Human Anatomy and Physiology Notes

1. Anatomy –
2. Physiology –
3. Form follows function –
4. Levels of Organization

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1. Atoms –
2. Molecules –
3. Cells –
4. Tissues –
5. Organs –
6. Organ systems –
7. Organisms –
8. Terminology
9. Anatomical Position –
10. Superior –
11. Inferior –
12. Anterior or ventral –
13. Posterior or dorsal –
14. Proximal –
15. Distal –
16. Medial –
17. Lateral –
18. Body Cavities
19. Dorsal
20. Cranial –
21. Vertebral (spinal) –
22. Ventral
23. Thoracic –
* Pleural cavities –
* Mediastium –
* Pericardial cavity –
1. Diaphragm –
2. Abdominopelvic –
* Abdominal Cavity –
* Pelvic Cavity –

 

1. 12 Body Systems
2. Skeletal System –
3. Organs –
4. Muscular System –
5. Organs –
6. Digestive System –
7. Organs –
8. Respiratory System –
9. Organs –
10. Circulatory System –
11. Organs –
12. Nervous System –
13. Organs –
14. Endocrine System –
15. Organs –
16. Integumentary System –
17. Organs –
18. Reproductive System –
19. Organs –
20. Excretory System –
21. Organs –
22. Immune System –
23. Organs –
24. Lymphatic System –
25. Organs –
26. Tissues –
27. Histology –
28. Four types of Tissues:
29.
30. Epithelial tissue –
31. Characteristics
32.
33.
34.
35.

1. Classification
2. Number of layers
* Simple –
* Stratified –
1. Shape
* Squamous –
* Cuboidal –
* Columnar –
1. Simple Epithelial –
2. Simple Squamous Epithelium –
* Found –
1. Simple Cuboidal Epithelium –
* Found –
1. Simple Columnar Epithelium –
* Found –
1. Pseudostratified Columnar Epithelium –
* Found –
1. Stratified Epithelial –
2. Stratified Squamous Epithelium –
* Found –
1. Stratified Cuboidal Epithelium –
* Found –
1. Stratified Columnar Epithelium –
* Found –
1. Transitional Epithelium –
* Found –
1. Connective tissue –
2. Characteristics
3.
4.
5.
6.
7. Classification
8.
9.
10.
11.
12.
13.
14. Areolar tissue -
15. Found –
16. Fibrous tissue –
17. Found –
18. Adipose tissue –
19. Found –
20. Cartilage –
21. 3 types
*
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*
1. Hyaline cartilage –
* Found –
1. Elastic cartilage –
* Found –
1. Fibrocartilage –
* Found –
1. Osseous tissue –
* Found –
1. Blood tissue –
* Found –
1. Muscle tissue –
2. Characteristics
3.
4.
5.
6.
7. Classification
8.
9.
10.
11. Skeletal muscle –
12.
13.
14.
15. Smooth muscle –
16.
17.
18.
19. Cardiac muscle –
20.
21.
22.
23. Nervous tissue –
24. Characteristics
25.
26.
27.
28. Tissue Repair
29. Inflammation –
30. Regeneration –
