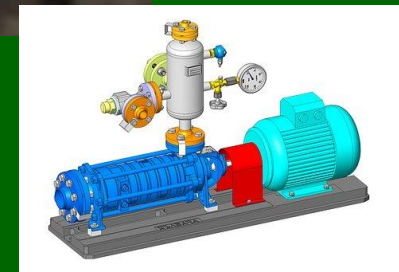
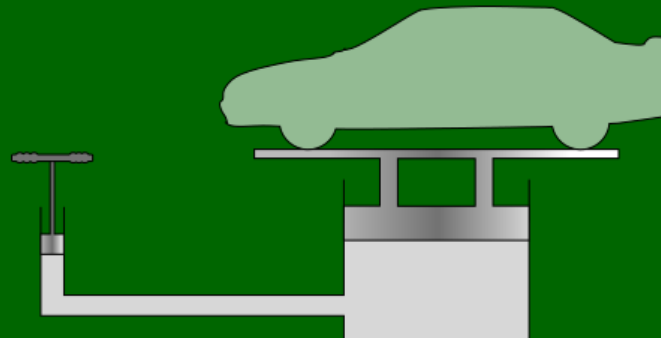
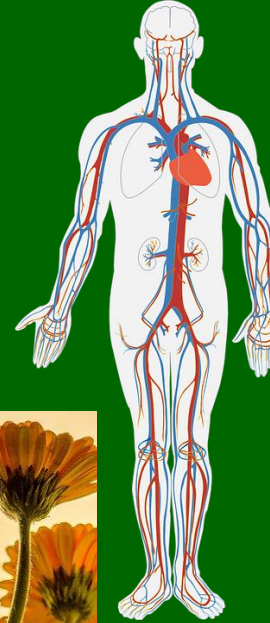
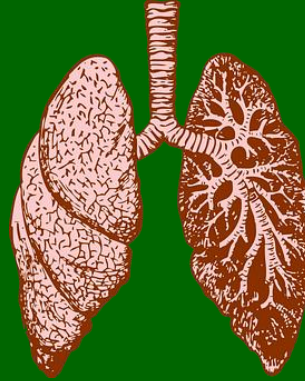


Comparative Fluid Mechanics

- What Is Fluid Mechanics?
- Fluids in Living Things
- Fluids in Man-Made Products
- Fluid Systems
- Driver
- Pumps
- Tubes and Pipes
- Valves
- Actuators
- Fluid Statics



TeachWithFergy

Preview File

Please enjoy this preview of your Student Version of the lesson. I've created this PDF for ease of viewing and to decrease the file size but of course, your lesson will be in PowerPoint format.

- Some slides appear blank because they have been removed.
- Student versions have portions of the text removed which is given in the teacher version and appear as _____
- Other slides may have on them, this represents writing that has been removed.

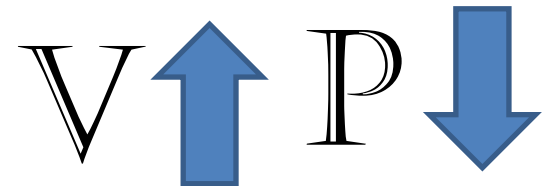
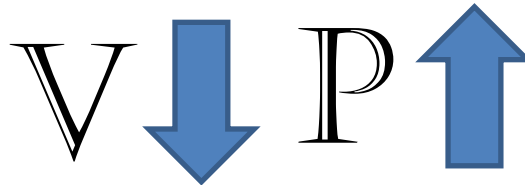
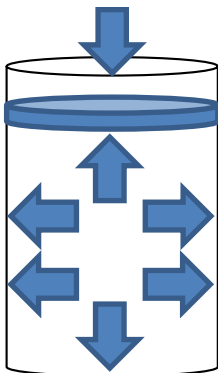
What Is Fluid Mechanics?

- _____
- Fluids: _____
- Fluid Dynamics: _____
- Fluid Statics: _____
- Fluid characteristics
 - _____
 - _____



What is Fluid Mechanics?

-
 - Pascal's Law: _____
 - Boyle's Law: _____



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Fluids in Living Things

- Types of fluid mechanics in living things:

—

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—

—

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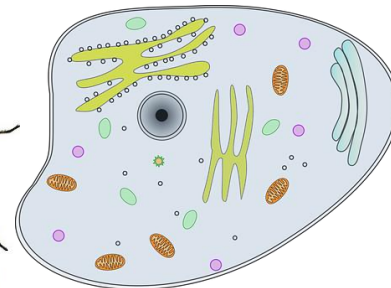
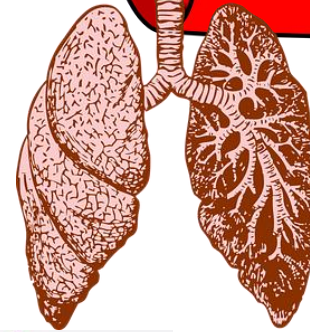
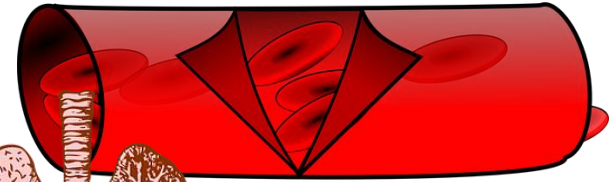
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Fluids in Living Things

