7.5C Diagram the flow of energy through living systems, including food chains, food webs, and energy pyramids.

1. A type of organism is missing from the food chain shown below.

```
Grasshoppers → Frogs → Great blue heron
```

Which statement about the type of organism that correctly completes this food chain is NOT true?
A. It produces its own food.
B. It is unable to move from one place to another.
C. It gets its energy from the sun.
D. It breaks down nutrients from decaying organisms.

2. Ecosystems can be described in terms of feeding levels, or trophic levels. Which organisms are found in the trophic level containing the greatest amount of available energy?
A. Producers
B. Primary consumers
C. Decomposers
D. Quaternary consumers

3. An ocean food chain is shown in the diagram. Which organism represents the trophic level containing approximately 1% of the initial amount of solar energy acquired by the phytoplankton?

```
0.01%  Humans

0.1%  Herring
1%  Copepods
100%  Phytoplankton
```

A. Copepods
B. Sand eels
C. Herring
D. Humans

4. The food web represents a prairie ecosystem. Students plan to draw an energy pyramid to represent the animals in this ecosystem. How many levels should students draw in their energy pyramid? **Draw your pyramid in the space provided.** Record and bubble in on the griddable.

```
Hawk → Snake → Prairie Dog → Mice → Grass
```

5. Mr. Jones draws six boxes connected by arrows to represent a food web. He instructs the class to complete the food web by cutting out pictures of organisms and placing one picture in each box. In which of these boxes should the student put a picture of a decomposer?
A. Box 1
B. Box 2
C. Box 5
D. Box 6

7.6A Identify that organic compounds contain carbon and other elements such as hydrogen, oxygen, phosphorus, nitrogen, or sulfur.

6. Which of the following is an organic compound?
A. H₂O
B. CH₄
C. CO₂
D. NaCl
7. Use the information in the data table to determine which answer includes ONLY organic substances?

<table>
<thead>
<tr>
<th>Chemical Formula</th>
<th>Name of Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaCl</td>
<td>Salt</td>
</tr>
<tr>
<td>C₆H₁₂O₆</td>
<td>Glucose (sugar)</td>
</tr>
<tr>
<td>H₂O</td>
<td>Water</td>
</tr>
<tr>
<td>H₂O₂</td>
<td>Hydrogen Peroxide</td>
</tr>
<tr>
<td>C₆H₁₀O₅</td>
<td>Potato</td>
</tr>
<tr>
<td>C₃H₁₃NO₃</td>
<td>Adrenaline</td>
</tr>
</tbody>
</table>

A. Salt, glucose, potato, adrenaline
B. Hydrogen peroxide, water, salt
C. Glucose, potato, adrenaline
D. Glucose, water, potato, adrenaline

8. Which of the following compounds would most likely be classified as being inorganic?
A. NaCl
B. C₆H₁₂O₆
C. C₆H₁₀O₅
D. CH₃CH₂CH₂COOH

7.6B Distinguish between physical and chemical changes in matter in the digestive system.

9. What is a physical change that happens in the digestive system?
A. Tearing of food into smaller pieces by the teeth.
B. Heat being released by stomach during digestion.
C. Pancreatic juices breaking down carbohydrates into simpler substances.
D. Carbohydrates being broken into smaller compounds.

10. Which step in the digestive process represents a chemical change in food?
A. Enzymes in the mouth, stomach, and small intestines breaking down large molecules
B. Storing of swallowed food in stomach
C. Churning of food, liquids, and digestive juices in the stomach
D. Peristalsis in the digestive tract

7.7A Contrast situations where work is done with different amounts of force to situations where no work is done such as moving a box with a ramp and without a ramp, or standing still.

11. A student pulled a 100 kg cart up a ramp using a force of 150 N. By the time the cart reached the top of the ramp, it had gained 980 joules of potential energy. What happened to the work the student did by pulling the cart?

A. Some of the work done on the cart became the cart’s potential energy, and some of the work was converted into heat by friction.
B. The work done on the cart was equally divided between the cart’s potential and kinetic energy.
C. All the work done on the cart was transformed into the cart’s potential energy.
D. The cart had no kinetic energy at the top of the ramp because all the work done on the cart was converted into heat by friction.

