

UNIT 2 LESSON 10 AND 11 ANSWERS TO HOMEWORK ON THE

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Unit 2 Lesson 10 and 11: The Immune System Homework Answers

Question 1:

Describe the three different types of immunity.

Answer:

- **Innate immunity:** Provides immediate, non-specific protection against pathogens through physical barriers, natural killer cells, and phagocytes.
- **Acquired immunity:** Specific, long-lasting protection developed through exposure to antigens and involving the production of antibodies and T cells.
- **Passive immunity:** Short-term protection acquired from antibodies or T cells obtained from another individual (e.g., through breast milk or vaccination).

Question 2:

Explain the role of antibodies in the immune response.

Answer:

Antibodies are proteins produced by B cells that recognize and bind to specific antigens on the surface of pathogens. They neutralize pathogens by preventing them from attaching to cells, activating complement, or opsonizing them for phagocytosis.

Question 3:

Describe the different types of T cells and their functions.

Answer:

- **Helper T cells (Th cells):** Recognize antigens presented by antigen-presenting cells (APCs) and activate B cells, cytotoxic T cells, and macrophages.
- **Cytotoxic T cells (Tc cells):** Kill infected cells by releasing cytotoxic granules and perforins that puncture the cell membrane.
- **Regulatory T cells (Treg cells):** Suppress immune responses and prevent excessive inflammation.

Question 4:

Explain the process of antigen presentation.

Answer:

Antigen presentation occurs when APCs (macrophages, dendritic cells) take in pathogens, break them down, and display fragments of their antigens on their cell surface, bound to MHC molecules. These MHC-antigen complexes are then recognized by T cells, which become activated.

Question 5:

Describe the role of cytokines in the immune response.

Answer:

Cytokines are signaling molecules released by immune cells that regulate the immune response. They activate and coordinate the actions of different immune cells, promote cell growth and differentiation, and regulate inflammation. For example, interleukin-2 (IL-2) activates T cells, while interferon-gamma (IFN- γ) activates macrophages and enhances cytotoxic T cell function.

Understanding Spin Hall Effect and Spin Orbit Torques

What is the Spin Hall Effect?

The spin Hall effect is a phenomenon in which a charge current can generate a perpendicular spin current. This occurs when electrons are deflected in a material due to their spin, resulting in a net spin accumulation. The spin Hall effect is a spin-charge conversion process that plays a crucial role in spintronics, a field that explores the spin of electrons for information processing.

What are Spin Orbit Torques?

Spin orbit torques (SOTs) are torques that act on electrons due to the interaction between their spin and the electric fields in the material. These torques can be generated by various mechanisms, including the spin Hall effect. SOTs are essential for controlling the magnetization in magnetic materials, which is critical for applications such as magnetic memory and logic devices.

How Do Spin Hall Effect and SOTs Relate?

The spin Hall effect and SOTs are closely interconnected. The spin Hall effect generates a spin current that can induce SOTs in neighboring magnetic layers. This spin current-induced SOT can modify the magnetization of the magnetic layers, enabling efficient and low-energy magnetization switching.

Applications of Spin Hall Effect and SOTs

Spin Hall effect and SOTs have numerous applications in spintronics. They are used for:

- Magnetic memory: SOTs enable fast and energy-efficient switching of magnetic bits in memory devices, such as spin-transfer torque magnetic random-access memory (STT-MRAM).
- Logic devices: SOTs can be used to implement logic operations in spintronic devices, such as spin logic gates and spin field-effect transistors (FETs).
- Sensors: The spin Hall effect can be utilized for spin-polarization detection, which is crucial for magnetic field sensing and quantum computing.

Conclusion

Spin Hall effect and spin orbit torques are essential phenomena in spintronics. They enable the manipulation of electron spin, which opens up new possibilities for low-energy and high-performance electronic devices. The understanding and application of these effects are expected to revolutionize the field of computing and sensing.

