the four types

- 1.
- 2.
- 3.
- 4.

Station 87 – Animal Sounds – Reptile - This Week you are also responsible for the following animals calls:

Rattlesnake

Alligator

Baby Alligator