31. Fibrosis –
32. Tissue Regeneration
33. Regenerates well –
34. Regenerates poorly –
35. No regeneration –
36. Conditions affecting repair
37. Blood supply –
38. Age –
39. Nutrition –
40. Issues with tissues
41. Cancer –
42. Benign -
43. Malignant –
44. Integumentary system -
45. Includes – skin, hair, and nails
46. Skin -
47. Functions – most important is protection
48.
49.
50.
51.
52.
53. Made of two main layers –
54. Epidermis -
55. Stratum Corneum –
56. Keratin –
* In animals, keratin also makes:
1. Replaced –
2. Stratum Germinativum –
3. Melanocytes –
4. Light and dark skin –
5. Importance of melanin –
6. Dermis –
7. Nerve endings –
8. Blood vessels –
* Hot –
* Cold –
1. Glands –
2. Sweat glands –
* Purpose –
* Smell? –
1. Sebaceous glands –
* Purpose –
* Acne –
* Blackhead –
* Whitehead –
* Pimple –
1. Hair follicle –
2. Muscles –
3. Hypodermis –
4. Issues with skin
5. Blister –
6. Callus –
7. Burns –
8. 1st degree –
9. 2nd degree –
10. 3rd degree –
11. Melanoma –
12. Warning signs
* A –
* B –
* C –
* D –
1. Hair –
2. Functions -
3.
4.
5.
6. Structure
7. Shaft –
8. Root -
9. Hair follicle –
10. Shaft layers
11. Medulla –
12. Cortex –
13. Cuticle –
14. Follicle shape –
15. Straight hair –
16. Curly hair –
17. Hair growth –
18. Nails –
19. Functions
20.
21.
22. Nail structure
23. Nail plate –
24. Nail bed –
25. Nail matrix –
26. Cuticle –
27. Lunula –
28. Nail growth -
29. Skeletal System –
30. Includes –
31. Functions
32.
33.
34.
35.
36.
37. Bone classification –
38. Long bones –
* Examples –
1. Short bones –
* Examples –
1. Flat bones –
* Examples –
1. Irregular bones –
* Examples –
1. Long bone structure
2. Periostium –
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1. Epiphyses –
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1. Epiphyseal plate –
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1. Diaphysis –
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1. Surface features
2. Projections –
3. Depressions –
4. Openings –
5. Osseous tissue
6. Osteon –
7. Central canal –
8. Lamellae –
9. Lacuna –
10. Osteocytes –
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*
1. Bone remodeling –
2. Issues with bones
3. Breaks or fractures
4. Greenstick –
5. Spiral –
6. Comminuted –
7. Transverse –
8. Compound –
9. Compression –
10. Fracture repair
11. Step 1 –
12. Step 2 –
13. Step 3 –
14. Step 4 –
15. Osteoporosis -
16. Two divisions:
17. Axial skeleton
18. Purpose –
19. Includes –
20. Skull –

