Phylum Annelida

Commonly known as ___segmented____________ worms
Have muscles that are both ____longitudinal__________ and __circular______________
Circulatory System: closed
Have a ______hydrostatic____________ skeleton
Symmetry: bilateral
Body type: tube in tube
Habitat: marine and fresh water, soil

Class Oligochaeta
Includes the _______earthworms____________
Can be ______terrestrial____________ or _______aquatic________
Hermaphroditic

Class Polychaeta
Includes the ______marine worms_____________ and _______fan worms________
Appendages are ______vascularized________________

Class Hirudinea
Includes ___leeches_______________
Can be carnivorous but most are ____parasitic_______________
Habitat: freshwater

Phylum Arthropoda
Largest phyla
_________modified__________ legs that assist in feeding, swimming
________reproduction________, and defense
Exoskeleton is made of _______chitin______________
Segments are ______fused____________
Have sense organs that are _____highly developed__________________
Aquatic organisms use ___green glands________________ for excretion
Terrestrial organisms use _____malpighian tubules_________________________
Body plan: tube in tube
Y/N organs

Subphylum Trilobitomorpha
All are extinct

Subphylum Cheliceriformes
Includes: horseshoe crabs, arachnids, sea spiders, ticks
____six_________ pairs of appendages
Have pincher like mouthparts called ______chelicerae_________________ that ______replace
the _____1st____ pair of walking legs___________________________

2nd pair of walking legs are called ______pedipalps_________________ and are used for
____feeding________________
No antennae
Arachnids have __book lungs________________ and insects have ___tracheal tubes________________ respiratory tubes

Class Merostomata
Includes the: horseshoe crabs
Referred to as __living fossils________________________
Most are extinct

Class Pycnogonida
Includes the: sea spiders

Class Arachnida
Includes spiders, ticks, mites, harvestmen, scorpions

Subphylum Myriapoda
Includes the: millipedes and centipedes
Habitat: terrestrial
Can have one or two pairs of ______antennae_____________

Class Chilopoda
Includes the centipedes
___ one___________ pairs of walking legs per segment
Carnivores

Class Diplopoda
Includes the millipedes
________ two__________ pairs of walking legs per segment
These are among the ______earliest________ land animals

Subphylum Hexapoda
____three_______ body regions
Mouthparts are used for: chewing, sucking, or lapping
____three_______ pairs of legs
Habitat: terrestrial

Class Insecta
Habitat: found all over earth but not in the sea
Thorax houses the ____legs_______ and ____wings_______
_____Malpighian tubules________________________ used for excretion
_______tracheal system________________________ used for respiration
Fertilization is ___internal_____________________

 Orders to know: coleoptera, hymenoptera, Lepidoptera, diptera

Subphylum Crustacea
Includes the: crabs, lobsters, shrimp, sow bugs, krill, barnacles, crayfish
Body has ___two______ or ___three_______ parts
__Y/N__ Antenna present
_________ pairs of legs
Habitat: marine or fresh water
Appendages are found on the ______abdomen__________________

**Deuterostomes**

**Phylum Brachiopoda**  
Commonly called the _____lamp shell______________
Has a U shaped ____lophophore______________ which surrounds the ___mouth__________
Symmetry: bilateral
__Y/N__ Organs
Germ Layers: 3
Body Plan: tube in tube

**Phylum Echinodermata**  
Symmetry: Adults- radial  
Larva- bilateral  
Have a ___water_________ ___vascular_________ ___system________ used for feeding,  
locomotion, ____respiration______________ and sensory perception
__Y/N__ Tube feet
Nervous tissue: nerve ring
Have a calcareous endoskeleton formed from __ossicles______________
Habitat: marine
Body plan: tube in tube
Germ layers: 3
__Y/N__ Organs

**Class Asteroidea**  
Includes: starfish
Tube feet located on ____suckers________________
Arms capable of ____regeneration________________

**Class Ophiuroidea**  
Includes: brittle stars
__Y/N__ tube feet on suckers

**Class Echinoidea**  
Includes: sea urchins and sand dollars
Body is made of ___plates________ which are fused together
__Y/N__ Arms

**Class Holothuroidea**
Includes: sea cucumbers
Spines are ___reduced_______________
Y/N Arms
Defense mechanism includes __evisceration__________________
___five____________ rows of tube feet which are used for ____feeding______________
Skeleton is ___reduced_______________

Class Crinoidea
Includes: feather stars and sea lilies
Oldest and most ____primitive______________ of echinoderms
Mouth points _____upward______________

Phylum Hemichordata
Commonly called the _____proboscis or acorn__________ worms
Have ______pharyngeal____________ gill slits
Nervous tissue: dorsal nerve cord
_______gill slits_______________ and __nerve cord________________ link this phyla to chordates

