

Active And Passive Transport Worksheet

Active and Passive Transport Worksheet: A Comprehensive Guide for Students

Introduction

Active and passive transport worksheet is an essential educational resource for students studying cell biology. These worksheets are designed to help learners understand the fundamental mechanisms by which substances move across cell membranes. Mastery of these concepts is critical for grasping cellular function, physiology, and the overall health of living organisms. Whether you're a student preparing for exams or a teacher seeking effective teaching tools, understanding the nuances of active and passive transport is vital. This article provides an in-depth overview of these processes, along with insights into how worksheets can enhance learning.

What is Active Transport?

Definition and Overview

Active transport is a biological process that moves molecules or ions against their concentration gradient, from a region of lower concentration to a region of higher concentration. Unlike passive processes, active transport requires energy input, usually in the form of adenosine triphosphate (ATP). This process is vital for maintaining cellular homeostasis, nutrient absorption, and waste removal.

Key Characteristics of Active Transport

1. Energy-Dependent: Requires ATP or another form of energy.
2. Against Gradient: Moves substances from low to high concentration.
3. Specificity: Often involves specific transport proteins or pumps.
4. Examples include:
5. Sodium-potassium pump
6. Proton pump
7. Calcium pump

The Role of Active Transport in Cells

Active transport is crucial for various cellular functions, such as:

1. Maintaining ion gradients essential for nerve impulses.
2. Regulating cell volume.
3. Absorbing nutrients in the intestines.
4. Excreting waste products.

What is Passive Transport?

Definition and Overview

Passive transport is the movement of molecules across cell membranes without energy expenditure,

driven solely by concentration gradients. It facilitates the natural movement of substances from areas of higher concentration to areas of lower concentration, leading to equilibrium.

Types of Passive Transport

Passive transport includes several mechanisms:

1. Diffusion: Movement of particles directly through the phospholipid bilayer.
2. Facilitated Diffusion: Movement facilitated by specific carrier or channel proteins.
3. Osmosis: Diffusion of water across the membrane.

Key Characteristics of Passive Transport

1. No Energy Required: Does not consume cellular energy.
2. Along Gradient: Moves substances from high to low concentration.
3. Selective: Channel and carrier proteins provide selectivity.
4. Examples include:
 5. Diffusion of oxygen and carbon dioxide.
 6. Water movement via osmosis.
 7. Glucose transport via facilitated diffusion.

Importance of Passive Transport in Cells

Passive transport maintains cellular equilibrium and enables the exchange of gases and nutrients efficiently without energy expenditure.

Comparing Active and Passive Transport

Feature	Active Transport	Passive Transport
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Energy Requirement	Yes (ATP or other energy source)	No
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Movement Direction	Against concentration gradient	Along concentration gradient
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Speed	Usually slower due to energy use	Faster due to natural diffusion
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Protein Involvement	Often involves specific transport proteins	May involve channel or carrier proteins
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Examples	Sodium-potassium pump, endocytosis	Diffusion, osmosis, facilitated diffusion
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Understanding these distinctions helps students grasp how cells regulate internal conditions and adapt to their environment.

How to Use an Active and Passive Transport Worksheet

Purpose of the Worksheet

An active and passive transport worksheet serves as an educational tool to:

1. Reinforce understanding of transport mechanisms.
2. Identify differences between active and passive processes.
3. Practice diagramming and labeling transport processes.
4. Answer critical thinking questions related to cell physiology.

Typical Content in the Worksheet

1. Definitions and explanations.
2. Diagrams illustrating different transport processes.
3. Matching exercises (e.g., match the process to the correct description).
4. Fill-in-the-blank and multiple-choice questions.
5. Scenario-based questions to apply concepts.
6. Labeling activities for transport proteins and membrane structures.

Benefits of Using Worksheets in Learning

1. Enhances retention through active participation.
2. Clarifies complex concepts with visual aids.
3. Prepares students for exams with practice questions.
4. Encourages critical thinking about cellular processes.