12. Keith pushed a shopping cart with a force of 4 Newtons across the parking lot to his car 25 meters away. Calculate how much work he has done.
A. No work has been done.
B. 29 Joules
C. 21 Joules
D. 100 Joules \((W=FxD)\)

13. Kevin wondered if moving a box with or without a ramp would be easier. So he moved the same box twice to the same height. In situation A he used 3N of force to move the box up the 7m ramp. Kevin moved the same box in situation B with 7N of force without a ramp straight up 3m. Compare and contrast situation A and B and choose the BEST answer.

A. More work is done in situation A with less force.
B. The same amount of work is done in both situations with situation A using less force.
C. More work is done in situation B with less force.
D. The same amount of work is done in both situations with situation B using less force.
14. John and Erin both push on a table at the same time. The table does not move. Explain what happened.
   A. The forces were unbalanced and no work was done.
   B. The forces were unbalanced and work was done.
   C. The forces were balanced and work was done.
   D. **The forces were balanced and no work was done.**

15. The diagram below shows a stationary cart on a frictionless surface. If the *unequal* opposing forces are applied to the cart at the same time, what will occur?

   ![Diagram of forces](image)

   - A. No work will be done because the cart moves to the left.
   - B. Work will be done because the cart does not move.
   - C. No work will be done because the cart does not move.
   - D. **Work will be done because the cart moves to the right.**

### 7.8C  Model the effects of human activity on groundwater and surface water in a watershed.

16. The diagram shows a residential neighborhood. The citizens of Mossy Acres are holding a town meeting to decide the best location of the new Super MegaMart store. Some citizens have concerns with the proposed location of the store. **Predict what affect runoff would have on the neighborhood lake?**

![Mossy Acres diagram](image)

   - A. The water level will decrease in the lake due to the runoff.
   - B. **The water quality will decrease, killing off several fish species.**
   - C. The water quality will improve which will increase the fish population.
   - D. The water level will increased due to water consumption.
17. Which area in the diagram is **BEST** classified as a watershed -

![Diagram](image)

**7.10C** observe, record, and describe the role of **ecological succession** such as in a microhabitat of a **garden with weeds**.

18. Which statement best describes plant growth as ecological succession proceeds in an area such as a barren farm field?

A. **The plants are few and short at the beginning and then grow taller and more numerous.**
B. Trees grow best because there are no other trees in the field to shade them out.
C. No plants will grow.
D. All different kinds of plant grow. You never know which will grow first, second and so on.

19. A non-native plant is introduced into a diverse, mature ecosystem in equilibrium. Assuming that the non-native plant has no natural enemies and that it thrives in the ecosystem, how will it affect the community?

A. The native species will become more like the new plant.
B. **The number of native species will decrease.**
C. The number of native species will not be affected at all.
D. The native species will all become extinct.

20. Which of these types of environments experiences the **LEAST** change in the total number and type of species over time?

A. An ecosystem with only pioneer species
B. An ecosystem that is in primary succession
C. An ecosystem that is in secondary succession
D. **An ecosystem with a climax community**

21. Which of these types of environments is **MOST LIKELY** to experience the arrival of pioneer species?

A. An old growth forest
B. An undisturbed prairie
C. An established mountain lake
D. **A newly formed volcanic island**

22. Mrs. March just planted tulips in her garden beside her house. Which observation would you expect to see in 6 months, if Mrs. March does not do anything else to her garden?

![Flower garden Mrs. March planted.](image)

A. More tulips will have bloomed.
B. The garden will be the same as when Mrs. March first planted it.
C. **Weeds would have choked out the tulips and became the dominate species.**
D. There will only be soil in the garden.

23. These graphs show changes in the number of species over time. Which one **BEST** represents the changes in the number of species over time as an ecosystem in secondary succession becomes a climax community?

![Graphs](image)

**7.10B** Describe how biodiversity contributes to the sustainability of an ecosystem.

24. As biodiversity _increases_, sustainability _increases_.

25. Identify which biomes are **LEAST** and **MOST** diverse?

**Tundra** – least diverse
**Rainforest/Ocean** – MOST diverse
7.11A Examine organisms or their structures such as insects or leaves and use dichotomous keys for identification.

26. Use the dichotomous key for leaves to identify the name of leaf II.
   A. Magnolia
   B. Robinia
   C. Carya
   D. Aesculus

27. Use the dichotomous key for leaves to identify the name of leaf VII.
   A. Magnolia
   B. Robinia
   C. Carya
   D. Aesculus

7.11C Identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (Geospiza fortis) or domestic animals.