- Major liquids in animals

- _____

-

- Extracellular fluid

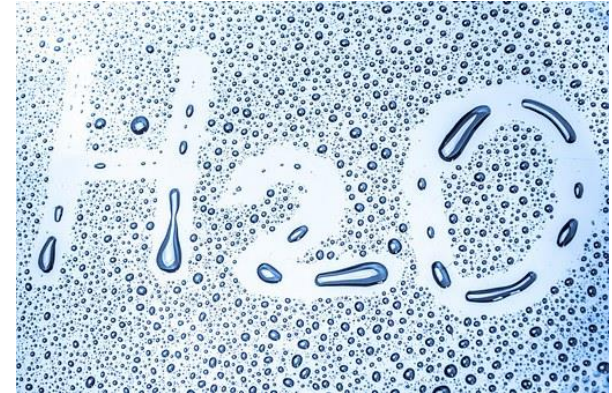
- _____

- Lymph

- _____

-

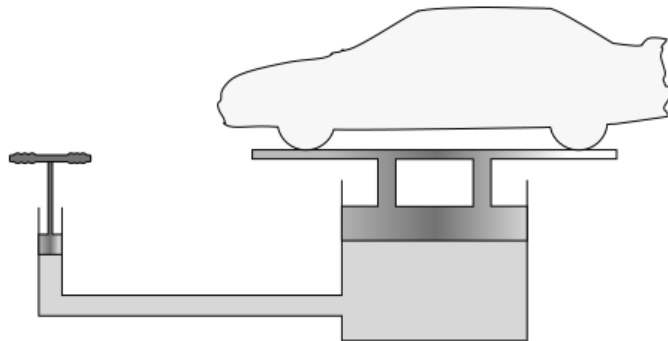
- Interstitial fluid



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Fluids in Man-Made Products

- Types of fluid mechanics in man-made products:
 - _____: Liquid power
 - _____: Compressed gas power



Fluids in Man-Made Products

- Many types of fluids are found in man-made products, e.g.,

— _____

— Oil

— _____

—

— _____

— Oxygen

— _____



Fluid Dynamics

Fluid Systems

- General parts of fluid systems

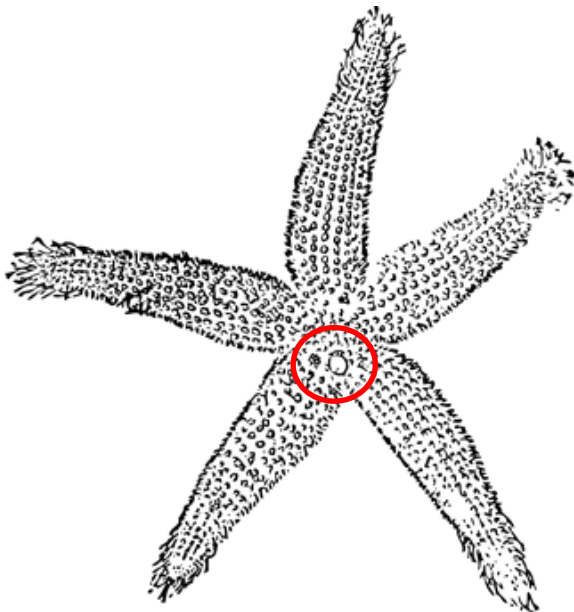
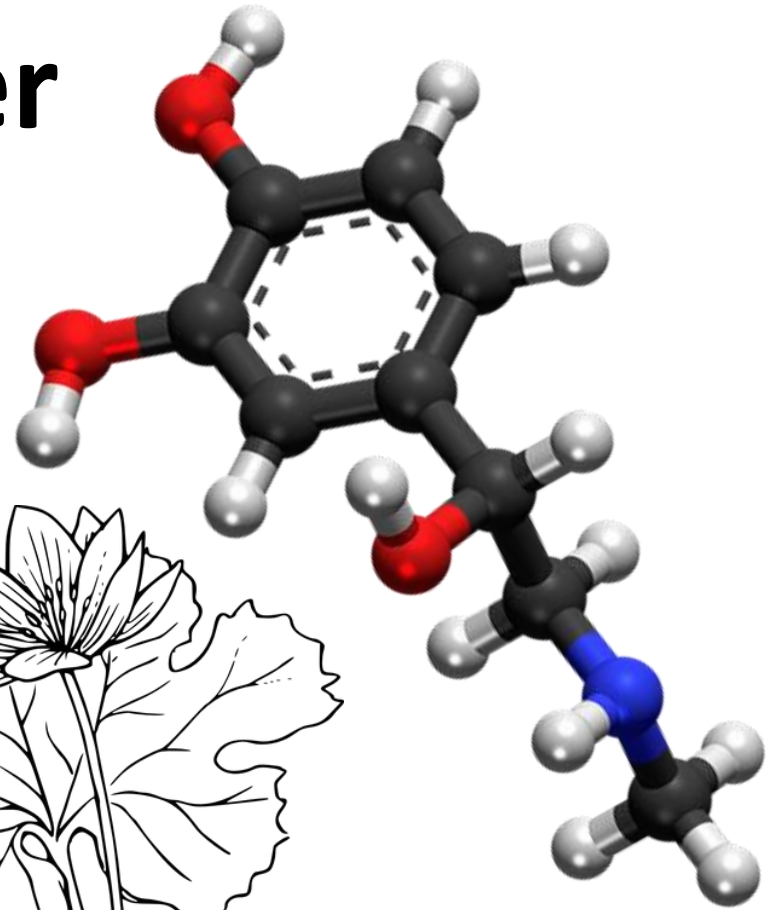
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Driver

