

Plant Physiology Quiz Questions and Answers PDF

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Which process in plants involves the conversion of glucose into energy?

- Photosynthesis
- Transpiration
- Respiration ✓
- Germination

The process in plants that converts glucose into energy is called cellular respiration. This process allows plants to utilize the glucose produced during photosynthesis to generate ATP, the energy currency of the cell.

Which plant hormone is primarily involved in promoting cell elongation?

- Ethylene
- Cytokinin
- Auxin ✓
- Abscisic acid

Auxin is the primary plant hormone responsible for promoting cell elongation, which is crucial for plant growth and development. It influences various growth processes by regulating cell division and elongation in response to environmental stimuli.

What is the primary function of the xylem in plants?

- Transport of nutrients
- Transport of water ✓
- Photosynthesis
- Respiration

The xylem is primarily responsible for the transport of water and dissolved minerals from the roots to the rest of the plant. It also provides structural support due to its lignified cell walls.

Explain the role of chlorophyll in the process of photosynthesis.

Chlorophyll absorbs light energy, primarily in the blue and red wavelengths, which is then used to convert carbon dioxide and water into glucose and oxygen during photosynthesis.

Describe the role of mitochondria in plant respiration and energy production.

The role of mitochondria in plant respiration and energy production is to convert glucose and oxygen into ATP through cellular respiration.

Which organelle is known as the powerhouse of the cell, crucial for respiration?

- Chloroplast
- Mitochondria ✓
- Nucleus
- Ribosome

The mitochondrION is the organelle responsible for producing energy through the process of cellular respiration, making it essential for the cell's energy needs.

Discuss the importance of transpiration in plant physiology.

Transpirational water loss in plants is essential for nutrient transport, cooling the plant, and maintaining turgor pressure, which supports overall plant structure and function.

Which of the following are essential micronutrients for plants? (Select all that apply)

- Iron ✓
- Zinc ✓
- Copper ✓
- Magnesium

Essential micronutrients for plants include elements like iron, manganese, zinc, copper, molybdenum, boron, and chlorine. These nutrients are crucial for various physiological functions and overall plant health.

Which plant hormones are involved in regulating plant growth? (Select all that apply)

- Auxins ✓
- Gibberellins ✓
- Cytokinins ✓
- Ethylene ✓

Plant hormones such as auxins, gibberellins, cytokinins, abscisic acid, and ethylene play crucial roles in regulating various aspects of plant growth and development.

What is the main product of the Calvin cycle in photosynthesis?

- Oxygen
- Glucose ✓
- ATP
- NADPH

The main product of the Calvin cycle is glucose, which is a simple sugar that serves as an energy source for plants. This process occurs in the stroma of chloroplasts and is essential for converting carbon dioxide into organic compounds.

What type of tropism is a plant exhibiting when it grows towards light?

- Gravitropism
- Thigmotropism
- Phototropism ✓**
- Hydrotropism

Plants that grow towards light are exhibiting phototropism, which is a growth response to light direction. This behavior allows plants to maximize their exposure to sunlight for photosynthesis.

Which processes are involved in plant responses to environmental stimuli? (Select all that apply)

- Phototropism ✓**
- Gravitropism ✓**
- Thigmotropism ✓**
- Hydrotropism ✓**

Plants respond to environmental stimuli through various processes including phototropism, gravitropism, and thigmotropism, which involve growth and movement towards or away from stimuli such as light, gravity, and touch.

How do plants adapt to drought conditions at the physiological level?

Plants adapt to drought conditions at the physiological level by closing their stomata to minimize water loss, increasing root depth to access deeper water sources, and producing osmoprotectants to help retain cellular water.

What are the components of water potential in plants? (Select all that apply)

- Solute potential ✓
- Pressure potential ✓
- Gravitational potential
- Osmotic potential ✓

Water potential in plants is determined by two main components: solute potential and pressure potential. These factors together influence the movement of water within plant cells and tissues.

Describe how plant hormones interact with environmental cues to regulate growth.

Plant hormones regulate growth by responding to environmental cues; for example, auxins promote cell elongation in response to light (phototropism) and gravity (gravitropism), while gibberellins stimulate seed germination and flowering in response to water availability.

What is the primary pigment responsible for capturing light energy in photosynthesis?

- Carotenoids
- Chlorophyll ✓
- Anthocyanins
- Xanthophylls

The primary pigment responsible for capturing light energy in photosynthesis is chlorophyll. It absorbs light most efficiently in the blue and red wavelengths, facilitating the conversion of light energy into chemical energy.

Which of the following is a macronutrient essential for plant growth?

- Iron
- Zinc
- Nitrogen ✓
- Manganese

Macronutrients are essential elements required in large quantities for plant growth, including nitrogen, phosphorus, and potassium. These nutrients play critical roles in various physiological processes within

the plant.

Explain the process of nutrient uptake in plant roots.

The process of nutrient uptake in plant roots begins with the absorption of water and dissolved nutrients through root hairs. This occurs primarily through osmosis and active transport, where plants utilize energy to move nutrients against their concentration gradient, often aided by mycorrhizal fungi that enhance nutrient availability.

Which of the following are factors affecting photosynthesis? (Select all that apply)

- Light intensity ✓
- Soil pH
- Carbon dioxide concentration ✓
- Temperature ✓

Photosynthesis is influenced by several factors including light intensity, carbon dioxide concentration, temperature, and water availability. These factors can enhance or limit the rate of photosynthesis in plants.

Which of the following are stages of plant growth and development? (Select all that apply)

- Germination ✓
- Vegetative growth ✓
- Pollination
- Flowerin ✓

The stages of plant growth and development typically include germination, seedling, vegetative, flowering, and fruit development. Each stage represents a critical phase in the life cycle of a plant, contributing to its overall growth and reproduction.