Synopsis of Phylum Annelida
(segmented worms, bristle worms)

Identifying Characteristics of the phylum

-large successful phylum in water & on land; include earthworms, sand worms, bristle worms, clam worms, fan worms, leeches
-worldwide distribution: marine, brackish, freshwater and terrestrial; some live in tubes they secrete or make with sand or shell
-elongated wormlike body with **head**-**body**-**pygidium**; true **coelom** present
-most show some degree of **cephalization** with a distinct head (=**prostomium**) **tentacles**, **palps** and sensory structures; mouth with **pharynx** and chitinous **jaws**
-body with well developed **metamerism** (=segmentation); seen in just a few other major phyla; segments are separated by tissue = **septae**; allows more efficient **hydrostatic skeleton** offers a way to achieve greater size:
-most annelids have paired appendages on most segments = **parapodia**; used for locomotion, respiration, in some, parapodia modified into fans and mucous bags for feeding terminal **-**
-body wall a single layer of epidermis**;** epidermis secretes a thin flexible **cuticle** and **setae**
-beneath **epidermis** is two layers of **muscle tissue**
-coelom is filled with fluid (except leeches) & serves as **hydrostatic skeleton** for burrowing, crawling and swimming
-complete digestive tract "tube within a tube" design; with **pharynx, esophagus, crop, gizzard, intestine** (with **typhlosole** on dorsal surface), **anus**; **chloragogue cells** line surface of intestine
-respiration by gills, parapodia, or through the body wall
-closed circulatory system with dorsal and ventral vessel and several pairs of pumping hearts; blood contains pigments to carry oxygen
-pair of **cerebral ganglia;** paired **ventral nerve cords**; ladderlike connections in each segment
-senses; simple photoreceptors, some with complex eyes, statocysts, chemoreceptors, tentacles, palps
-one pair of **nephrida** (=metanephridia) in each segment
-both asexual and sexual reproduction; monoecious or dioecious; larva, if present = **trochophore**

Class: Polychaeta (Sand Worms)

-largest, most diverse and most primitive class of Annelids
-sand worms, bristle worms, fan worms, clam worms, etc
-mostly marine; a few found in freshwater
-deposit feeders, filter feeders, predators, scavengers; some have elaborate filtering structures
-distinct **head** with mouth and sense organs
-most body segments have appendages = **parapodia** with **setae**
-free swimming polychaetes are mostly predators; sedentary polychaetes are filter or deposit feeders
-most are dioecious; gonads appear as temporary swelling of peritoneum at certain seasons
-some polychaetes live most of the year as sexually immature individuals = **atokes**; become sexually mature and swollen with gametes = **epitokes**

Class Oligochaeta (Earthworms)

-mostly terrestrial; most abundant 'worms' on land; also many live in freshwaters
-relatives of sand worms but **no parapodia** and very **few setae**
-**no distinct head**
-most are **scavengers** on decaying organic matter; mainly burrowers; eat as they burrow then let digestive system extract nutrients
-**typhlosole** in intestine improves absorption of nutrients
-no respiratiory organs or parapodia like polychaetes; breath through skin, no lungs or gills

-earthworms are **hermaphrodites**; cross fertilize each other; use **clitellum** to form **coccoon**

Class Hirudinea (Leeches)

-mainly freshwater; a few marine and terrestrial
-many are carnivores; some are parasites
-body is dorsoventrally flattened with **anterior** and **posterior suckers**
-coelom is filled with connective tissue and muscle
-**no parapodia ; no setae;** leeches have poor hydrostatic skeleton
-most are predators of snails, worms and insect larvae; some are scavengers; some are blood sucking parasites
-very slow digestion; can live for almost a year on one meal
-most exchange gasses through skin; a few aquatic forms have **gills**
-hermaphroditic; cross fertilize during copulation
-do have **clitellum** to produce coccoon that receives eggs and sperm

<u>Ecological and Economic Impacts of Annelids</u>

Polychaetes

-detritus food chains; prominent in marine food webs
-**beardworms** entire ecosystem not based on photosynthesis; common in hydrothermal vent communities
-Major decomposers of deep sea whale carcasses
-human food (samoa)

Oligochaetes

-detritus food chains
-important in keeping soil fertile since they are constantly turning over earth and mixing organic matter into it
-Food for birds and other animals
-Food for Humans
-Fishing bait

Hirudinea

-medicinal uses; in past centuries medicinal leech, *Hirudo*, was used to suck out "bad blood" **today** leeches used in medicine to speed healing of reattached fingers and limbs
-commonly used in **biology labs**
-leeches have become leading **research models** for understanding how the nervous system works
-some chemicals used by the leech in obtaining and digesting blood are being studied for treating circulatory diseases
-leeches have also affected history: eg. land leeches of India