Phylum Chordata
What are the four characteristics specific to all chordates at one point in their lifetime?
- pharyngeal/gill slits, notochord, muscular, post-anal tail and blocks of muscle, dorsal, hollow nerve chord

General characteristics of chordates:
- coelomates, bilateral symmetry, organs, 3 germ layers, segmented body, tube in tube body plan

Subphylum Urochordata
Includes the: tunicates and sea squirts
Adults are ______sessile________________
______Filter____________ feeders
Larva have ________4_________ characteristics of chordates while adults only maintain
___only pharyngeal gill slits________________

Subphylum Cephalochordata
Commonly called the lancelet
______Filter_____________ feeders
Y/N Gill Slits
Y/N Nerve Cord
Y/N Notochord
Y/N Segmentation
Adults keep which characteristics of chordates? All four

Subphylum Craniata
Includes the: vertebrates
Notochord is replaced by ______backbone_______________
Backbone can be ___cartilaginous____________________ or _calcified________________
Segmentation is present in: muscles and vertebrae
Y/N Gill slits in adults (some yes, others modify their gills)
Ectoderm folds in to form the ______neural tube________________________
Neural crest cells migrate to form:
- teeth, bones/cartilage of the skull, dermis of skin/face, neurons, sensory capsules
of eyes and other sense organs
Heart has at least ______2 chambers___________________ with
_____hemoglobin____________________

Class Myxini
Commonly known as the: hagfish
Feeds on ______detritus_______
Skeleton is: cartilaginous
Chambers in heart: 2
Habitat: marine
Defense mechanism is to produce: slime

Class Cephalaspisdomorphi
Commonly known as: lamprey
The oldest living lineage of vertebrates
Y/N Parasitic
Skeleton is: cartilaginous but contains no collagen
Notochord is surrounded by _____cartilaginous pipe with stiff
projections____________________
Chambers in heart: 2
Habitat: marine and freshwater

Class Placodermi
All are extinct

Class Chondrichthyes
Commonly called the: cartilaginous fish
Includes the: sharks, rays, skates
Use ___lateral line_______________ to sense vibrations in the water
Teeth are formed from modified ____scales________________
Y/N Swim Bladder
Fertilization: internal
- can be oviparous (eggs hatch outside of mom)
- can be ovoviviparous (eggs remain inside mom)

Class Osteichthyes
Commonly known as the: bony fish
\[
\text{Calcium phosphate replaces cartilage during development.}
\]

Gill covering is called the **operculum**

Y/N Swim bladder
Chambers in heart: 2
Fertilization: external

Which of the following combinations of phylum and description is incorrect?

A. Echinodermata - bilateral symmetry as a larva, coelom present
B. Nematoda - roundworms, pseudocoelomate
C. Cnidaria - radial symmetry, polyp and medusa body forms
D. Platyhelminthes - flatworms, gastrovascular cavity, acoelomate
E. Calcarea - gastrovascular cavity, coelom present

Which of the following is a shared characteristic of all chordates?

A. Scales
B. Jaws
C. Vertebrae
D. Dorsal, hollow nerve cord
E. Four-chambered heart

Chordate pharyngeal slits appear to have functioned first as

A. The digestive system’s opening
B. **Suspension-feeding devices**
C. Components of the jaw
D. Gill slits for respiration
E. Portions of the inner ear

A new species of aquatic chordate is discovered that closely resembles an ancient form. It has the following characteristics: external armor of bony plates, no paired lateral fins, and a suspension-feeding mode of nutrition. In addition to these, it will probably have which of the following characteristics?

A. Legs
B. **No jaws**
C. An amniotic egg

Terry catches a ray-finned fish from the ocean and notices that, attached to its flank, there is an equally long, snakelike organism. The attached organism has no external segmentation, no scales, a round mouth surrounded by a sucker and two small eyes. Terry thinks it might be a marine leech, a hagfish, or a lamprey.

Which feature excludes it from possibly being a leech?

A. Its elongate shape
B. Its lack of scales
C. **Its lack of external segmentation**
D. Its round mouth
E. Its anterior sucker

Terry takes the body of the snakelike organism and slices it open along its dorsal side. If it is a hagfish, what should Terry see?

A. A well-developed series of bony vertebrae surrounding the spinal cord
B. A well-developed series of cartilaginous vertebrae surrounding the spinal cord
C. A tube of cartilage with dorsal projections on both sides of the spinal cord
D. **A notochord, located underneath the spinal cord**

Terry saved some of the tooth-like objects within the hagfish’s round mouth to analyze their composition in his mentor’s biochemistry lab. Terry will
find that they are composed of the same protein found in reptilian
A. Scales
B. Teeth
C. Bones
D. Blood
E. Muscles

The endoskeletons of most vertebrates are composed of calcified
A. Cartilage
B. Silica
C. Chitin
D. Dentin
E. Enamel