- Facial bones –

- Cranium –

a. Cranium –

b. Cranial bones

* Frontal –
* Parietal –
* Occipital –
* Temporal –
* Sphenoid –
* Ethmoid –

c. Facial bones –

* Mandible –
* Maxillae –
* Zygomatic –
* Nasal –
* Lacrimal –
* Vomer –
* Palantine –
* Inferior nasal concha –

D. Vertebral column –

a. 5 divisions

* cervical vertebrae –
* thoracic vertebrae –
* lumbar vertebrae –
* sacrum –
* coccyx –

b. issues with the spine

* kyphosis –
* lordosis –
* scoliosis –

E. Ribcage –

a. sternum –

b. ribs -

* true ribs –
* false ribs –

- floating ribs –

1. Appendicular skeleton –

A. purpose –

B. Includes –

C. Pectoral girdle –

a. clavicle –

b. scapula –

D. Upper limb

a. humerus –

b. ulna –

c. radius –

E. Hand

a. carpals –

b. metacarpals –

c. phalanges -

F. Pelvic girdle –

a. illium –

b. ishium –

c. pubis –

d. Male vs. Female

* Female –
* Male -

G. Lower limb

a. femur –

b. patella –

c. tibia –

d. fibula –

H. Foot

a. tarsals –

b. metatarsals –

c. phalanges –

1. Joints –

A. classified –

B. Synovial joints -

a. joint capsule –

b. synovial membrane –

c. synovial fluid –

* Bursa –

d. joint cavity –

e. articular cartilage –

C. Types of synovial joints

a. hing –

* Examples –

b. ball and socket –

* Examples –

c. pivot –

* Examples –

d. condyloid –

* Examples –

e. plane –

* Examples –
1. saddle –
* Examples –

D. Amphiarthrosis joints –

E. Types of amphiarthrosis joints

a. Syndesmosis (fibrous) –

* Examples –

b. Symphysis (cartilaginous) –

* Examples –
1. Synarthrosis joint –
2. Types of synarthrosis joints
3. Sutures –
* Examples –
1. Gomphoses –
* Examples –
1. Ligaments –
2. Tendons –
3. Issues with joints
4. Arthritis –
5. Gout –
6. Dislocation –
7. Sprain -
8. Muscular System
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1. Characteristics
2.
3.
4.
5.
6. Functions
7.
8.
9.
10.
11. 3 main types of muscles
12. Skeletal muscle –
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1. Smooth muscle –
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1. Cardiac muscle –
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*
1. Skeletal muscle anatomy
2. Muscle –
3.
4. Fascicle –
5.
6. Muscle fiber –
7.
8. Sarcolemma –
9. Sarcoplasm –
10. Nucleus -
11. Myoglobin –
12. Mitochondria –
13. Myofibrils –
14. Myofibrils
15.
16. 2 myofilaments
* Actin –
* Myosin –
1. Sarcomeres –
2. I-band –
3. A-band –
4. H-zone –
5. Z-line –
6. Sliding Filament Theory
	1.
	2.
	3.
7. Movement
	* 1. Tendons –
8. * 1. Contracting –
		2. Relaxing –
		3.
		4.
		5. Flexor –
		6. Extensor –
		7.
		8.
9. Muscle size
10.
11. Hypertrophy –
12. Atrophy –
13. Muscle fibers and Exercise
14. Two types of fibers
15. Slow-twitch –
16. Fast-twitch –
17. Anaerobic exercise
18.
19.
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*
1.
2.
3. Aerobic exercise
4.
5.
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1.
2.
3.
4. Bodybuilding –
5. Testosterone –
* Do girls have it?
1. Steroid –
* Negative side effects –
1. Muscles of the Body
2. Naming muscles
3. Location –
* Example -
1. Shape –
* Example –
1. Size –
* Example –
1. Direction of muscle fibers –
* Example –
1. Head muscles
2. Frontalis –
3. Orbicularis Oculi –
4. Orbicularis Oris –
5. Zygomaticus –
6. Masseter –
7. Temporalis –
8. Neck and Shoulders
9. Sternocleidomastoid –
10. Platysma –
11. Trapezius –
12. Deltoid –
13. Body core
14. Pectoralis major –
15. Rectus abdominis –
16. External oblique –
17. Latissimus dorsi –
18. Gluteus maximus –
19. Arms
20. Biceps brachii –
21. Triceps brachii –
22. Brachioradialis –
23. Legs
24. Rectus femoris –
25. Sartorius –
26. Adductors –
27. Biceps femoris –
28. Gastrocnemius –
29. Soleus –
30. Tibialis anterior –
31. Issues with muscles
32. Hernia –
33. Muscular Dystrophy –
34. Tetanus –
35. Cramp –
36. Strain -
37. Nervous System -
38. Two main parts:
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*
1. CNS –

* Includes –
1. PNS –
* Includes –
1. Functions

a.

b.

c.

1. Nervous tissue -
2. Neuroglia or glial cells –
3. Astrocytes –
*
*
1. Microglia –
*

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1. Oligodendrocytes
2. Schwann cells
3. Neurons or nerve cells –
4. Sensory neurons –
* Exteroceptors -
* Proprioceptors -
* Interoceptors -
1. Inter-neurons –
2. Motor neurons –
3. Neuron structure
4. Cell body
5.
6.
7. Dendrites
8.
9.
10. Axon
11.
12.
13. Myelin sheath
14.
15.
* White matter –
* Gray matter –
1. Node of Ranvier
2.
3. Synaptic knob

a.

