

Bioenergy Basics 101 Game

Categories:

Category 1: Fun in the Sun

Category 2: The Raw Materials

Category 3: From Field to Pump

Category 4: Fueling the Future

Category 5: Check Your Source

Category 6: Biobenefits

Category Values: 100 points; 200 points; 300 points; 400 points; 500 points

Category 1

Category 1, Fun in the Sun; 100 points

Question: The process in plants where light energy is converted to chemical energy is referred to as .

Answer: Photosynthesis

Category 1, Fun in the Sun; 200 points

Question: These are the three things that are required for photosynthesis to proceed.

Answer: Carbon dioxide (CO₂), light energy, and water

Category 1, Fun in the Sun; 300 points

Question: These are the two end products of photosynthesis.

Answer: Oxygen and sugar (i.e., glucose)

Category 1, Fun in the Sun; 400 points

Question: This is a complex sugar compound that is used to store future energy needs or to build new tissues, and is created from excess glucose from photosynthesis. It is also the most common carbohydrate in the human diet.

Answer: Starch

Category 1, Fun in the Sun; 500 points

Question: This organic compound is the main component of plant cell walls, providing structural support and preventing cell damage.

Answer: Cellulose

Category 2

Category 2, The Raw Materials; 100 points

Question: is an energy resource derived from plant-and algae-based material that can be converted to fuels, chemicals, or power.

Answer: Biomass

Category 2, The Raw Materials; 200 points

Question: These are a diverse group of primarily aquatic organisms that lack true roots, stems, and leaves, and can turn sunlight into energy through photosynthesis.

Answer: Algae

Category 2, The Raw Materials; 300 points

Question: The energy stored in biomass can be released to produce what three forms of usable energy?

Answer: Electricity, thermal energy (heat), and transportation fuels

Category 2, The Raw Materials; 400 points

Question: First generation biofuels are produced from these types of biomass.

Answer: Feed crops, food crops (e.g., corn) and vegetable or animal fats and oils

Category 2, The Raw Materials; 500 points

Question: Second generation or advanced biofuels are produced from these types of biomass.

Answer: Non-food/feed/fiber biomass (e.g., corn stover, perennial grasses, forest residues, and algae)

Category 3

Category 3, From Field to Pump; 100 points

Question: Ethanol is a renewable fuel made from this class of macromolecules that contain sugars and starch.

Answer: Carbohydrates

Category 3, From Field to Pump; 200 points

Question: Biodiesel is a renewable fuel that can be manufactured from plant or animal-based fats and oils. Oils and fats are considered this class of macromolecules.

Answer: Lipids

Category 3, From Field to Pump; 300 points

Question: This is the process carried out by yeast in which simple sugars are converted to ethanol and carbon dioxide.

Answer: Fermentation

Category 3, From Field to Pump; 400 points

Question: Cellulase, which breaks down cellulose molecules into simple sugars, is an example of this class of protein that accelerates chemical reactions.

Answer: Enzymes

Category 3, From Field to Pump; 500 points

Question: Renewable gasoline, jet fuels, and diesel fuels are composed primarily of molecules containing atoms of hydrogen and carbon, which are classified as this type of compound.

Answer: Hydrocarbons

Category 4

Category 4, Fueling the Future; 100 points

Question: What is the end product when biomass is converted directly into a liquid fuel.

Answer: Biofuel

Category 4, Fueling the Future; 200 points

Question: Ethanol is typically mixed with this type of transportation fuel in blends of E10, E15, or E85 (depending on the percentage of ethanol).

Answer: Gasoline

Category 4, Fueling the Future; 300 points

Question: These are the two most common types of biofuels used in the United States today.

Answer: Ethanol and Biodiesel

Category 4, Fueling the Future; 400 points

Question: This term is given to biofuels that can be used to power transportation in the airline industry.

Answer: Sustainable Aviation Fuel

Category 4, Fueling the Future; 500 points

Question: Another name for biomass-derived renewable hydrocarbon fuels that are compatible with existing cars, trucks, jets, and infrastructure, and serve as a direct replacement for petroleum-derived gasoline, jet fuels, and diesel fuels.

Answer: "Drop-in" fuels

Category 5

Category 5, Check Your Source; 100 points

Question: In the United States, this is the most widely used energy resource for transportation.

Answer: Petroleum

Category 5, Check Your Source; 200 points

Question: Biomass is this type of energy source as it can be replaced naturally and used again.

Answer: Renewable

Category 5, Check Your Source; 300 points

Question: Coal, petroleum, and natural gas are considered this type of resource as their supplies are finite.

Answer: A non-renewable resource, or fossil fuel

Category 5, Check Your Source; 400 points

Question: Biomass materials can be turned into these, which are renewable alternatives to products derived from petroleum or natural gas, and include plastics, fertilizers, lubricants, and industrial chemicals.

Answer: Bioproducts

Category 5, Check Your Source; 500 points

Question: The materials that go into the production of bioenergy and bioproducts are called ____.

Answer: Feedstocks

Category 6

Category 6, Biobenefits; 100 points

Question: The term that is used to describe a gradual increase in the average temperature of the earth's atmosphere (and can lead to changes in global climate patterns).

Answer: Climate change, or global warming

Category 6, Biobenefits; 200 points

Question: Using biofuels can reduce life-cycle _____ emissions. This is a type of gas that traps heat in the atmosphere.

Answer: Greenhouse gas

Category 6, Biobenefits; 300 points

Question: This is the primary or most abundant greenhouse gas that is contributing to recent climate change.

Answer: Carbon dioxide (CO₂)

Category 6, Biobenefits; 400 points

Question: This is what is referred to as “the ability to meet the needs of the present without compromising the ability of future generations to meet their needs,” or “the ability to maintain biodiversity, renewability, and resource productivity in an ecosystem over time.”

Answer: Sustainability

Category 6, Biobenefits; 500 points

Question: Diverting waste from landfills to use in bioenergy production reduces total emissions of this gas and reduces the size of landfills.

Answer: Methane