Sample Questions for an Active and Passive Transport Worksheet

To give a sense of what these worksheets entail, here are some example questions:

1. Define active transport and explain its significance in maintaining cell function.
2. Describe the process of facilitated diffusion and give an example of a substance that uses this pathway.
3. Label the diagram showing the sodium-potassium pump. Identify the parts involved.
4. Compare and contrast diffusion and osmosis. Include their definitions and examples.
5. A cell is placed in a solution with a higher concentration of salt. Describe what happens to the cell via osmosis.
6. Explain why active transport is necessary for the absorption of nutrients in the small intestine.
7. Identify which transport process is depicted in the scenario: Water moving into a plant root cell.

Designing Effective Active and Passive Transport Worksheets

Tips for Educators

1. Incorporate diagrams and visual aids.
2. Use real-life scenarios to connect theory with practice.
3. Include a variety of question types to assess different cognitive levels.
4. Allow space for students to explain processes in their own words.
5. Integrate interactive activities, such as labeling diagrams or matching exercises.

Tips for Students

1. Review key terms before attempting the worksheet.
2. Use diagrams to visualize processes.
3. Think critically about the differences and similarities.
4. Practice explaining concepts aloud or in writing.
5. Use the worksheet as a study guide for exams.

Conclusion

An active and passive transport worksheet is an invaluable educational resource that facilitates a deeper understanding of how substances move across cell membranes. By mastering these concepts, students can better comprehend cellular functions, physiological processes, and the importance of maintaining homeostasis. Whether used in classroom instruction or individual study, these worksheets serve as an effective tool to reinforce learning, improve retention, and prepare for assessments. Emphasizing the differences, mechanisms, and significance of active and passive transport will empower students to excel in biology and appreciate the intricate workings of life at the cellular level.

SEO Keywords for Optimization

1. Active transport worksheet
2. Passive transport worksheet
3. Cell membrane transport
4. Diffusion and osmosis worksheet
5. Biology transport processes
6. Cellular transport activities
7. Teaching cell biology
8. Cell transport diagram
9. Active vs passive transport comparison
10. Biology practice questions on transport

By integrating these keywords naturally into the content, this article aims to improve visibility for search engines and reach students and educators seeking quality educational resources on cell transport mechanisms.

Active and Passive Transport Worksheet: An In-Depth Exploration of Cellular Movement Mechanisms In the realm of cell biology, understanding how substances traverse the cell membrane is fundamental to comprehending life processes at the microscopic level. The active and passive transport worksheet serves as an educational tool designed to elucidate these essential mechanisms, fostering a deeper grasp of cellular function, homeostasis, and the intricate balance of internal environments. This article delves into the core concepts, contrasting features, and practical applications of active and passive transport, providing an extensive analysis suitable for students, educators, and enthusiasts seeking a comprehensive understanding.

Introduction to Cellular Transport

Cells, the building blocks of all living organisms, are bounded by a semi-permeable membrane that regulates the movement of substances in and out. This regulation ensures optimal conditions within the cell, such as nutrient intake, waste removal, and maintenance of ionic balances. Two primary categories govern this movement: passive transport and active transport. Understanding these mechanisms is crucial for interpreting numerous physiological processes, from nerve impulse transmission to nutrient absorption in the intestines. Educational worksheets focusing on these topics aim to clarify concepts, provide visual representations, and reinforce learning through exercises and questions.

Passive Transport: The Spontaneous Movement of Molecules

Passive transport refers to the movement of molecules across the cell membrane without the expenditure of cellular energy (ATP). Instead, it relies on the natural kinetic energy of molecules and their concentration gradients.

Basic Principles of Passive Transport

- Concentration Gradient: The difference in concentration of a substance between two areas—usually inside and outside the cell. - Entropy and Diffusion: Molecules tend to move toward a state of higher entropy, resulting in movement from areas of high concentration to low concentration. - Equilibrium: When the concentration of molecules is equal on both sides of the membrane, net movement ceases, though molecules continue to move randomly.