- Living things:
 - The brain in most animals _____
 -, _____
 - _____
 - Plant roots _____

Driver

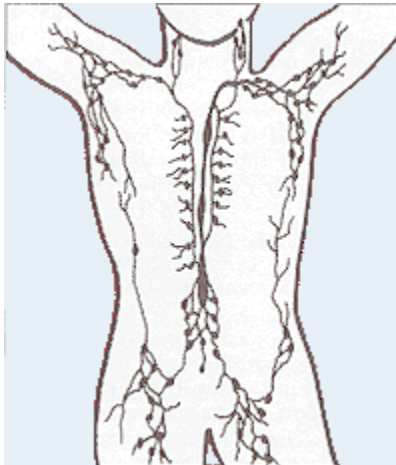


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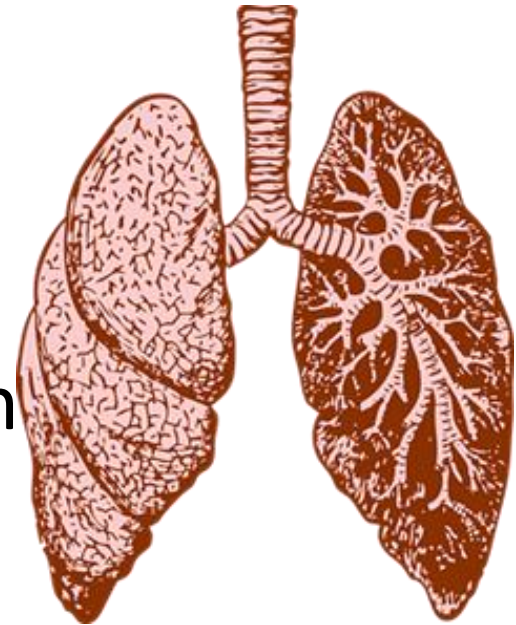
Pumps

- Living things: _____
 -, _____
 -(not mammals), _____



Pumps

- Living things: _____
 - Lungs pump air from outside the body by _____
 -
 - Lungs _____ to pump carbon dioxide out (exhalation, contracting lungs)



Pumps

- Living things: _____
 - Two pumps
 - _____ pulls milk
 - _____ pushes milk



Pumps

- Living things: _____
 - Plate with holes in it
 - Water _____
 -



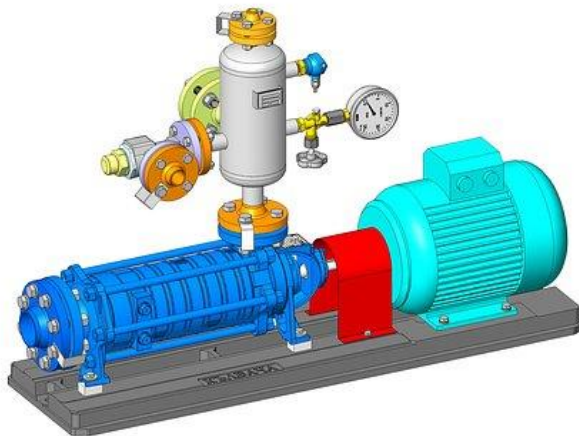
Pumps

- Living things: _____
 -
 - Cohesion between water molecules causes _____



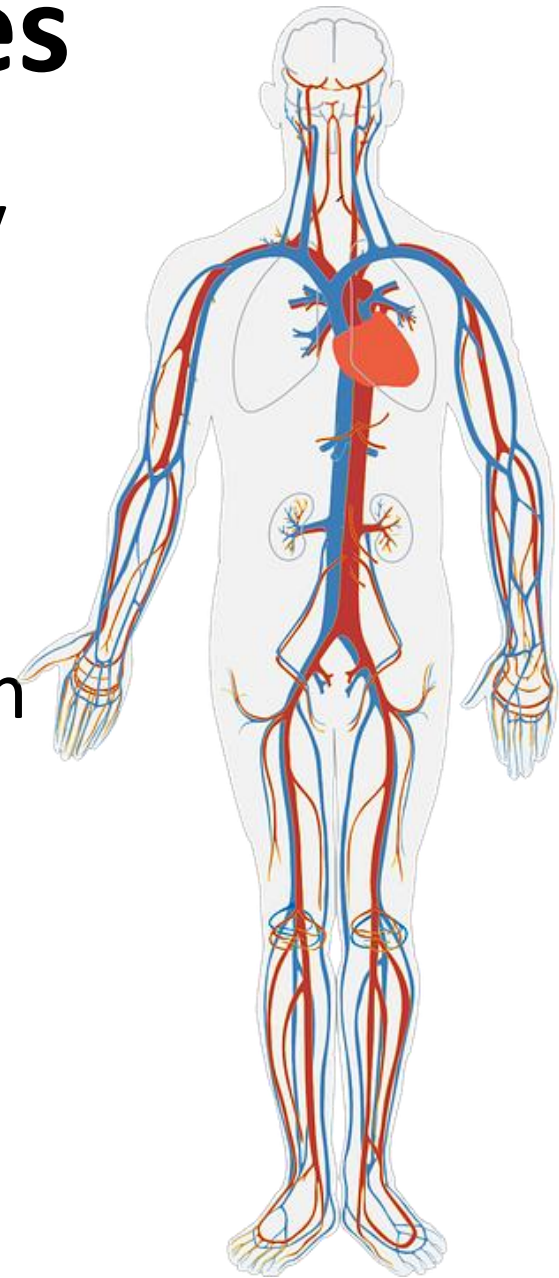
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Pumps



