Animal and Plant Systems

Primary TEKS Supported
10A – [Reporting Category 4] – describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals

10B – [Reporting Category 4] – describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants 10C analyze the levels of organization in biological systems and relate the levels to each other and to the whole system

10C – [Reporting Category 4] – analyze the levels of organization in biological systems and relate the levels to each other and to the whole system

11A – [Reporting Category 4] – describe the role of internal feedback mechanisms in the maintenance of homeostasis

TEKS Also Supported
11C – [Reporting Category 5] – summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems

Contents of This Packet:
I. Review and Practice
II. Vocabulary Cards
III. Practice Items
IV. Sapling Instructions
Animal Body Systems:

Body systems must work together to keep an organism alive. No one individual body system can keep someone alive on its own.
1. Feedback Mechanisms: Your body is able to regulate itself and maintain homeostasis through Feedback mechanisms.
   a. Positive Feedback: Keep increasing a response until the disturbance is over
      i. Fever: Increasing body temperature until the virus/pathogen is “dead”
      ii. Child Labor: Increasing muscle contractions until the baby is born
   b. Negative Feedback: A check and balance system that will reverse the disruption or disturbance.
      i. Temperature
         1. Too Hot: the body releases sweat to cool down body temperature
         2. Too Cold: the body will begin to shiver, which means the muscles move creating heat, to warm the body up
      ii. Blood Glucose Levels
         1. The pancreas secretes insulin and glucagon in order to regulate blood glucose levels. Too high or too low glucose levels can cause the body to go into shock
      iii. Heart Rate/Pulse: The heart pumps blood carrying oxygen to the rest of the body.
         1. Exercise can cause the heart to pump quicker in order to deliver enough oxygen to the muscles to maintain the level of activity

2. Body systems work together to maintain homeostasis (which is a balance). The following below are ways systems work together in order to regulate, absorb nutrients, reproduce, and protect for injury or illness.
   a. Regulation: the following are examples of how the body regulates --
      i. Temperature: see above
      ii. Heart Rate/Pulse: see above
      iii. Breathing Rate: You can breathe faster or slower depending on the amount of oxygen you need and the amount of carbon dioxide you make as a waste and breathe out.
      iv. Blood Glucose Sugar Levels: see above
b. Nutrient Absorption: the body breaking down and absorbing nutrients from food
   i. Digestive System and Circulatory System works together
      1. The Digestive system physically (chewing food, churning food in stomach) and
         chemically (saliva, enzymes, stomach acid) breaks down food polymers into monomers
      2. Once food has been broken down and reaches the small intestines, all the broken food
         (glucose) is absorbed into the blood stream.
         a. The small intestines have microvilli which are finger-like projections that
            increase surface area in order to efficiently absorb digested food into the
            circulatory system.

3. Once the digested food gets absorbed into the circulatory system, the food travels in
   the blood streams to the muscles where the glucose (broken down food) gets converted
   into energy through Cellular Respiration in the muscle cell’s mitochondria.
   a. Cellular Respiration: Glucose + Oxygen → Water + Carbon Dioxide + ATP (energy)

c. Reproduction
   i. Endocrine System and Reproductive System works together
      1. Endocrine System creates hormones, like Estrogen and Testosterone.
      2. Female Reproductive System creates egg game and the Male Reproductive System
         creates sperm gamete cells needed in order to create new life.

d. Defense from injury or illness
   i. Many organ systems work to help protect the body
      1. Integumentary System: Skin is the main barrier between the body and outside
         environment
      2. Immune System: White blood cells seek out and destroy foreign pathogens
      3. Respiratory System: hairs in the nose and mucus helps to trap and stop particles, like
         pollen and dust from entering the body.
Plant Systems:

Just like animal systems, plants have systems that work together to keep the plants alive.

1. Plant Structures:
   a. Leaf: Capture sunlight for photosynthesis
      i. Stomata: Small openings/pores in the leaf where water (transpiration) and respiratory gases (carbon dioxide and oxygen) can move in/out of the leaf
      ii. Guard Cells: Controls and regulates when stomata opens and closes

2. Stem/Trunk: Helps support leaves; has tubes that carry water, nutrients, and food throughout the plant
   i. Xylem: tube that carries water throughout the plant, from root to leaves
   ii. Phloem: tube that carries nutrients and food -> glucose throughout the plant
c. Root: Helps to anchor the plant to the ground and absorb water for the plant to use in photosynthesis
   i. Fibrous Roots: small thin roots that are able to spread horizontally in search for water
      1. Grass
   ii. Tap Roots: a single thick root that is good at anchoring plants to the ground
      1. Ex: Carrots

2. Each plant organ helps support the plant in the following systems:

<table>
<thead>
<tr>
<th>Plant Systems</th>
<th>Organs/Structures</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>Stem and Trunk</td>
<td>Responsible for the movement of water, minerals, and food to travel to all parts of the plant</td>
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<tr>
<td></td>
<td>- Phloem</td>
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</tr>
<tr>
<td></td>
<td>- Xylem</td>
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<tr>
<td>Roots</td>
<td>- Taproot</td>
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<tr>
<td></td>
<td>- Fibrous Roots</td>
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<tr>
<td>Leaves</td>
<td>- Stomata</td>
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<tr>
<td></td>
<td>- Guard Cells</td>
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<tr>
<td>Reproduction</td>
<td>Flower</td>
<td>Responsible for the continuation of plant species by sexual or asexual means</td>
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<td>- Male Portion</td>
<td>Asexual Reproduction in Plants – Plants can reproduce by asexual (vegetative) means. Asexual plants are able to reproduce through structures such as rhizomes, plantlets, or runners. The new plants are genetically identical to the parent plant unlike sexual reproduction.</td>
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<tr>
<td></td>
<td>- Female Portion</td>
<td>Sexual Reproduction in Plants – Plants can reproduce sexually using structures found in the plant flower. The male reproductive structure produces sperm cells (pollen). The female reproductive structures include the ovule that produces the egg cells (ova).</td>
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<tr>
<td></td>
<td>- Stamen</td>
<td>Pollination - The transfer of pollen from the anthers of a flower to the stigma of the same flower or of another flower. Flowers are bright and colorful to attract pollinators like bee. Pollination is a prerequisite for fertilization: the fusion of nuclei from the pollen grain with nuclei in the ovule. Fertilization allows the flower to develop seeds which then goes through germination - the process in which a plant emerges from a seed and begins growth.</td>
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<td>- Pistil</td>
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<td>Response</td>
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<td>Allows plant to receive information from their surrounds and translate it into some type of action</td>
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<td>Hormones: can control when a plant’s reproduction process (flower)</td>
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<td>Tropisms: process where plants receive information from the environment and translate it into a response:</td>
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<td></td>
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<td>- Thigmotropism: responds to touch (vines)</td>
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<td></td>
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<td>- Phototropism: responds to light</td>
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<td></td>
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<td>- Hydrotropism: responds to water</td>
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<td></td>
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<td>- Gravitotropism: responds to gravity</td>
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