Types of Passive Transport

Passive transport encompasses several mechanisms, each suited to different types of molecules and cellular needs:

1. Diffusion - The simplest form of passive transport. - Molecules move directly through the phospholipid bilayer. - Typical for small, non-polar molecules like oxygen (O_2) and carbon dioxide (CO_2).
2. Facilitated Diffusion - Utilizes specific transport proteins embedded in the membrane. - Facilitates movement of larger or polar molecules that cannot diffuse freely. - Examples include glucose and amino acids.
3. Osmosis - Specialized diffusion for water molecules. - Water moves across the membrane through aquaporins or directly via the phospholipid bilayer. - Critical for maintaining cell turgor and internal fluid balance.

Characteristics of Passive Transport

Feature	Description	Energy Requirement	Direction of Movement	Speed	Selectivity
	High to low concentration	None; relies on concentration gradients	Varies based on molecule size and membrane permeability	Achieved through specific transport proteins in facilitated diffusion	

Role of Passive Transport in Physiology

Passive transport underpins vital physiological processes: - Gas Exchange: Oxygen diffuses into alveoli; CO₂ diffuses out. - Nutrient Uptake: Glucose enters cells via facilitated diffusion. - Waste Removal: Metabolic wastes diffuse out of cells into the bloodstream. - Water Balance: Osmosis regulates hydration levels across cell membranes.

Active Transport: Moving Against the Gradient

While passive transport operates spontaneously, active transport requires energy input to move substances against their concentration gradient, from areas of lower to higher concentration. This energy-dependent process is vital for maintaining cellular homeostasis, especially when cellular requirements differ from the environment.

Fundamental Aspects of Active Transport

- Energy Source: Primarily ATP hydrolysis, although some systems utilize electrochemical gradients. - Transport Proteins: Specialized carrier proteins facilitate movement. - Directionality: Moves substances against their natural gradient, often necessary for accumulation of nutrients or ions inside cells.

Types of Active Transport

1. Primary Active Transport - Direct use of ATP. - Example: Sodium-potassium pump (Na⁺/K⁺-ATPase), which maintains electrochemical gradients essential for nerve impulses and muscle contractions. 2. Secondary Active Transport - Uses energy stored in electrochemical gradients established by primary active transport. - Two subtypes: - Symporters: Move two substances in the same direction. - Antiporters (Exchangers): Move substances in opposite directions. - Example: Sodium-glucose co-transporter.

Characteristics of Active Transport

Feature	Description	Energy Requirement	Yes; consumes ATP or other energy sources
Direction of Movement	Against concentration gradient	Speed	Usually slower than passive processes due to energy and protein involvement
Specificity	High; transport proteins are highly selective		

Physiological Significance of Active Transport

- Nerve Function: The sodium-potassium pump maintains resting membrane potential. - Muscle Contraction: Ionic gradients are crucial for action potential generation. - Nutrient Absorption: Intestinal cells actively absorb glucose and amino acids. - Cell Volume Regulation: Controls osmotic balance and prevents cell swelling or shrinking.

Comparison of Active and Passive Transport

A side-by-side comparison elucidates their differences and similarities:

Feature	Passive Transport	Active Transport
Energy Requirement	No external energy required	Requires energy input (e.g., ATP)
Direction of Movement	Down concentration gradient	Against concentration gradient
Speed	Generally faster	Generally slower
Specificity	Low (simple diffusion) to High (facilitated diffusion)	High (specific transport proteins)
Examples	Osmosis, simple diffusion, facilitated diffusion	Sodium-potassium pump, glucose co-transporter

Active Transport | |||| | Energy | No | Yes | | Gradient | Moves molecules down gradient | Moves molecules against gradient | | Speed | Generally faster | Usually slower | | Protein Involvement | Facilitated diffusion uses specific proteins | Requires specific transporters and energy | | Example | Diffusion of oxygen | Sodium-potassium pump | Understanding these distinctions is vital for grasping cellular physiology and the importance of each process in maintaining cellular health.

The Role of Worksheets in Learning Cellular Transport

Educational active and passive transport worksheets serve as valuable tools to reinforce theoretical knowledge with visual aids, diagrams, and exercises. They often include: - Labeling diagrams of cell membranes illustrating different transport mechanisms. - Comparing and contrasting passive and active transport. - Answering multiple-choice and short-answer questions to test understanding. - Problem-solving exercises involving calculating diffusion rates or ion movement. - Scenario-based questions to apply concepts in physiological contexts. These worksheets are particularly effective in classroom settings, facilitating active engagement, promoting critical thinking, and enabling students to visualize complex processes.