Workbook Answers: Summit 1 Second Edition

Unit 1

1. Complete the dialogues with the words in the box.

- always
- anymore
- ever
- never
- often
- rarely
- sometimes
- usually

Dialog 1: A: Do you like to play tennis? B: No, I don't play it ____.

Dialog 2: A: Do you go to the movies? B: Yes, I go to the movies ____.

2. Write questions with the prompts provided.

- play / video games? A: _____. B: Yes, I play video games.
- go / out? A: _____. B: Yes, I often go out.

Unit 2

1. Complete the sentences with the correct verb form.

- present continuous

- simple present

Sentence 1: I ___(study) English at the moment.

Sentence 2: She ___(not / work) on Saturdays.

2. Write questions with the prompts provided.

- what / do / you / do? A: ___. B: I'm a teacher.
- how / often / you / go / to the gym? A: ___. B: I go to the gym three times a week.

Unit 3

1. Circle the correct options.

- He's / He is working in a restaurant.
- She doesn't / doesn't like coffee.
- Can / Do you speak English?

2. Write sentences using the words in the box.

- but
- on the other hand
- however

Sentence 1: I like coffee, ___, I don't like tea.

Sentence 2: He's a good student ___, he's not very organized.

Unit 4

1. Complete the story with the words in the box.

- finally
- first

- next
- then

Story: ___, I went to the store. ___, I bought some groceries. ___, I came home. ___, I cooked dinner.

2. Write questions with the prompts provided.

- what / you / do / yesterday? A: ___. B: I watched a movie.
- what / the weather / like / tomorrow? A: ___. B: The weather will be sunny tomorrow.

Unit 5

1. Circle the correct words to complete the sentences.

- I'm / My name is John.
- How / What are you?
- Where / What do you live?

2. Write sentences using the words in the box.

- too
- enough
- very

Sentence 1: The coffee is ___ hot.

Sentence 2: I'm ___ tired to go out.

Sentence 3: I don't have ___ money to buy a car.

Writing Frames for the Interactive Whiteboard: Quick and Easy Lessons for Narrative and Descriptive Writing

The interactive whiteboard has revolutionized the way teachers deliver instruction, providing students with engaging and interactive experiences. When it comes to writing, writing frames offer a valuable tool for guiding students through the writing process, especially in the genres of narrative and descriptive writing.

What are Writing Frames?

Writing frames are templates or scaffolds that provide students with a structured approach to writing. They typically consist of a series of prompts or questions that guide students through the development of their ideas and the organization of their writing.

How to Use Writing Frames with the Interactive Whiteboard

Using writing frames with an interactive whiteboard is straightforward. Teachers can display the writing frame on the board for students to follow. Students can interact with the frame by typing directly onto it or using a stylus to write. The whiteboard allows students to collaborate and share their ideas, enhancing the writing experience.

Benefits of Using Writing Frames

Writing frames offer numerous benefits for students, including:

- **Guided Writing:** They provide students with a structured approach to writing, helping them to develop ideas and organize their thoughts.
- **Scaffolding:** They scaffold students' learning by providing support at appropriate levels, allowing them to develop their writing skills gradually.
- **Differentiation:** Different writing frames can be used to meet the varying needs of students, ensuring that all students are challenged appropriately.

Quick and Easy Lessons with Writing Frames

Teachers can create quick and easy lessons using writing frames that guide students to write narrative and descriptive texts. For example:

- **Narrative Writing:** A writing frame could include prompts such as "Who was the main character?" "What was the problem?" and "How was the problem solved?"
- **Descriptive Writing:** A writing frame could include prompts such as "Describe the setting in detail," "What did you see, hear, and smell?" and "What emotions did you experience?"

Conclusion

Writing frames are a valuable tool for teachers using interactive whiteboards to teach narrative and descriptive writing. They provide students with guided instruction, scaffolding, and differentiation, enhancing their writing skills and making the writing process more engaging and interactive.

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