**Name:** _____ **Date:** _____

**Section:** _____

# Gene to Protein Simulator Activity

## Bacteria Survival Game

## Phase 1: ENGAGE (2 minutes)

**Getting Started:** Open peebedu.com and navigate to Gram Theft Strepto

You're a bacterium in a dangerous world!

**Your Mission:** Collect genes to survive various threats.

**First Thought:** What might threaten bacteria in real life? _____

## Phase 2: EXPLORE (10 minutes)

**Play the Game**

**Round 1: Gene Hunt**

Collect floating genes and observe changes.

**Gene Collection:**

- First gene collected: _____

- New ability gained: _____

**Multiple Genes:**

- Can you collect more than one? YES / NO
- Do they stack up? YES / NO

**Round 2: Survival Challenge**

Face the hazards!

**Hazard Response:** Check what saves you:

- _____

**Strategy Discovery:**

- Best approach: AVOID HAZARDS / COLLECT GENES FIRST

- Why? _____

## Phase 3: EXPLAIN (6 minutes)

**How Bacteria Really Work**

**Gene Stealing:** Real bacteria can take genes from:

**Instant Changes:** In the game, genes work immediately. This is realistic because bacteria:

- Make proteins: FAST / SLOW
- Adapt: QUICKLY / SLOWLY

**Antibiotic Resistance:** When you survive antibiotics in the game, it shows:

- How superbugs: _____

**Group Behavior:** Later rounds show bacteria working together. This represents:

## Phase 4: ELABORATE (1 minute)

**Real-World Impact**

**MRSA:** This '`superbug`' has collected many resistance genes. Why is it hard to treat? _____

**Evolution Speed:** A bacterial generation = 20 minutes A human generation = 20 years This means bacteria evolve: _____ times faster!

## Phase 5: EVALUATE (1 minute)

**Quick Check**

Bacteria gain new traits by:

The game shows why antibiotic resistance spreads because: _____

**Exit Question:** Should we use antibiotics less? Why? _____