

Name: _____ Period: _____ Date: _____

Open **peebedu.com** and navigate to **Gram Theft Strepto**. Click **Intro** and **Learn** to read how transformation, transduction and biofilms work, then click **1P Start**. Move with the arrow keys, eat sugars, collect the gold gene circles, and avoid the red antibiotic zones.

Free Response Questions

Question 1 — Conceptual Analysis

Simulation Task: *Start a game and play until you have survived at least two antibiotic events. Note what happens to a cell that enters a red antibiotic zone without the matching resistance gene, and what happens to one that has collected it. Check the Gene Collection panel and the Activity Log after each event.*

(A) (1 pt) **Describe** the change that occurs in a bacterial population that is exposed to the same antibiotic repeatedly.

(B) (1 pt) **Explain** why a bacterium carrying a resistance gene survives an antibiotic event while one without it does not.

(C) (1 pt) **Predict** the proportion of the bacterial population that will carry the resistance gene after several further antibiotic events.

(D) (1 pt) **Justify** your prediction.

Question 2 — Analyze Model / Visual Representation

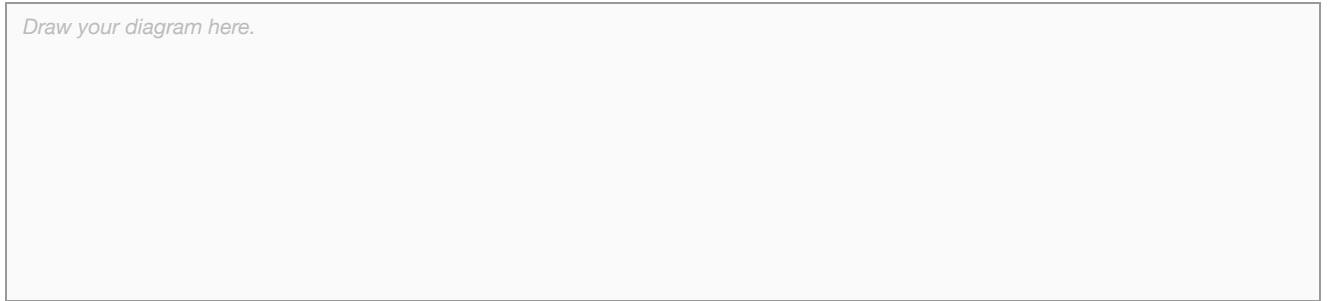
Simulation Task: Play two rounds. In the first, collect as many different genes as you can before the antibiotic events begin. In the second, collect only sugars and avoid the gold gene circles. Compare how long your cell survives in each round and how far the Quorum Progress counter gets.

(A) (1 pt) **Describe** the difference in survival between the round in which you collected many different genes and the round in which you collected none.

(B) (1 pt) **Explain** why a bacterial population containing little genetic variation is at greater risk when a new antibiotic appears.

(C) (1 pt) **Represent** the effect of genetic variation on survival by drawing two labeled bacterial populations, one varied and one uniform, and showing what remains of each after an antibiotic is applied.

Draw your diagram here.



(D) (1 pt) **Explain** how a bacterium can gain a new gene from DNA released by a bacterium that has died nearby.

7.11.A.1