

**Table 1: Kingdom Worksheet**

Kingdom	Bacteria	Archaea	Protista	Fungi	Plantae	Animalia
Cell Type	<i>prokaryotic</i>	<i>prokaryotic</i>	<i>eukaryotic</i>	<i>eukaryotic</i>	<i>eukaryotic</i>	<i>eukaryotic</i>
Cell Wall	<i>often present, contains peptidoglycan</i>	<i>present, does not contain peptidoglycan</i>	<i>exists in some, composition will vary</i>	<i>usually composed of chitin</i>	<i>composed of cellulose</i>	<i>none</i>
Body Form	<i>unicellular, some are colonial</i>	<i>unicellular, some are colonial</i>	<i>unicellular, colonial, and some simple multicellular</i>	<i>most are multicellular</i>	<i>multicellular</i>	<i>multicellular</i>
Nutrition	<i>photosynthesis, chemosynthesis and absorption (heterotrophs)</i>	<i>heterotrophs (absorption)</i>	<i>some autotrophs, some heterotrophs (ingestion and absorption) and some both</i>	<i>heterotrophs (absorption or secrete enzymes that digest food outside of itself)</i>	<i>photosynthesis</i>	<i>ingestion</i>
Nervous System	<i>absent</i>	<i>absent</i>	<i>absent</i>	<i>absent</i>	<i>absent</i>	<i>absent</i>
Reproduction	<i>asexual</i>	<i>asexual</i>	<i>asexual and sexual</i>	<i>asexual and sexual</i>	<i>asexual and sexual</i>	<i>sexual</i>
Locomotion	<i>present in some</i>	<i>present in some</i>	<i>present in some</i>	<i>none</i>	<i>none</i>	<i>distinct at some point in the life cycle</i>
Examples	<i>bacteria, cyanobacteria</i>	<i>methanogens, extreme thermophiles, extreme halophiles (organisms that live in harsh environments such as salt lakes, hot springs and animal guts)</i>	<i>algae, protozoa</i>	<i>mushrooms, yeast, bread molds</i>	<i>mosses, ferns, conifers, flowering plants</i>	<i>sponges, jellyfish, starfish, lobsters, worms, birds, mammals</i>

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<b>Kingdom</b>	<b>Bacteria</b>	<b>Archaea</b>	<b>Protista</b>	<b>Fungi</b>	<b>Plantae</b>	<b>Animalia</b>
<b>Cell Type</b>						
<b>Cell Wall</b>						
<b>Body Form</b>						
<b>Nutrition</b>						
<b>Nervous System</b>						
<b>Reproduction</b>						
<b>Locomotion</b>						
<b>Examples</b>						

**Table 2: Plants Worksheet**

Characteristics	Bryophyta	Tracheophyta		
		Ferns and fern allies	Gymnosperms	Angiosperms
<b>Vascular vs nonvascular structure</b>	<p><i>lack true roots, stems and leaves</i></p> <p><i>small in size</i></p> <p><i>transport through diffusion</i></p> <p><i>no internal support</i></p>	<p><i>vascular tissue provides support and aids in transport</i></p> <p><i>possess true roots, stems and leaves</i></p>	<p><i>vascular tissue provides support and aids in transport</i></p> <p><i>possess true roots, stems and leaves</i></p>	<p><i>vascular tissue provides support and aids in transport</i></p> <p><i>possess true roots, stems and leaves</i></p>
<b>Dependency on water</b>	<i>yes, for movement of sperm</i>	<i>yes, for movement of sperm</i>	<i>no</i>	<i>no</i>
<b>Dominant generation</b>	<i>gametophyte</i>	<i>sporophyte</i>	<i>sporophyte</i>	<i>sporophyte</i>
<b>Reproduction</b>	<p><i>depends on water for movement of sperm to egg</i></p> <p><i>no protection of egg</i></p>	<p><i>depends on water for movement of sperm to egg</i></p> <p><i>no protection of egg</i></p>	<p><i>wind and insects are used to move sperm to egg</i></p> <p><i>seed is produced in a cone that is not covered by a fruit</i></p>	<p><i>wind and insects are used to move sperm to egg</i></p> <p><i>seed is produced in a flower that is covered by a fruit</i></p>
<b>Examples</b>	<i>mosses, liverworts and hornworts</i>	<i>ferns, whisk ferns, club mosses, horsetails</i>	<i>evergreens/conifers</i>	<i>deciduous trees, heaths, roses, peas, magnolias, dandelions</i>