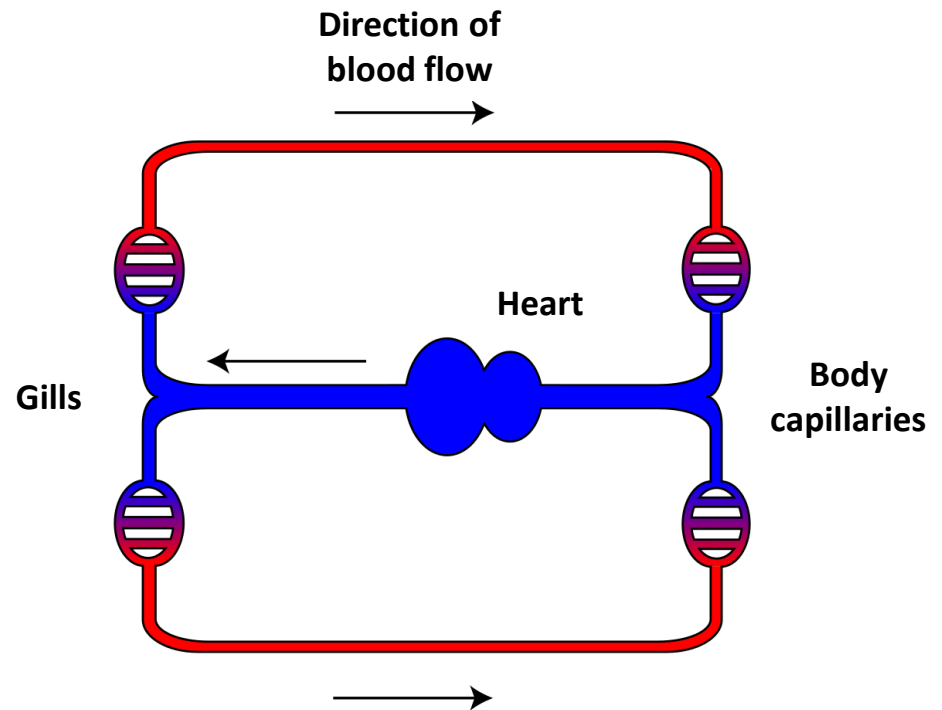
Tubes and Pipes

- Living things: closed circulatory system
 - All vertebrates and some invertebrates
 - (_____) through which blood flows
 - Vessels are _____ and can



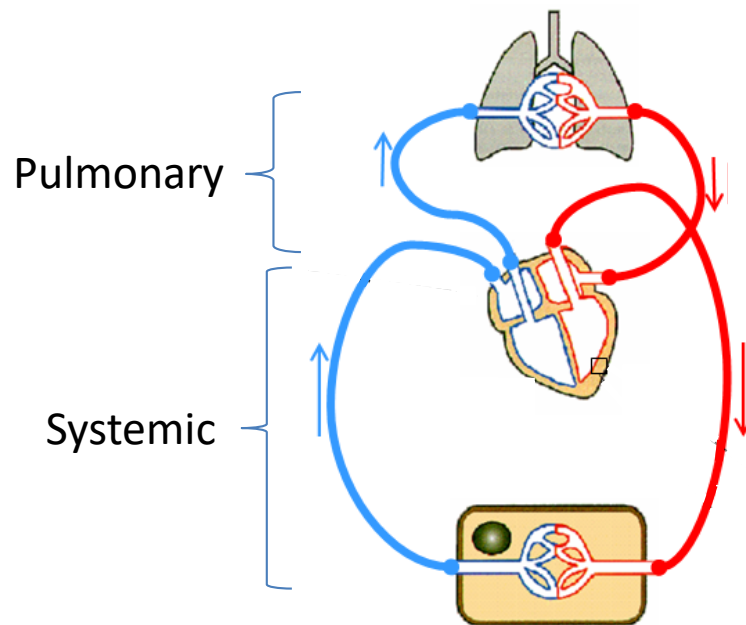
Tubes and Pipes

- Living things: closed circulatory system
 - Fish have one circuit: _____
 -



Tubes and Pipes

- Living things: closed circulatory system
 - Some animals have two circuits
 - Systemic: _____
 - Pulmonary: _____

