

Lab 2: Digestive & Respiratory Systems

Abdominal & Thoracic Cavities pp.164-171, p. 172 questions 6, 7, 11-13, 16-17, 19
Lung Structure & Function pp. 216-217, p. 230 questions 1-3
Spirometer, Aerobic Respiration pp. C49-50, C51

GOALS:

-Locate and explain the functions of the structures listed below:

Neck Region:

thymus gland
thyroid gland
larynx
trachea
esophagus

Abdominal Cavity:

umbilical vein
liver
stomach
spleen
small intestine (locate duodenum)
gall bladder
pancreas
large intestine
cecum
colon

Thoracic Cavity:

right & left lungs
heart

Thoracic/Abdominal Division:

Diaphragm

- Describe the appearance of villi in the small intestine. Explain how the structure of villi aid in their function.
- Describe the internal structure of the lungs and explain the process of gas exchange.
- Explain the difference in appearance and function between healthy and diseased alveoli.
- Demonstrate how lung capacities can be determined with a spirometer.
- Compare and contrast the respiratory surfaces/ ventilation methods of fish, frogs, and humans.

KEY TERMS:

methods of ventilating (fish/frog/human)	bronchioles	alveoli
gas exchange by diffusion	negative pressure breathing	villi
positive pressure breathing	vital capacity	bronchi
surface area (of lungs & small intestine)	residual volume	spirometer

I. Thoracic and abdominal incisions:

pp. 164-165: Read and follow directions.

- Step 8: you do not need to tie string to the umbilical chord – but cut close to the skin so you can trace it back into the pig during later labs.
- Step 9: you do not need to rinse out your pig unless you'd like to. Use the pig sink.

II. Neck Region, Thoracic Cavity, and Abdominal Cavity:

pp. 166-171: Read all introductions, follow procedures to locate organs listed above and know their functions.

- After dissection, be sure to find the following structures: **Thymus** (2 tan glands on each half of the larynx), **Thyroid** (small circular gland between thymus halves), **Larynx** (smooth cartilage like a box), **Trachea** (ribbed cartilage) and **Esophagus** (muscular tube behind trachea) -compare with demo pig.

- use your pig to locate the following structures: **heart, lung, and diaphragm**
- compare with demo pig
- observe dissecting scope showing **branchioles** and **alveoli** (for delivery of gas and exchange of gas)
- observe slides of normal lung tissue and tissue from lungs of a coal miner; what are the impacts of lung tissue (air spaces) being filled with foreign material?

III. Review:

p. 172 Answer questions 6, 7, 11-13, 16, 17, 21-22

*Put the following organs in order by the way food travels through them:
stomach, esophagus, large intestine, mouth, small intestine, anus, rectum.

*Trace the movement of an inhaled breath of air by putting the following in order:
pharynx, bronchi, alveoli, nasal passages, trachea, bronchioles, larynx

IV. Lungs:

pp. 216-217: Read and answer questions 1 & 2

V. Review:

p. 230: Answer questions 1-3

Aerobic respiration:

pp. C49-C51: Fill out the table on p.C51 comparing respiration of different organisms

- Preserved fish showing operculum and gills
- How do fish breathe underwater?
- Observe preserved frogs; How do frogs breathe? Do they gulp air or use a diaphragm to regulate flow of air? Frogs use bottom of oral cavity/throat to actively push air into glottis. Note that adults also use skin to assist gas exchange. Tadpoles (baby frogs) respire with gills, which disappear as they mature.
- model of how diaphragm and lungs work; what happens when you push up or pull down on the diaphragm? Do humans gulp air?
- Optional spirometer** demo (C49-C50); I will explain terms and you can decide if you wish to experiment with the machine.