Practical Applications and Real-World Examples

The principles of active and passive transport have broad applications in medicine, biotechnology, and environmental science: - Pharmacology: Many drugs target transport proteins to alter cellular uptake or efflux of substances. - Medical Diagnostics: Understanding ion transport aids in diagnosing conditions like cystic fibrosis or cardiac arrhythmias. - Biotechnology: Engineering of transport systems enhances nutrient uptake in genetically modified organisms. - Environmental Science: Studying passive diffusion informs pollution control and water treatment processes.

Conclusion: The Interplay of Active and Passive Transport in Life

The active and passive transport worksheet encapsulates fundamental cellular processes that sustain life. Passive transport exemplifies nature's efficiency, utilizing existing energy gradients, while active transport showcases biological ingenuity in overcoming energetic barriers. Together, these mechanisms maintain homeostasis, enable cellular communication, and facilitate vital biological functions. By comprehensively understanding these processes, students and professionals can appreciate the delicate balance that sustains life at the cellular level. Educational tools like worksheets not only reinforce theoretical knowledge but also inspire curiosity about the dynamic world within cells, highlighting the elegance and complexity of biological systems. In summary, mastery of active and passive transport concepts is essential for advancing in biological sciences, medicine, and related fields. As research continues to unveil new transport mechanisms and their implications, the foundational knowledge provided by educational worksheets remains a cornerstone for lifelong learning and scientific discovery.

Learning today looks very different from what it did just a few years ago. Information no longer sits quietly on shelves waiting to be discovered. It moves, adapts, and responds to the needs of modern readers. In this changing landscape, the option to download [Active And Passive Transport Worksheet](#) has become

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Students also benefit from digital access in meaningful ways. Academic success often depends on the ability to review material repeatedly and study efficiently. Downloadable PDFs allow offline access, easy note-taking, and organized revision. Digital books reduce physical strain and support more comfortable study habits.

Digital formats also accommodate different learning preferences. Some readers prefer linear reading, while others focus on specific sections or themes. Digital access allows both approaches. Readers can skim, search, annotate, or read deeply depending on their objectives, making Active And Passive Transport Worksheet adaptable rather than restrictive.

Accessibility features further expand the reach of digital books. Adjustable text size, text-to-speech options, screen reader compatibility, and night modes help ensure that content is usable by readers with diverse needs. These features promote inclusive access to knowledge and align with modern educational values.

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Perhaps the most significant change brought by digital access is how it reshapes attitudes toward learning. When information is readily available, curiosity feels encouraged rather than inconvenient. Readers are more willing to explore unfamiliar topics, revisit previous interests, and continue learning throughout their lives.

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In conclusion, the option to download [Active And Passive Transport Worksheet](#) reflects a broader shift in how knowledge is accessed and experienced. Digital access combines immediacy, flexibility, affordability, and ethical distribution into a single, powerful tool. More than just a file, [Active And Passive Transport Worksheet](#) becomes a trusted companion—supporting curiosity, critical thinking, and continuous intellectual growth in a world that never stands still.

Questions & Answers About active and passive transport worksheet

No	Question	Answer
1	What is the main difference between active and passive transport?	Active transport requires energy to move substances against their concentration gradient, while passive transport does not require energy and moves substances along their concentration gradient.
2	Can you give an example of active transport in cells?	An example of active transport is the sodium-potassium pump, which moves sodium ions out of the cell and potassium ions into the cell against their concentration gradients.
3	What types of passive transport are commonly studied?	The common types of passive transport include diffusion, facilitated diffusion, and osmosis.