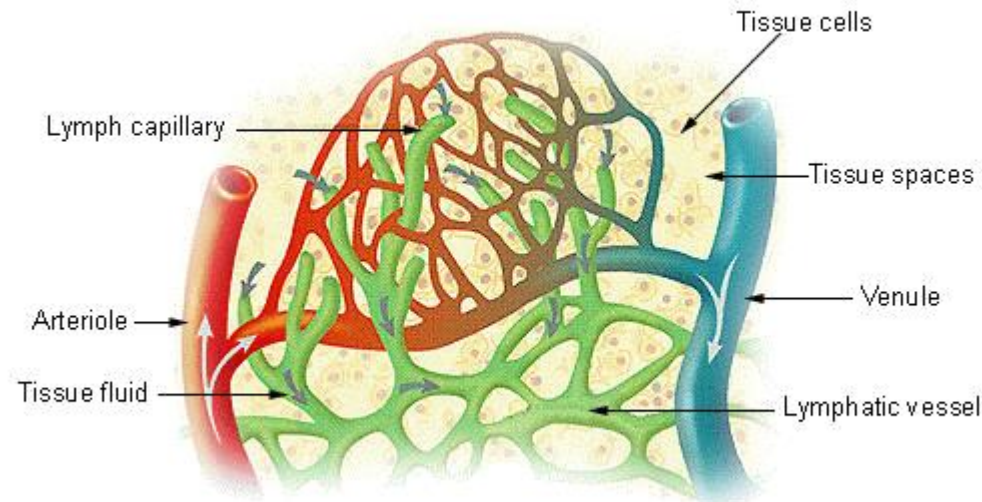


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Tubes and Pipes

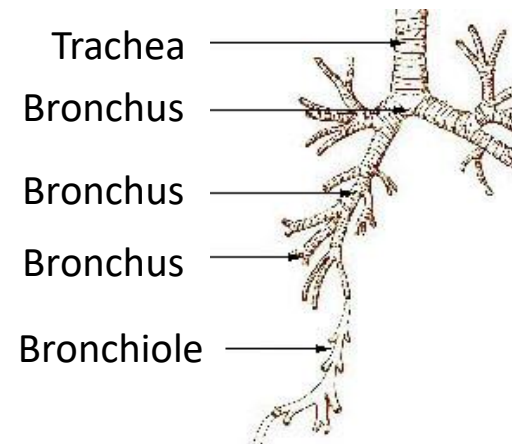
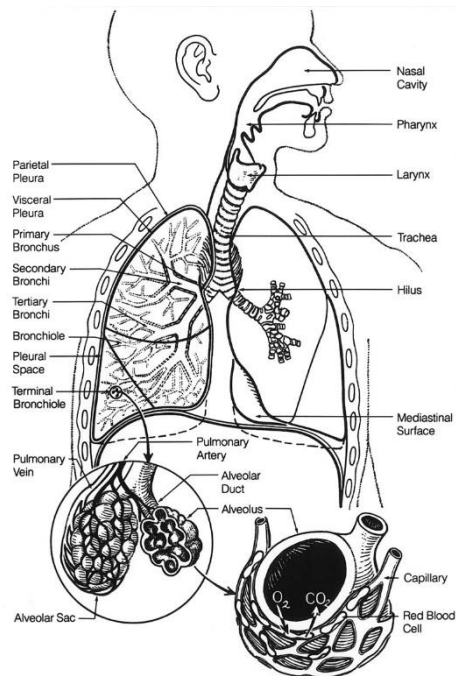
- Living things: lymphatic system
 - Lymphatic vessels _____

