MARCO LEARNING®

Welcome to AP® Jumpstart!

AP Biology

Welcome – Who Are You?

- Mrs. Jones
- 11 years of AP Biology
- Georgia
- AP Reader
- Founder of apbiopenguins
- B.S. in Biology
- Ed.S. in Instructional Tech

AP Biology students are penguins because they are Dressed for Success!

You are now an AP Bio Penguin!

Helpful Resources for Content...

- AP Biology Penguins Website: 316 pg Review Guide, Quizizz Game Codes, Review PPTs, ...so much more
- Social Media Accounts (apbiopenguins)
  TikTok, Instagram, YouTube, Twitter
- Podcast:
  The APsolute RecAP
- YouTube:
  Bozeman Biology, Crash Course, Amoeba Sisters
- Review Book to READ:
  Barron's (7th Edition)

Exam Format

Time: 90 minutes

- Section I: Multiple Choice
- 60 Questions
- 50% of Exam Weighting

Time: 90 minutes

- Section II: Free Response
- 6 Questions (2 Long, 4 Short)
- 50% of Exam Weighting

Based on the 2020 Practice Exam Scoring Guidelines

You need approximately 54 of the available 120 points for a 3 on the exam

Topic Breakdown

Units	Exam Weighting	#Qs
Unit 1: Chemistry of Life	8 – 11 % (5 – 7)	5.7
Unit 2: Cell Structure and Function	10 – 13% (6 – 8)	6.7
Unit 3: Cellular Energetics	12 – 18% (7 – 10)	9.3
Unit 4: Cell Communication and Cell Cycle	10 – 15% (6 – 9)	6.7

Topic Breakdown

Units	Exam Weighting	#Qs
Unit 5: Heredity	8 – 11% (5 – 7)	6
Unit 6: Gene Expression and Regulation	12 – 16% (7 – 10)	8
Unit 7: Natural Selection	13 – 20% (8 – 12)	9.3
Unit 8 Ecology	10 – 15% (6 – 9)	8.3

Multiple Choice Questions

Types of Questions

- Independent Questions
- Set Questions

Based on the 2020 Practice Exam

31 – 38 Independent Questions
22 – 29 Set Questions

MARCO LEARNING

Sample Qs

Multiple Choice Questions

Types of Questions

- Independent Questions

Insulin is a protein hormone that is secreted in response to elevated blood glucose levels. When insulin binds to its receptors on liver cells, the activated receptors stimulate phosphorylation cascades that cause the translocation of glucose transporters to the plasma membrane.

Based on the information provided, which of the following best describes the role of insulin in this liver cell signal transduction pathway?

(A) It acts as a ligand.

(B) It acts as a receptor.

(C) It acts as a secondary messenger.

(D) It acts as a protein kinase.

- Set Questions

40. Plates that have only ampicillin-resistant bacteria growing include which of the following?

(A) I only
(B) III only
(C) IV only
(D) I and II

41. Which of the following best explains why there is no growth on plate II?

(A) The initial *E. coli* culture was not ampicillin-resistant.
(B) The transformation procedure killed the bacteria.
(C) Nutrient agar inhibits *E. coli* growth.
(D) The bacteria on the plate were transformed.

42. Plates I and III were included in the experimental design in order to

(A) demonstrate that the *E. coli* cultures were viable
(B) demonstrate that the plasmid can lose its amp^r gene
(C) demonstrate that the plasmid is needed for *E. coli* growth
(D) prepare the *E. coli* for transformation

43. Which of the following statements best explains why there are fewer colonies on plate IV than on plate III?

(A) Plate IV is the positive control.
(B) Not all *E. coli* cells are successfully transformed.
(C) The bacteria on plate III did not mutate.
(D) The plasmid inhibits *E. coli* growth.

44. In a second experiment, the plasmid contained the gene for human insulin as well as the amp^r gene. Which of the following plates would have the highest percentage of bacteria that are expected to produce insulin?

(A) I only
(B) III only
(C) IV only
(D) I and III

Strategy for Multiple Choice

Underline important words as you read the question

“Jot down” notes that could help you with the question

Insulin is a protein hormone that is secreted in response to elevated blood glucose levels. When insulin binds to its receptors on liver cells, the activated receptors stimulate phosphorylation cascades that cause the translocation of glucose transporters to the plasma membrane.

Based on the information provided, which of the following best describes the role of insulin in this liver cell signal transduction pathway?

(A) It acts as a ligand.

(B) It acts as a receptor.

(C) It acts as a secondary messenger.

(D) It acts as a protein kinase.

Protein hormones are extracellular signaling molecules

Step 2 in Signal Transduction Pathway (Transduction)

Step 1 in Signal Transduction Pathway (Reception)

Insulin is a protein hormone th… …ood glucose levels. When insulin bi… …on liver cells, the activated receptors stimulate phosphorylation cascades that cause the translocation of glucose transporters to the plasma membrane.