4	Why is active transport necessary for cells?	Active transport is necessary to move substances that are in low concentration inside or outside the cell against their concentration gradient, which is essential for maintaining cellular functions and homeostasis.
5	What role does a protein play in facilitated diffusion?	In facilitated diffusion, a specific transport protein helps move substances across the cell membrane without using energy, usually for molecules that cannot diffuse freely through the lipid bilayer.
6	How does osmosis differ from simple diffusion?	Osmosis is the diffusion of water across a semi-permeable membrane from an area of lower solute concentration to higher solute concentration, whereas simple diffusion involves the movement of solutes or gases directly through the membrane.
7	What factors influence the rate of passive transport?	Factors include the concentration gradient, temperature, surface area of the membrane, and the permeability of the membrane to the substance.
8	In what situations would a cell use active transport instead of passive transport?	A cell uses active transport when it needs to import nutrients, export waste, or maintain ionic balances that cannot be achieved through passive means alone.
9	What is an example of passive transport in everyday life?	A common example is the diffusion of oxygen into the blood or carbon dioxide out of the blood during respiration.
10	How do transport proteins facilitate both active and passive transport?	Transport proteins provide a pathway for specific molecules to cross the membrane; in passive transport, they allow molecules to move along the gradient, while in active transport, they assist in moving molecules against the gradient using energy.

cell membrane, diffusion, osmosis, facilitated diffusion, active transport, passive transport, transport proteins, concentration gradient, membrane permeability, cellular transport

Active And Passive Transport Worksheet

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This flexibility allows knowledge acquisition to occur naturally throughout the day.

Readers can prioritize relevant sections without losing context.

Digital access enables quick consultation during real-world application.

Active And Passive Transport Worksheet eBooks help bridge the gap between theory and applied knowledge.

Active And Passive Transport Worksheet eBooks are effective tools for refreshing knowledge before projects, meetings, or assessments.

Readers benefit from Active And Passive Transport Worksheet eBooks by reducing distractions found in unstructured web content.

Sharing Active And Passive Transport Worksheet

Sharing Active And Passive Transport Worksheet with others can be a positive way to spread knowledge, encourage learning, and build communities around shared interests. However, responsible and legal sharing is essential to respect copyright laws and support the authors and publishers who create valuable content. Understanding what can and cannot be shared helps prevent legal issues and ensures ethical use of digital materials.

In general, only free, open-access, or public domain versions of Active And Passive Transport Worksheet may be shared freely. Public domain works are no longer protected by copyright and can be distributed without restrictions. Many classic texts, government publications, and educational resources fall into this category. Trusted platforms such as public libraries and reputable digital archives clearly label content that is legally shareable.

For copyrighted or paid editions of Active And Passive Transport Worksheet, direct file sharing is usually prohibited. Instead of sending copies, it is best to share official purchase links, publisher pages, or authorized platforms where others can obtain the book legally. Recommending a book through legitimate channels supports content creators and ensures that readers receive accurate and complete versions.

Many eBook platforms provide built-in sharing features that allow limited access, previews, or recommendations without violating copyright. Some services even support temporary lending or family sharing within defined rules. Always review the platform's terms of use before sharing any content related to Active And Passive Transport Worksheet.

Ethical considerations when sharing

Beyond legal requirements, ethical considerations play an important role. Sharing unauthorized copies can harm authors and publishers by reducing potential income and discouraging future content creation. Supporting legal distribution ensures that high-quality Active And Passive Transport Worksheet materials continue to be produced and updated. Ethical sharing builds trust and sustainability within reading and learning communities.

Finding Reviews

Reading reviews is one of the most effective ways to choose the best edition of Active And Passive Transport Worksheet. With many versions, formats, and publishers available, reviews help readers avoid low-quality or poorly formatted editions and focus on content that meets their expectations.

Online bookstores often feature customer reviews and ratings that provide insights into readability, formatting quality, and overall satisfaction. Paying attention to detailed reviews can reveal common issues such as missing pages, poor editing, or compatibility problems with certain devices. Reviews that

mention specific strengths or weaknesses are especially useful when selecting a digital version of Active And Passive Transport Worksheet.

Community-driven platforms such as Goodreads, Reddit, and specialized forums offer additional perspectives. These communities allow readers to discuss content in depth, compare editions, and share personal experiences. Recommendations from experienced readers or subject-matter enthusiasts can be particularly valuable when choosing educational or technical Active And Passive Transport Worksheet materials.

Professional reviews from blogs, academic journals, or reputable websites can also provide objective evaluations. These reviews often focus on content accuracy, relevance, and usefulness, making them helpful for students and professionals who rely on reliable information.