Lymph Capillaries in the Tissue Spaces



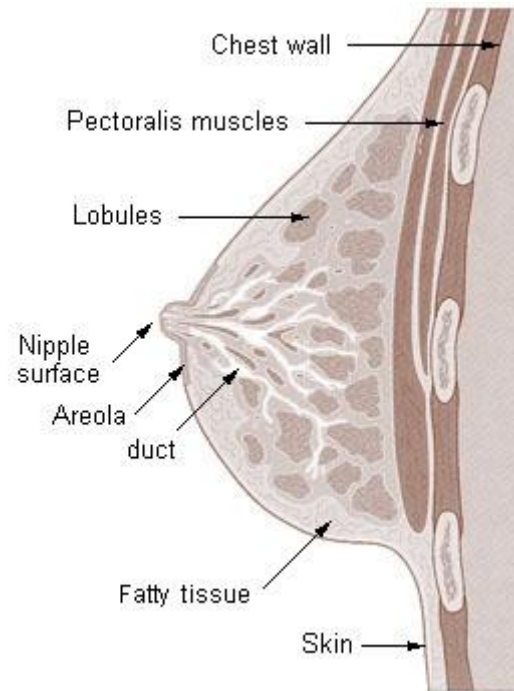
Tubes and Pipes

- Living things: respiratory system
 - Trachea (_____)
 - Bronchi: _____



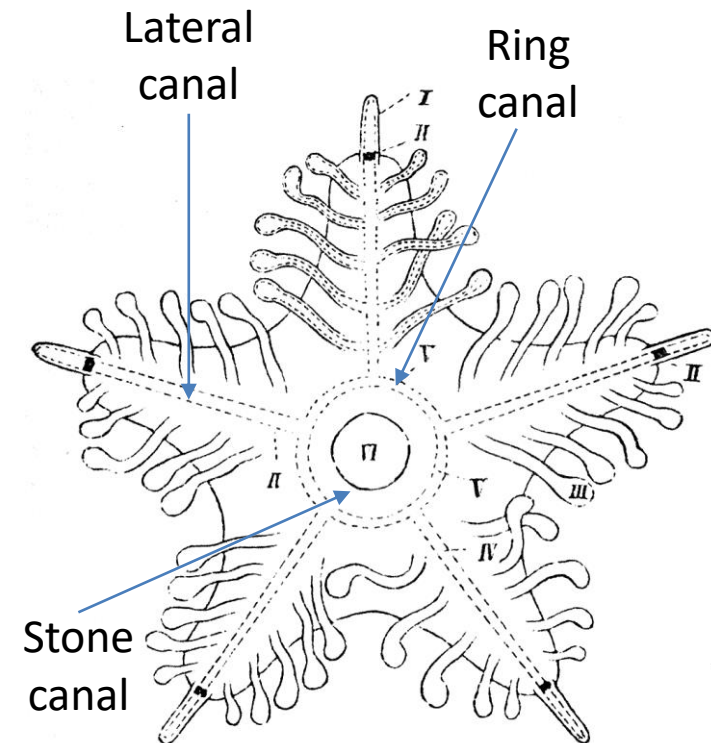
Tubes and Pipes

- Living things: mammary gland
 - Milk ducts _____



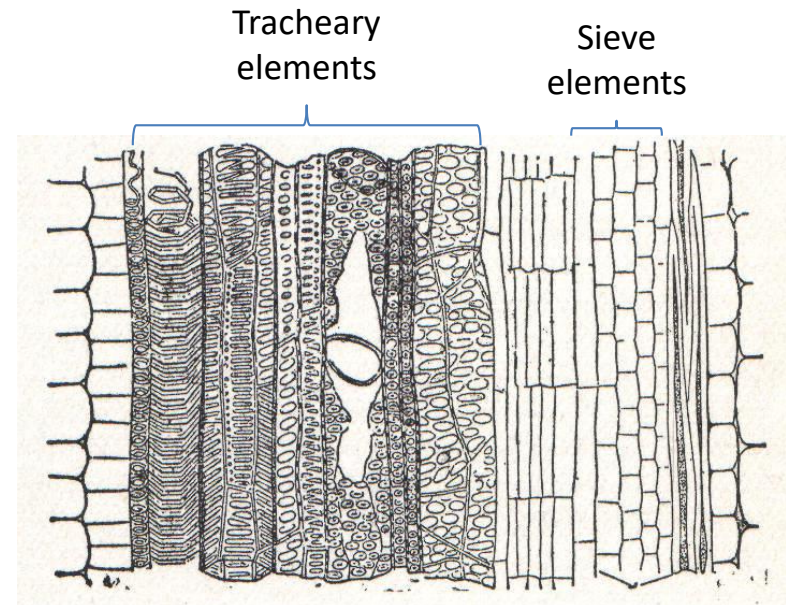
Tubes and Pipes

- Living things:
 - Canals
 - Madreporite → _____
→ _____ (ring around
center of body) →
_____ (.....) →
_____ (branch off from
lateral canals)



Tubes and Pipes

- Living things: plants
 - _____:
 - _____: living cells that actively move water into storage tissues

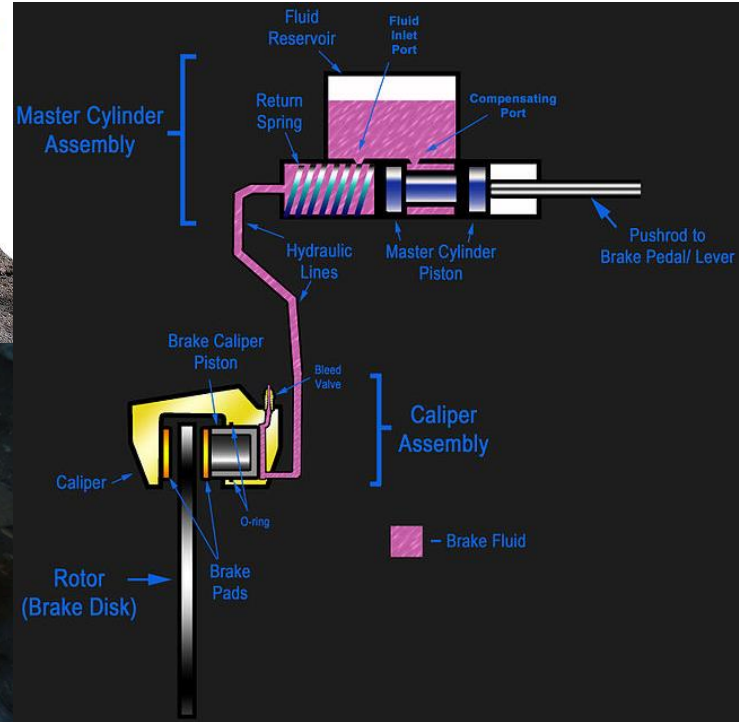


Tubes and Pipes

- Hydraulic and pneumatic systems
 - Network of pipes through which hydraulic fluid or air travels
 - _____: mainly hydraulics, but also
.....
 - _____
 - McKibben artificial muscles
 -