1. Impulse transmission –
2. Two methods
	1. Mylinated –
	2. Unmylinated –
3. Synaptic transmission –
4. Synapses –
5. Synaptic vesicles –
6. Neurotransmitters –
7. Endorphins –
8. Dopamine –
9. Serotonin –
10. Norepinephrine –
11. Receptors –
12. One way propagation
13.
14. Central Nervous System (CNS)
15. Protection
16. Bones
*
*

1. Meninges –
* Dura mater –
* Arachnoid mater –
* Pia mater –
1. Cerebrospinal Fluid (CSF)–
* Hydrocephalus –
1. The Brain
2.
3.
4.
5. Divided into 4 main parts:
6. Cerebrum
7.
8.
*
* Right brained –
* Left brained -
1. Cerebral cortex –
*
1. Divided into 4 main lobes
* Frontal lobe –
* Parietal lobe -
* Temporal lobe –
* Occipital lobe –
1. Diencephalon –
2. Thalamus
*
*
1. Hypothalamus
*

*
1. Cerebellum
2.
3.
4. Arbor vitae -
5. Brain stem
6.
7.
8. Midbrain
*
*
1. Pons
*

*
1. Medulla Oblongata
*
*
1. Limbic System
2.
3.
4. Amygdala –
5. Hippocampus –
6. Broca’s area –
7. Wernicke’s area –
8. Spinal Cord
9.

*
*

1. Gray –
2. White –
3.
4. Cauda Equina –
5. Spinal Injuries
6. Quadriplegia –
7. Paraplegia –
8. Peripheral Nervous System (PNS)
9. Types of nerves
10. Sensory nerves –
11. Motor nerves –
12. Sciatic nerve –
13. Somatic nervous system –
14. Autonomic nervous system –
15. Reflex arc –
16. Sympathetic Division –
17. Parasympathetic Division –
18. Respiratory System
19. Functions
20.
21.
22.
23.
24. Respiration –
25. Types of Respiration
26. Internal –
*
1. External –
*
1. Organs of the respiratory system
2. Nose –
3. Nasal cavity –
4. Functions
*
*
*
* Olfaction –
1. External nares –
2. Nasal septum –
*
1. Nasal conchae –
* Mucus –
* Cilia –
* Runny nose on cold day –
* Bloody nose on cold day –
*
1. Sinuses –
2. Pharynx –
3.
4.
5. Adenoids and tonsils –
* Tonsils –
* Adenoids –
1. Larynx –
2. Laryngeal prominence –
3. Glottis –
4. Epiglottis –
5. Vocal cords –
* High pitch –
* Low pitch –
* Laryngitis –
* Causes
* Boy’s voice change -
1. Trachea –
2.
3.
4. Cartilage rings –
*
*
1. Cilia –
2. Smoker’s cough –
3. Tracheotomy –
4. Primary bronchi –
5. Secondary bronchi
6.

1.
2. Bronchioles
3.
4.
5. Asthma –
6. Alveoli
7.
8.
9.
10. Surfactant –
11. Lungs
12.
13.
14. Right lung –
15. Left lung –
* Cardiac notch –
1. Pulmonary ventilation –
2. Boyle’s law –
3.
4. Inspiration –
5. Intercostals muscles
* Diaphragm –
* Intercostals –
1. Steps of inspiration
	* 1.
		2.

* + 1.
		2.
		3.
1. Expiration –
2. Steps of Expiration
	* + 1.
			2.

* + - 1.

* + - 1.
1. Lung Capacity
2. Tidal volume –
3. Expiratory reserve Volume –
4. Inspiratory Reserve Volume -
5. Vital Capacity –
6.
7. Inspiratory Capacity –
8. Residual Volume –
9. DEAD SPACE -
10. Control of Breathing –
11. Respiratory centers
12.
13.
14. Reflex control –
15. Chemoreceptor reflex –
16. If…
17. Protective reflex
18.
19.
20. External respiration –
21. Diffusion –
22. Hemoglobin
23.
24.
25.
26.
27. CO poisoning
28.
29.
30. Hyperventilating –
31. Other respiratory issues
32. Pneumonia –

