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 chitinuous jaws
- body with well developed metamermism (=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 nephridia (=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 respiratory organs or parapodia like polychaetes; breath through skin, no lungs or gills

This is NOT “what’s on the test”; this is a summary of the major points from lab and lectures; the lecture & lab notes are the sources of exam questions
- Earthworms are **hermaphrodites**; cross fertilize each other; use **clitellum** to form **cocoon**

**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 cocoon that receives eggs and sperm

**Ecological and Economic Impacts of Annelids**

**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 (samoan)

**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