Tubes and Pipes

Hydraulics



Pneumatics

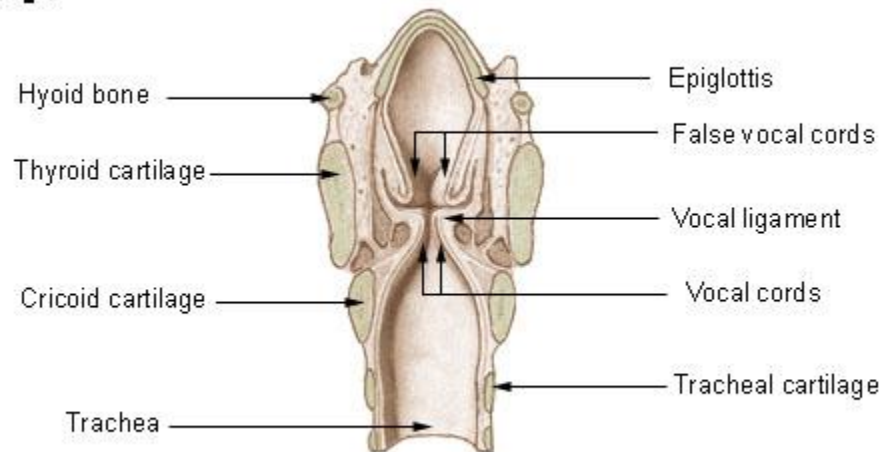


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Valves

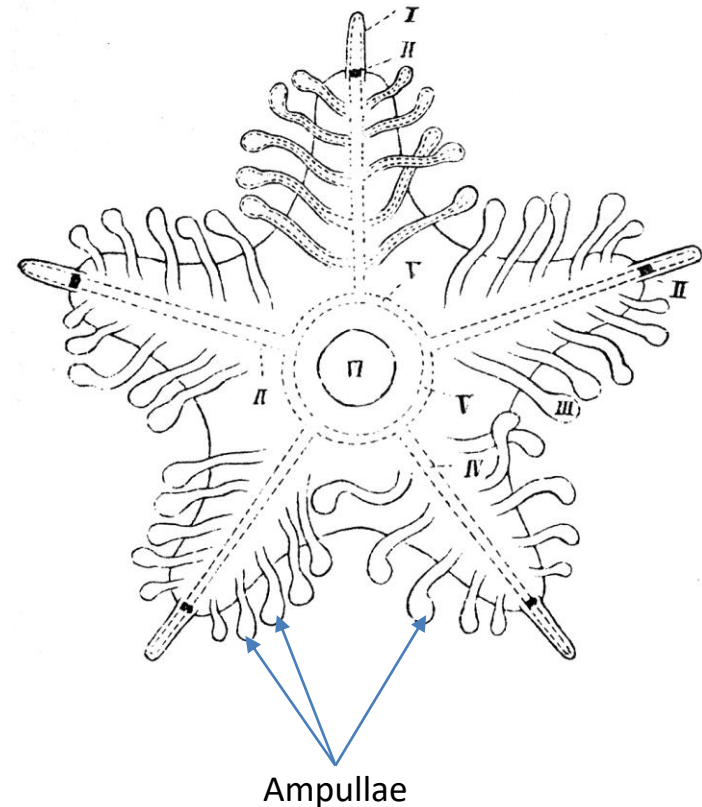
- Living things: respiratory system
 - Valve in throat (_____)
 -
 - Closed during swallowing to prevent _____

Larynx



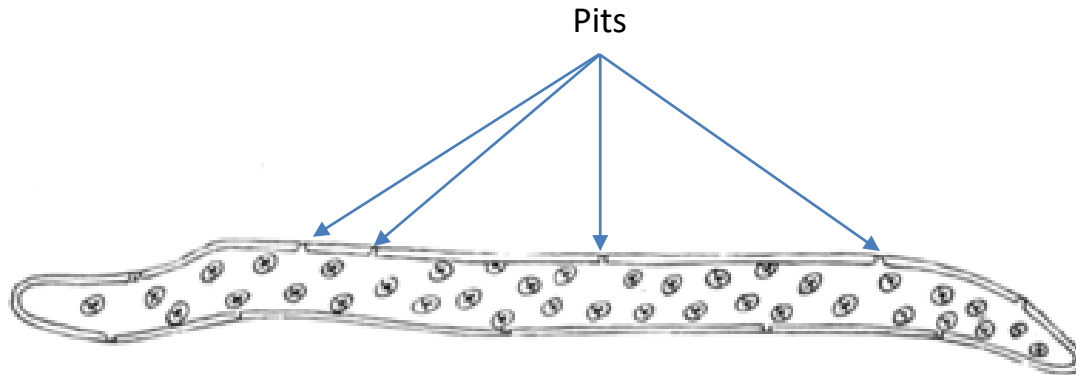
Valves

- Living things: echinoderms
 - The madreporite is a valve that determines _____
 - _____ (sacs) in tube feet



Valves

- Living things: plants
 - Pits in tracheary elements _____



Valves

- Hydraulic and pneumatic systems
 -
 - Can be opened and closed to _____
 - Can allow _____
 - Types: _____
 - Think of

Valves

- Hydraulic and pneumatic systems examples
 - in hydraulic brake systems (in cars) control the flow of hydraulic fluid _____
 - in hydraulic brake systems

 - is a valve that opens to _____

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Actuators

- Living things: tube feet
 - Water pushed into feet → _____
 - Water pulled out of feet → _____



Actuators

- Living things: plant structure and function
 - : _____
 - Water is one of the main components of photosynthesis → _____ → _____



