Name: _____ **Date:** _____

Section: _____

Electron Transport Chain Activity

The Cell's Power Plant

Phase 1: ENGAGE (2 minutes)

Getting Started: Open peebedu.com and navigate to Electron Transport Chain

Read the introduction to understand what's happening.

The Big Question: How do your cells turn food and oxygen into usable energy (ATP)? _____

Quick Think: Why do you breathe faster when you exercise? _____

Phase 2: EXPLORE (8 minutes)

Watch and Discover

Start the simulation with middle settings.

Following the Action:

Electron Donors:

- Yellow electrons come from: _____

The Journey: Watch electrons move through complexes.

- Do they go UP or DOWN in energy? _____

The End Point:

- Electrons end up at: _____

ATP Production:

- Watch ATP synthase (the spinning part)

- What does it produce? _____

Test Different Conditions:

No Oxygen: Set oxygen to zero.

- What happens? _____

Temperature: Try hot and cold settings.

- Which produces ATP faster? _____

Phase 3: EXPLAIN (7 minutes)

Understanding the Process

Energy Flow Map: Fill in what happens at each step:

Food molecules → _____ → Electron transport → _____ pumping → _____ production

The Proton Pump:

- Electrons provide energy to pump protons: IN / OUT

- Protons flow back through: _____

Why We Need Oxygen:

Without oxygen to accept electrons:

- The chain gets: _____

- Cells can't get: _____

Phase 4: ELABORATE (2 minutes)

Real-World Connections

Athletic Performance: Why do athletes train at high altitudes? Think about oxygen availability: _____

Feeling Tired: When you're sick, mitochondria may not work well. Result: _____

Cyanide: This poison blocks the electron transport chain. Why is it deadly? _____

Phase 5: EVALUATE (1 minute)

Show What You Know

Complete the energy story:

Nutrients provide _____ → These move through protein complexes → Energy pumps _____ out → These flow back through _____ → Making _____ for the cell

Exit Question: Why can't we just use food energy directly? Why do cells need this complex system? _____

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Fun Fact: You produce about your body weight in ATP every day!