   **Natural Selection** – environment chooses which traits are passed on based on which ones are best suited for the environment; **Selective Breeding** – people choose which organisms mate based on the traits they desire.

29. Identify at least 2 changes in genetic traits that have occurred over several generations through **NATURAL SELECTION**.
   - Beak size in finches; Wing color in peppered moths; Fur color in mice;

30. Identify at least 2 changes in genetic traits that have occurred over several generations through **SELECTIVE BREEDING**.
   - Temperament and fur color in domesticated animals/pets (dogs/cats); food production in farm animals and crops

7.12B Identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems.

<table>
<thead>
<tr>
<th>System</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulatory</td>
<td>Transport material in body</td>
</tr>
</tbody>
</table>
Respiratory
Breathe oxygen

Skeletal
Protect, support, movement

Muscular
Shape, movement

Digestive
Break down food, energy

Excretory
Get rid of waste

Reproductive
Offspring, survival of species

Integumentary
Protect UV/infection, sweat

Nervous
Control thinking/body/senses

Endocrine
Hormones regulate function – growth, fight/flight, hair

Urinary
Filters blood, urine waste

Immune/Lymphatic
Fights infection

<table>
<thead>
<tr>
<th>Organelle</th>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Membrane</td>
<td>Surrounds cytoplasm</td>
<td>Determines what enters &amp; exits</td>
</tr>
<tr>
<td>Cell Wall</td>
<td>Surrounds plant cell</td>
<td>Supports</td>
</tr>
<tr>
<td>Nucleus</td>
<td>Contains DNA/ chromosomes</td>
<td>Control center</td>
</tr>
</tbody>
</table>

Cytoplasm
Gel, fills cell

Mitochondrion
Double membrane, inner folds

Chloroplast
Plants cells, green

Vacuole
Varies in size; large in plant cells

Lysosome
Small, circular

Cilia
Hair-like projections

Flagellum
Tail

7.12F Recognize that according to cell theory all organisms are composed of cells and cells carry on similar functions such as extracting energy from food to sustain life.

32. List the parts of the Cell Theory with the scientist who is credited.

1. **Cells are the basic building blocks of life/structure and function.** (Schleiden & Schwann)
2. **All organisms are made of 1 or more cells.** (Schleiden & Schwann)
3. **Cells come from other cells/pre-existing cells.** (Virchow)

33. Which of the following BEST explains how cells are similar to organisms?

A. Cells and organisms are the same size.
B. **Both cells and organisms extract energy from food to sustain life.**
C. Both cells and organisms make their own food.
D. Neither cells nor organisms reproduce.

7.12D Differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole.

34.

<table>
<thead>
<tr>
<th>Description</th>
<th>Asexual</th>
<th>Sexual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 2 Parents</td>
<td>1 parent</td>
<td>2 parents</td>
</tr>
<tr>
<td>Different or Same</td>
<td>Same</td>
<td>Different</td>
</tr>
<tr>
<td>Uniform or Diverse</td>
<td>Uniform</td>
<td>Diverse</td>
</tr>
<tr>
<td>Variety or Clone</td>
<td>Clone</td>
<td>Variety</td>
</tr>
<tr>
<td>Budding or Zygote</td>
<td>Budding</td>
<td>Zygote</td>
</tr>
</tbody>
</table>

7.14B Compare the results of uniform or diverse offspring from sexual reproduction or asexual reproduction.

35. Fill in the table below. Use the words under descriptions like a word bank to fill in the asexual and sexual reproduction columns.

36. The illustrations depict two types of reproduction. Identify which of the following statements are correct.

A. Illustration A: sexual, diverse offspring; Illustration B: asexual, diverse offspring
B. Illustration A: asexual, diverse offspring; Illustration B: asexual, offspring same as parent
C. Illustration A: sexual, diverse offspring; Illustration B: asexual, offspring same as parent
D. Illustration A: sexual, offspring same as parent; Illustration B: sexual, diverse offspring

7.14C recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus.
37. Heredity material is found in each body cell of organisms. List in order the specific location where heredity material would be located, starting with a cell. (Word Bank: DNA, Nucleus, Gene, Chromosome)

Cell → **Nucleus** → **Chromosome** → **DNA** → **Gene**