Evaluating review credibility

Not all reviews carry the same level of reliability. When reading reviews, consider the reviewer's background, level of detail, and consistency with other feedback. Multiple reviews highlighting similar strengths or weaknesses usually indicate a genuine pattern. Avoid relying solely on extreme opinions and instead look for balanced assessments that discuss both pros and cons of the Active And Passive Transport Worksheet edition.

Using Audiobooks

Audiobooks offer an alternative way to experience Active And Passive Transport Worksheet content and are increasingly popular among modern readers. Instead of reading text, users listen to narrated versions, allowing them to engage with content while performing other tasks. Audiobooks are especially useful during commuting, exercising, or completing routine activities.

Platforms such as Audible, Google Audiobooks, Apple Books, and Scribd offer professionally narrated audiobooks of many Active And Passive Transport Worksheet titles. These versions often feature high-quality narration, clear pronunciation, and structured pacing that enhances understanding. Some audiobooks also include chapter navigation, bookmarks, and playback speed controls for added convenience.

For public domain works, platforms like LibriVox provide free audiobooks narrated by volunteers. While narration quality may vary, LibriVox remains a valuable resource for accessing classic or open-access versions of Active And Passive Transport Worksheet without cost. Listening to samples before committing to a full audiobook can help ensure a comfortable listening experience.

Audiobooks are particularly beneficial for auditory learners or individuals with visual impairments. They also help reduce screen time, making them a healthy alternative for extended content consumption. However, audiobooks may not be ideal for detailed study that requires frequent referencing, highlighting, or visual analysis.

Combining audiobooks with text

Many readers find value in combining audiobooks with digital or printed text. Listening while following along in the text can improve comprehension and retention. Others use audiobooks for initial exposure and then refer to the text version of Active And Passive Transport Worksheet for deeper study. This multi-format approach maximizes flexibility and learning efficiency.

Tracking Progress

Tracking reading progress is a powerful way to stay motivated and organized when engaging with Active And Passive Transport Worksheet. Monitoring progress helps readers set goals, manage time effectively, and reflect on what they have learned. Whether reading for leisure, study, or professional development, tracking tools enhance accountability and consistency.

Apps such as Goodreads, StoryGraph, and LibraryThing allow users to log books, track reading status, write reviews, and set annual or monthly reading goals. These platforms also offer personalized recommendations based on reading history, making it easier to discover related Active And Passive Transport Worksheet materials.

For readers who prefer a more customized approach, spreadsheets or note-taking apps can serve as effective tracking tools. Creating a simple reading log that includes dates, chapters completed, key notes, and personal reflections helps organize learning and maintain focus. Digital notes can be linked directly to highlighted sections within Active And Passive Transport Worksheet for easy reference.

Using tracking for study and research

For academic or professional purposes, tracking progress goes beyond simple completion. Recording insights, questions, and references while reading Active And Passive Transport Worksheet creates a structured knowledge base that can be revisited later. This approach supports deeper understanding and improves long-term retention of information.

Tracking tools also help identify patterns in reading habits, such as preferred formats or optimal reading times. Understanding these patterns allows readers to adjust their routines for better productivity and enjoyment.

Community engagement and motivation

Sharing progress within reading communities can increase motivation and accountability. Many platforms allow users to join reading challenges, discussion groups, or book clubs centered around specific topics or genres. Engaging with others who are also reading Active And Passive Transport Worksheet fosters discussion, insight exchange, and a sense of shared purpose.

However, sharing progress should always respect privacy preferences. Users can choose what information to make public and what to keep personal. Balanced participation ensures that tracking remains a supportive tool rather than a source of pressure.

Final thoughts on sharing and managing Active And Passive Transport Worksheet

Responsible sharing, informed selection, and effective tracking are key aspects of enjoying Active And Passive Transport Worksheet in the digital age. By respecting copyright, relying on trusted reviews, exploring audiobooks, and monitoring reading progress, readers can create a well-rounded and ethical reading experience. These practices not only enhance personal understanding but also contribute to a sustainable and supportive reading ecosystem built around high-quality Active And Passive Transport Worksheet content.