**Table 2: Plants Worksheet**

Characteristics	Bryophyta	Tracheophyta		
		Ferns and fern allies	Gymnosperms	Angiosperms
Vascular vs nonvascular				
Dependency on water				
Dominant generation				
Reproduction				
Examples				

**Table 3: Invertebrate Worksheet**

Characteristic	Porifera	Cnidarians (coelenterata)	Platyhelminthes	Nematoda	Annelida	Mollusca	Arthropoda	Echinodermata
<b>Symmetry</b>	<i>asymmetric</i>	<i>radial</i>	<i>bilateral</i>	<i>bilateral</i>	<i>bilateral</i>	<i>bilateral</i>	<i>bilateral</i>	<i>pentamorous radial</i>
<b>Body Cavity (Coelom)</b>	<i>none</i>	<i>none</i>	<i>none</i>	<i>present</i>	<i>present</i>	<i>present</i>	<i>present</i>	<i>present</i>
<b>Digestion</b>	<i>none</i>	<i>two way one opening</i>	<i>two way one opening</i>	<i>one way two openings</i>	<i>one way two openings</i>	<i>one way two openings</i>	<i>one way two openings</i>	<i>one way two openings</i>
<b>Reproduction</b>	<i>asexual and sexual</i>  <i>external fertilization</i>  <i>hermaphrodites</i>	<i>asexual and sexual</i>  <i>external fertilization</i>  <i>hermaphrodites and separate sexes</i>	<i>asexual and sexual</i>  <i>internal fertilization</i>  <i>hermaphrodites and separate sexes</i>	<i>sexual</i>  <i>internal fertilization</i>  <i>separate sexes and few hermaphrodites</i>	<i>sexual</i>  <i>internal fertilization</i>  <i>hermaphrodites and separate sexes</i>	<i>sexual</i>  <i>external and internal fertilization</i>  <i>hermaphrodites and separate sexes</i>	<i>sexual</i>  <i>internal fertilization</i>  <i>separate sexes and few hermaphrodites</i>	<i>sexual (some asexual)</i>  <i>external fertilization</i>  <i>separate sexes and few hermaphrodites</i>
<b>Examples</b>	<i>sponges</i>	<i>jellyfish, hydra, coral</i>	<i>planaria, tapeworm, blood flukes</i>	<i>hookworm, pinworm</i>	<i>earthworm, leech</i>	<i>clams, squid, snails</i>	<i>spiders, insects, lobster</i>	<i>starfish, sea urchin, sand dollar</i>

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Characteristic	Porifera	Cnidarians (coelenterata)	Platyhelminthes	Nematoda	Annelida	Mollusca	Arthropoda	Echinodermata
Symmetry								
Body Cavity (Coelom)								
Digestion								
Reproduction								
Examples								