1. Emphysema –
2. Cystic fibrosis –
3. Digestive System
4. Functions
5.
6.
7.
8. Alimentary Canal –
9.
10. Job –
11. Organs –
12. Accessory Digestive Organs
13. Job –
14. Organs –
15. Digestive Processes
16. Ingestion –
17. Propulsion –
18. Swallowing –
19. Peristalsis –
*
1. Mechanical digestion –
2. Chewing –
3. Churning –
4. Segmentation –
*
1. Chemical digestion –
2. Absorption –
3. Defecation –
4. Feces –
5. Organs of the Digestive System
6. **Mouth** –
7. Lips and cheeks –
8. Palete –
* Hard palete –
* Soft palete –
* Uvula –
1. **Teeth**
2.
3.
4. Incisors –
5. Canines –
6. Premolars –
7. Molars –
* Wisdom teeth –
1. Gingiva –
2. **Tongue** –
3. Jobs of tongue
*
*
*
1. Bolus –
2. Frenulum –
3. Papillae –
4. Tastebuds –
* Tastes –
1. **Salivary glands** –
2. 3 pairs
* Parotid –
* Submandibular –
* Sublingual –
1. Saliva –
2. **Pharynx** –
3.
4. **Esophagus** –
5.
6.
7. Diaphragm –
8. Lower Esophageal Sphincter –
* Heartburn –
1. **Stomach**
2.
3.
4. Functions
5.

1.
* Gastric juices

- hydrochloric acid –

- pepsin –

- mucus –

* Chyme –
1.
2. 3 Regions of the Stomach
* Fundus –

* Body –
* Pyloric region –
1. Pyloric sphincter –
2. Rugae –
3. Ulcers –
4. **Small intestine** –
5. Size –
6. 3 main parts:
7. Duodenum
*
*
* Bile
	+ - * +
				+
				+
				+
1. Jejunum
*
1. Ileum
*
*
1. Villi
*
*
*
1. **Large intestine**
2.
3.
*
*
1. Size -
2. Ileocecal valve –
3. Cecum –
4. Appendix –
* Appendicitis -
1. Colon
* Ascending –
* Transverse –
* Descending –
* Sigmoid –
1. Rectum –
2. Anus -
* Two anal sphincters:

- interior –

- exterior –

1. Digestive issues
2. Diarrhea –
3. Constipation –
4. Hemorrhoids –
5. Other accessory organs
6. Liver
7.
8.
9. Functions
*
*
*
1. Regeneration -
2. Issues with liver
* Jaundice –
* Hepatitis -
	+ - * + Hepatitis A –
				+ Hepatitis B –
				+ Hepatitis C –
* Cirrhosis –
1. Gall bladder
2.
3.
4. Gallstones
*
*
1. Pancreas
2.
3.
4. Digestive –
5. Endocrine –
* Insulin –
* Glucogon –
1. Diabetes –
2. Type 1 –
* Treatment –
1. Type 2 –
* Treatment –
1. Nutrition
2. Nutrients –
3. Calorie (kilocalorie) –
4. Carbohydrates
5.
6.
7.
8. Lipids
9.
10.
11.
12. Protein
13.
14.
15.
16. Vitamins and Minerals –
17. Water –
18. Metabolism –
19. Basic Metabolic Rate (BMR) –
20. Female –
21. Male –
22. Losing weight – 2 steps:
23.
24.
25. Body Mass Index (BMI) –

BMI = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Underweight –
2. Normal –
3. Overweight –
4. Obese –
5. Nutrition Issues
6. Obesity –
7. Bulimia –
8. Anorexia –
9. Reproduction System -

A. Gonads –

B. Roles

 a. Male –

 b. Female –

1. Male Reproductive System

A. Scrotum –

 a.

B. Testes –

 a.

 b.

 c. Seminiferous Tubules –

 d. Spermatogenesis –

*
*
*
*

C. Sperm Structure

 a. Head

* Flattened nucleus –
* Acrosome –

 b. Midpiece -

 c. Tail –

D. Epididymis –

 a.

E. Vas Deferens –

 a. vasectomy –

F. Urethra –

 a.

G. Penis –

H. Accessory Glands

 a. Seminal Vesicles –

* Releases -

-

-

 b. Prostate gland -

* Releases -

-

* Prostate cancer –

 c. Bulbourethral Glands -

* Releases -

-

I. Semen

 a.

 b.