Actuators

- Hydraulic and pneumatic systems

- _____

- Jacks

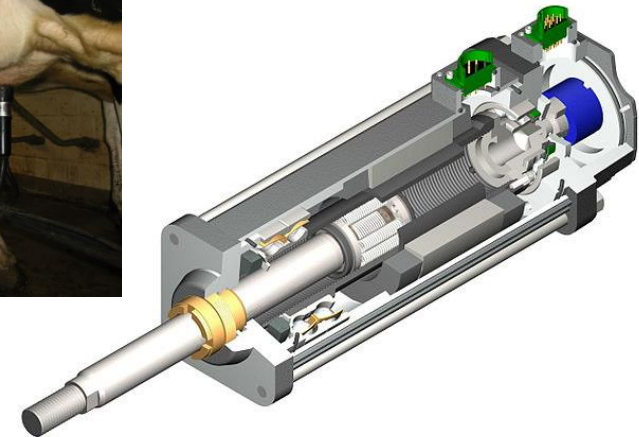
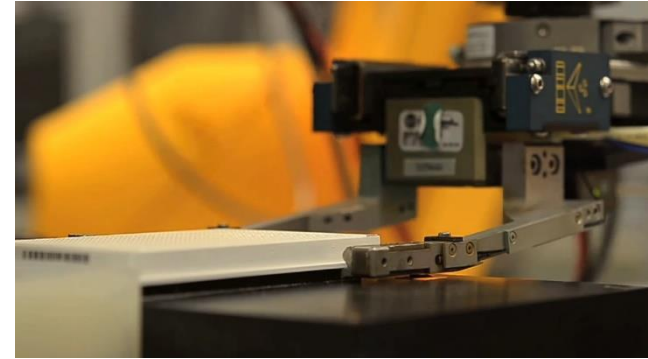
- _____

-

- _____

- Suction cups

- _____



Fluid Statics

Fluid Statics

- Static body fluids

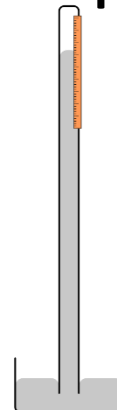
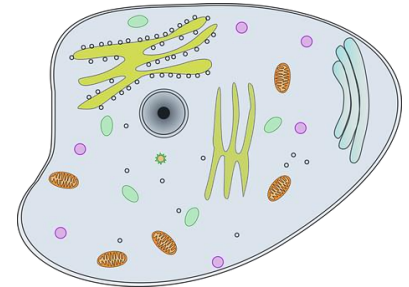
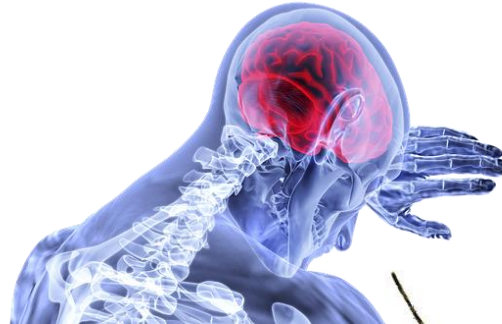
- Water-based

- _____
 - _____
 - _____
 - _____

- Gas

- Static fluids in man-made products

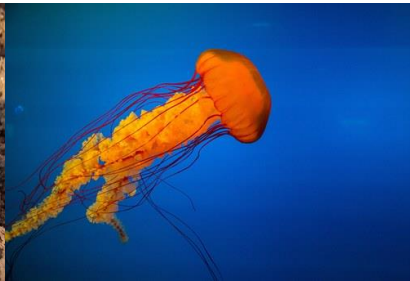
- _____
 - _____
 - _____



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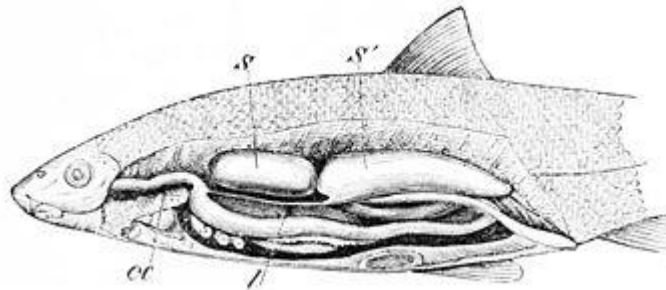
Fluid Statics

- Hemolymph _____
 - _____
 - E.g., ...; it's why their legs curl up when they die
 - _____
 - Muscles change pressure



Fluid Statics

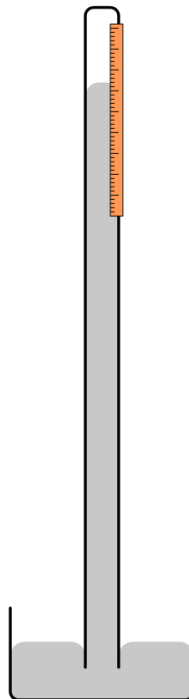
- Gas (typically oxygen) fills the _____
 - Allows → keeps them _____
 - Facilitates production and reception of sound
 - _____



Fluid Statics

- Devices used to measure

—



Fluid Statics

- Filling some structures and objects with gas causes

—

- Used for sporting events, warehouses, as temporary shelters, etc.

—

—

—

—



Fluid Statics

- Inflatable jump cushions for _____
- Bubble wrap and other inflatable plastics



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Fluid Statics

- Buoyancy

- _____ $\rightarrow$
- Fluid's upward force and object's downward force (.....) determines _____
- Objects with density _____ fluid density will float
- Objects with density _____ fluid density will sink

Fluid Statics

- Boats float because _____
 - Act like fish's swim bladder: _____
- Life jackets, _____, inflatable boats, children's floaties, _____, and _____ are also
- Hot air balloons float in air

Fluid Statics