**Table 4: Vertebrate Worksheet**

Subphylum Gnathostomata							
Characteristic	Subphylum Agnatha (Jawless Fish)	Class Chondrichthyes (Cartilaginous Fish)	Class Osteichthyes (Bony Fish)	Class Amphibia (Amphibians)	Class Reptilia (Reptiles)	Class Aves (Birds)	Class Mammalia (Mammals)
<b>Endoskeleton</b>	<i>cartilage (no jaw)</i>	<i>cartilage</i>	<i>cartilage and bone</i>	<i>cartilage and bone</i>	<i>cartilage and bone</i>	<i>cartilage and bone</i>	<i>cartilage and bone</i>
<b>Respiratory</b>	<i>multiple gill openings no operculum</i>	<i>multiple gill openings no operculum</i>	<i>one gill opening covered by operculum</i>	<i>gills, skin, lungs (low surface area)</i>	<i>lungs (moderate surface area)</i>	<i>lungs (air sacs, high surface area)</i>	<i>lungs (high surface area)</i>
<b>Circulatory</b>	<i>two chambered heart</i>	<i>two chambered heart</i>	<i>two chambered heart</i>	<i>three chambered heart</i>	<i>three chambered heart (incomplete septum for fourth chamber)</i>	<i>four chambered heart</i>	<i>four chambered heart</i>
<b>Reproduction</b>	<i>external fertilization and development</i>	<i>external fertilization (internal for sharks) and development</i>	<i>external fertilization and development</i>	<i>external fertilization and development</i>	<i>internal fertilization and external development</i>	<i>internal fertilization and external development</i>	<i>internal fertilization and internal development</i>
<b>Examples</b>	<i>lamprey, hagfish</i>	<i>sharks, skates, rays</i>	<i>trout, cod, salmon</i>	<i>frogs, salamanders</i>	<i>snakes, turtles</i>	<i>birds</i>	<i>humans, whales</i>

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Characteristic								
<b>Endoskeleton</b>								
<b>Respiratory</b>								
<b>Circulatory</b>								
<b>Reproduction</b>								
<b>Examples</b>								

**Table 5: Digestion Worksheet**

<b>Organ</b>	<b>Associated Glands</b>	<b>Chemical Digestion (Enzyme Action)</b>	<b>Mechanical Digestion</b>	<b>Other Secretions</b>
<b>Mouth</b>	<i>salivary glands</i>	<i>salivary amylase breaks starch into maltose</i>	<i>teeth and tongue</i>	<i>sodium bicarbonate, mucin and water</i>
<b>Stomach</b>	<i>gastric glands and pyloric glands</i>	<i>pepsin breaks proteins into shorter polypeptides</i>	<i>peristalsis 3 times a minute</i>	<i>HCl kills bacteria, breaks down cellulose, lowers pH for pepsin</i> <i>water</i> <i>mucus protects stomach</i> <i>gastrin is a hormone that controls the release of gastric juice</i>
<b>Small Intestine</b>	<i>liver and gall bladder</i>	<i>none</i>	<i>peristalsis occurs regularly to mix food and enzymes and so push food against the intestinal wall for absorption</i>	<i>bile emulsifies lipids and neutralizes chyme</i> <i>sodium bicarbonate neutralizes chyme</i> <i>mucus lubricates food mass and protects the digestive tube from enzymes</i>
	<i>pancreas</i>	<i>proteases (trypsin and chymotrypsin) further break down polypeptides from the stomach into shorter polypeptides</i> <i>erepsins break down simple polypeptides into amino acids</i> <i>lipase breaks down fats into fatty acid and glycerol</i> <i>pancreatic amylase breaks down starch into maltose</i>		
	<i>intestinal glands</i>	<i>peptidases break simpler polypeptides into amino acids</i> <i>lipase breaks down fats into fatty acids and glycerol</i> <i>maltase breaks maltose into simple sugars, sucrase breaks sucrose into simple sugars and lactase breaks lactose into simple sugars</i>		
<b>Large Intestine</b>	<i>mucus glands</i>	<i>none</i>	<i>none, any muscular action is for the movement of food</i> <i>water is reabsorbed</i>	<i>mucus to lubricate passageway</i>

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<b>Organ</b>	<b>Associated Glands</b>	<b>Chemical Digestion (Enzyme Action)</b>	<b>Mechanical Digestion</b>	<b>Other Secretions</b>
<b>Mouth</b>				
<b>Stomach</b>				
<b>Small Intestine</b>				
<b><i>Large Intestine</i></b>				