1. Female Reproductive System

A. Ovaries -

 a.

 b.

 c. Oogenesis –

*
*
*

d. Ovulation –

B. Fimbriae –

C. Fallopian tubes –

 a.

D. Uterus –

 a.

 b. Uterus Layers

* Perimetrium –
* Myometrium –
* Endometrium –

 c. Menstration –

E. Cervix –

 a. Hysterectomy –

F. Vagina –

G. External Genitilia

 a. Labia Majora -

 b. Labia Minora –

 c. Clitoris –

1. Mammary Glands –

63. Human Development

A. Fertilization – ( )

1. Zygote –
2. Embryo –
3. Fetus –

Embryo Development

1st week –

Morula –

Blastocyst –

Implantation –

Gastrula –

Ectoderm –

Mesoderm –

Endoderm –

Amnion and chorion –

Placenta –

Umbilical cord –

5 weeks –

9 weeks –

14 weeks –

20 weeks –

32 weeks –

40 weeks –

Twins

 Identical –

 Fraternal –

Birth

1. Labor –
2. Afterbirth –
3. Circulatory System –
4. Substances transported:
5.
6.
7.
8.
9. 3 main parts:
10. Blood vessels –
11. Closed system –
12. Length –
13. 3 types of blood vessels
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1. Arteries –
2. 3 Layers
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- vasoconstriction –

- vasodialation –

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1. Largest artery –
2. Atherosclerosis –
3. Arterioles –
4. Capillaries –
5. Capillary bed –
6. Venules –
7. Veins –
8. 3 Layers -
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*
*
1. Largest Vein –
2. Valves –
3. Varicose veins –
4. Heart –
5. Chambers –
6. Upper –
* Right –
* Left –
1. Lower –
* Right –
* Left –
1. Valves –
2. Diastole –
* Tricuspid valve –
* Mitral valve –
1. Systole –
* Pulmonary valve –
* Aortic valve –
1. Double Pump –
2. Pulmonary circuit –
3. Systemic circuit –
4. Path of blood through the heart
5.
6.
7.

1.
2.
3.
4.

1.
2.
3.
4.
5.
6. Septum –
7. “blue baby” –
8. Heart Rate –
9. “Lub-dup”
* Lub –
* Dup –
1. Heart murmur –
2. Blood –
*

1. Plasma –
2. Makes up –
3. Made of –
4. Erythrocytes –
	* + 1. Shape –
			2.
			3. Job –
			4. Hemoglobin –
* Oxygen rich –
* Oxygen poor –
	+ - 1. Life span –
1. Leukocytes –
2. Size –
3. Job –
4. Types
* Monocytes –
* Lymphocytes –
* Eosinophils –
1. Thrombocytes –
2.
3. Job –
4. Clotting Process
*
*
*
*
1. Blood types –
2. A =
3. B =
4. AB =

1. O =
2. Importance -

|  |  |  |
| --- | --- | --- |
| **Blood Type** | **Can Donate To** | **Can Receive From** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. RH factor -

Rh+ =

Rh - =

1. Blood Pressure –
2. Systolic pressure –
3. Diastolic pressure –
4. Normal –
5. Other Circulatory Disorders
6. Hypertension –
7. Anemia –
* Hemorrhagic –
* Iron deficiency –
* Sickle cell –
1. Hemophilia –
2. Leukemia –
3. Excretory System –
4. Functions:
5.
* Nitrogenous wastes –

1.
2. Organs of the Excretory System
3. Kidneys –
4.
5. Aorta –
6. Renal arteries –
7. Renal veins –
8. Inferior vena cava –
9. Ureters –
10. Urinary bladder –
11. Urethra –

1. Other organs
2. Lungs –
3. Skin –
4. Microscopic view of kidneys
5. Nephron –
6. Glomerulus –
7. Bowman’s capsule –
8. Urine –
9. Colors and possible meaning
* Blue –
* Clear –
* Dark yellow –
* Orange –
* Light yellow -
* Green –
* Pink or Red –
1. Healthy Excretory system

1.
2.
3. Problems
4. Urinary Tract Infection –
5. Kidney stones –

 