

## Science ISAT: General Science - Biology

Skills: Understand the relationship between matter, energy, and organization to trace matter as it cycles and energy as it flows through living systems and between living systems and the environment

**Students:**

**RIT Above 240:**

- Describes how mRNA is transcribed from DNA
- Differentiates between biomolecules in terms of structure and function within the cell

**Students:**

**RIT 231-240:**

- Classifies living things as producers (term not defined)
- Compares the function of mitochondria and chloroplast within the cell
- Orders the molecules and organelles involved in the stages of protein synthesis
- Compares photosynthesis and respiration in terms of reactants and products
- Describes the structure of lipids
- Describes the structure of amino acids and proteins
- Predicts how interaction of biotic and abiotic factors will affect an ecosystem
- Recognizes that population size fluctuates depending on relative rates of birth, death, emigration, and immigration
- Recognizes that producers convert light energy into chemical energy
- Describes the organization of a pyramid of biomass

**Students:**

**RIT 221-230:**

- Classifies living things as producers (term defined)
- Describes the characteristics shared by all living organisms
- Infers that most cell functions involve chemical reactions
- Describes the role of enzymes in cellular reactions
- Describes the structure and mechanism of action of enzymes
- Describes the chemical reactions used by the cell in respiration
- Compares respiration in plant and animal cells
- Compares the process of anaerobic respiration in different organisms
- Compares the processes of photosynthesis and respiration
- Predicts how interaction of biotic and abiotic factors will affect an ecosystem
- Explains that organisms occupying the same niche may compete for resources
- Compares types of symbiosis (commensalism, mutualism, parasitism)
- Classifies an interaction between species as symbiosis
- Applies the idea that all members of a species that occur in the same place at the same time comprise a population
- Recognizes factors that affect the number of organisms an ecosystem is able to support
- Recognizes that living organisms are capable of producing populations of infinite size, but are limited by the amount of resources available in the environment (i.e., carrying capacity and limiting factors)
- Identifies biotic factors in an environment that affect population density
- Classifies abiotic and biotic factors in an environment
- Describes responses of an ecosystem to the events that cause it to change
- Recognizes that plants convert light energy into stored energy
- Classifies organisms according to the function they serve in a food chain
- Explains why numbers of organisms decrease as trophic level within a food chain increases
- Predicts which link in a food chain will be made up of the fewest number of organisms
- Recognizes that food webs are comprised of more than one food chain
- Recognizes that individual food chains occur within a food web
- Recognizes that the Sun's energy from millions of years ago is trapped in fossil fuels

**Students:**

**RIT 211-220:**

- Makes inferences about the roles of heterotrophs and autotrophs
- Classifies living things as producers (term defined)
- Defines metabolism as the sum of chemical reactions in the body
- Describes the role of enzymes in digestion
- Explains that cells obtain food and oxygen from the outside environment
- Describes the process of photosynthesis in terms of its location within the cell, reactants, and products
- Recognizes that oxygen is an essential product of photosynthesis
- Gives examples of carbohydrates
- Classifies biomolecules as carbohydrates
- Defines ecology as the interaction of living things with each other and with the non-living (abiotic) environment
- Describes how plants and animals in an ecosystem interact with each other
- Makes inferences about the effect of changes to a predator-prey relationship
- Explains that different species occupying the same environment may compete, if their needs are similar and resources are limited
- Applies the idea that all members of a species that occur in the same place at the same time comprise a population
- Predicts how biotic factors will affect population density
- Recognizes abiotic and biotic factors can affect all levels of an ecosystem, from individual to community

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	<ul style="list-style-type: none"> <li>• Describes how capture of light by plants serves as the basis of all food chains</li> <li>• Explains how organisms are related within food chains</li> <li>• Infers how changes in one portion of a food chain will affect other parts of the food chain</li> <li>• Explains why numbers of organisms decrease as trophic level within a food chain increases</li> <li>• Predicts which link in a food chain will be made up of the fewest number of organisms</li> <li>• Describes how producers, carnivores, herbivores and decomposers interact to form a food chain</li> <li>• Explains that batteries change chemical energy into electrical energy</li> </ul>
<b>Students:</b>	<p><b>RIT 201-210:</b></p> <ul style="list-style-type: none"> <li>• Classifies living things based on role played within ecosystem</li> <li>• Classifies living things as decomposers</li> <li>• Classifies living things as herbivores</li> <li>• Predicts how oxygen and carbon dioxide levels within a system are affected by respiration</li> <li>• Recognizes that photosynthesis is the process plants use to produce food using the energy of the Sun</li> <li>• Gives examples of lipids</li> <li>• Describes how environmental conditions affect the growth of plants</li> <li>• Explains how animals depend on plants</li> <li>• Explains that without plants (or other producers such as algae) animals could not survive on Earth</li> <li>• Makes inferences about the effect of changes to a predator-prey relationship</li> <li>• Describes cooperation within species</li> <li>• Describes parasite/host relationship</li> <li>• Evaluates problems associated with population growth (e.g., waste disposal, supply of food, control of disease, resource availability, transportation)</li> <li>• Analyzes factors that influence the size and stability of populations within ecosystems</li> <li>• Describes the role of biotic factors in limiting the size of populations</li> <li>• Gives examples of foods produced by plants</li> <li>• Explains how energy is supplied to an ecosystem primarily as sunlight</li> <li>• Describes how energy flows through a food web, from producers to consumers</li> <li>• Builds a simple food chain, using a given set of organisms</li> <li>• Recognizes the producer in a food chain</li> <li>• Differentiates between consumers that eat plants and consumers that eat other consumers</li> <li>• Understands that the role of a decomposer is to recycle matter from dead plants and animals</li> <li>• Gives examples of decomposers</li> <li>• Matches a decomposer to its specific role in an ecosystem</li> <li>• Describes the organization of a pyramid of numbers</li> </ul>
<b>Students:</b>	<p><b>RIT 191-200:</b></p> <ul style="list-style-type: none"> <li>• Classifies living things as carnivores</li> <li>• Classifies living things as plant eaters</li> <li>• Infers the type of resources needed for an animal to survive</li> <li>• Recognizes that energy is required for the chemical reactions in cells to occur</li> <li>• Recognizes that plants and animals are often hidden</li> <li>• Classifies a species interaction as a predator-prey relationship</li> <li>• Infers effects of animals' interaction with plants on the life of the animal</li> <li>• Recognizes that food chains (generally) begin with a plant</li> <li>• Describes the organization of a simple food web</li> <li>• Explains that green plants can make their own food from sunlight</li> <li>• Locates the producer in an ecological pyramid</li> </ul>
<b>Students:</b>	<p><b>RIT 181-190:</b></p> <ul style="list-style-type: none"> <li>• Classifies living things as carnivores</li> <li>• Compares basic needs of different organisms in their environment</li> <li>• Recognizes the importance of oxygen to the survival of animals</li> <li>• Sorts organisms and objects as living or non-living</li> <li>• Differentiates among living and nonliving things</li> <li>• Gives examples of foods that come from plants</li> </ul>
<b>Students:</b>	<p><b>RIT 171-180:</b></p> <ul style="list-style-type: none"> <li>• Identifies habitats of various organisms</li> <li>• Explains that to be able to live and grow, plants and animals require resources (e.g., food, water, light, and air)</li> <li>• Describes the basic needs of plants and animals</li> </ul>
<b>Students:</b>	<p><b>RIT Below 171:</b></p> <ul style="list-style-type: none"> <li>• <i>No Skills Listed</i></li> </ul>