Name: _____ **Date:** _____

Section: _____

Enzyme Environment Activity

Enzymes: The Picky Eaters of the Cell World!

Phase 1: ENGAGE (5 minutes)

Getting Started: Open peebedu.com and navigate to Enzyme Environmental Impact Explorer

Read the introduction - look for the body parts and their pH levels!

The Mystery: Have you ever wondered why your stomach doesn't digest itself? Or why food starts breaking down in your mouth? It's all about enzymes - special proteins that are VERY picky about their working conditions!

Think Like Goldilocks: Just like Goldilocks wanted everything '`just right,`' enzymes need:

- Temperature that's just right (not too hot, not too cold)
- pH that's just right (not too acidic, not too basic)

Quick Questions:

- What happens to butter in a hot pan? _____

- Could the same thing happen to enzymes? Yes / No

Phase 2: EXPLORE (18 minutes)

Enzyme Detective Work

Part A: Meet Your First Enzyme

Click on **Amylase** (the spit enzyme!)

What do you see?

- The enzyme is: Moving / Still
- Its shape is: Blob-like / Stretched out

- Blue parts marked with: _____

Temperature Investigation: Keep pH at 7, change only temperature:

- ———— Yes / No

Enzyme ——— Pepsin Amylase Lipase Lactase Protects from peroxide!
Catalase

Part C: Pattern Hunt

Group Your Discoveries:

- All enzymes work best at ___°C (Hint: your body temperature!)

- Intestine enzymes like pH _____ (high number)

Phase 3: EXPLAIN (12 minutes)

Making Sense of Enzyme Pickiness

Temperature Rules (Find the Pattern):

- Too cold = Enzyme moves _____

- Too hot = Enzyme _____

pH Rules (Connect the Dots): Fill in what happens:

Wrong pH → Charges repel → Enzyme _____ → Can't work! Right pH → Shape stays good → Enzyme _____ → Food breaks down!

The Digestive Journey: Match each stop to its enzyme:

Digestive Stop: Best Enzyme:

- Mouth (pH 7) • Pepsin
- Stomach (pH 2) • Trypsin
- Intestine (pH 8) • Amylase

Why Different pHs?

Think about it:

- Stomach needs acid to: _____

- Each enzyme evolved to work where it's needed!

Phase 4: ELABORATE (10 minutes)

Enzyme Problems in Real Life

Health Connections:

Fever Alert! Normal body: 37°C (98.6°F) High fever: 40°C (104°F)

- Do enzymes still work? Yes / No / Some

Antacid Commercial: ‘`Neutralizes stomach acid!`‘

- Normal stomach pH: 2
- With antacid pH: 5
- Can pepsin still work? Yes / No

Lactose Intolerance: Some people don’t make enough lactase.

- What they can’t digest: _____
- Solution: _____

Design Your Own Enzyme:

If you could make an enzyme for any job:

- What would it break down? _____
- What conditions would it need? _____

Phase 5: EVALUATE (5 minutes)

Show What You Know

True or False (circle one):

- T / F: All enzymes work best at 100°C
- T / F: Stomach enzymes like acidic conditions
- T / F: Denatured enzymes can be fixed by cooling
- T / F: Your body temperature is perfect for enzymes

Fill in the Story: Enzymes are like _____ (workers/machines) that need _____ conditions. Too much heat makes them _____ like a cooked egg. Wrong pH makes them change _____ and stop working. That's why different parts of your _____ system have different pH levels!

Draw It: Sketch an enzyme in three conditions:

[Just Right] [Too Hot] [Wrong pH]

Explain to a Friend:

Why can't the same enzyme work everywhere in your body?

Enzyme Joke: Why did the enzyme go to therapy?

It couldn't handle the pressure (and temperature)!

Research Challenge: Find out about one of these:

- How penguins' enzymes work in the cold
- How desert animals' enzymes handle heat
- Why some bacteria live in hot springs
- –

Cool Enzyme Facts:

- **Fastest enzyme:** Catalase - breaks down 40 million molecules per second!
- **Oldest enzyme use:** Cheese making (4000+ years ago)
- **Weirdest location:** Some enzymes work in solid ice!
- **Most studied:** Lysozyme - first enzyme structure ever solved

Key Vocabulary

See activity for vocabulary specific to this topic.