Based on the information provided, which of the following best describes the role of insulin in this liver cell signal transduction pathway?

It acts as a ligand. Signaling molecule that binds to a receptor

(B) It acts as a receptor. Protein that binds to a ligand/signaling molecule to initiate transduction

(C) It acts as a secondary messenger. Small intracellular molecule in transduction

(D) It acts as a protein kinase. Relay molecule in transduction

2. Humans have a diploid number ("2n") of 46. Which of the following statements best predicts the consequence if meiosis did not occur during gametogenesis?

(A) The gametes would get larger from one generation to the next.

(B) The chromosome number would double with each generation.

(C) The chromosome number would be halved with each generation.

(D) The chromosome number would triple with each generation.

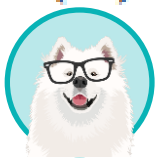
Strategy for Multiple Choice

Cover up the answer choices and develop your own answer then check if its an option

2. Humans have a diploid number ("2n") of 46. Which of the following statements best predicts the consequence if meiosis did not occur during gametogenesis?

2. Humans have a diploid number ("2n") of 46. Which of the following statements best predicts the consequence if meiosis did not occur during gametogenesis?

(A) The gametes would get larger from one generation to the next.



(B) The chromosome number would double with each generation.

(C) The chromosome number would be halved with each generation.

(D) The chromosome number would triple with each generation.

Strategy for Multiple Choice

Use the figures or diagrams to help you answer the questions

10. A student used a microscope to observe a wet-mount slide of red onion epidermal cells that were suspended in a 1% NaCl solution. The student then added a 15% NaCL solution to the slide and observed the changes that occurred. The student's observations are represented in Figure 1.

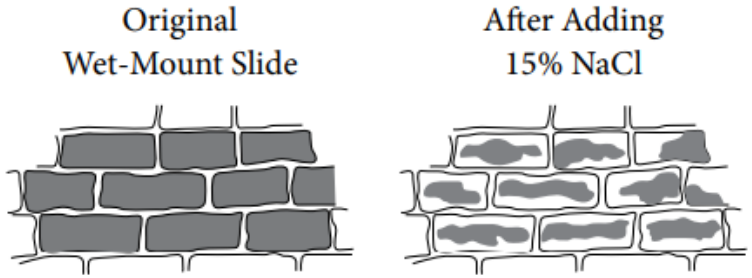


Figure 1. Student's observations of onion cells

Which of the following most directly explains the changes in the cells?

(A) The degradation of DNA in the nuclei of the cells

(B) The lysis of chloroplasts in the cells

(C) The movement of water from the central vacuoles of the cells into the solution

(D) The movement of NaCl from the solution into the cytoplasm of the cells

10. A student used a microscope to observe a wet-mount slide of red onion epidermal cells that were suspended in a 1% NaCl solution. The student then added a 15% NaCL solution to the slide and observed the changes that occurred. The student's observations are represented in Figure 1.

1% NaCl:
Hypotonic Sol'n

15% NaCl:
Hypertonic Sol'n

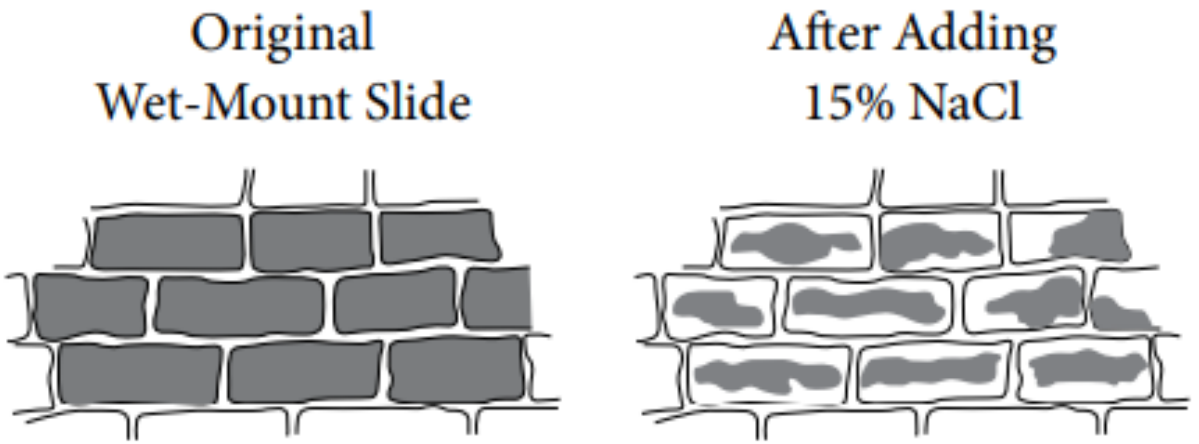


Figure 1. Student's observations of onion cells

Water moves from hypotonic solution to a hypertonic solution

MARCO LEARNING

Sample Qs

Water moves from hypotonic solution to a hypertonic solution

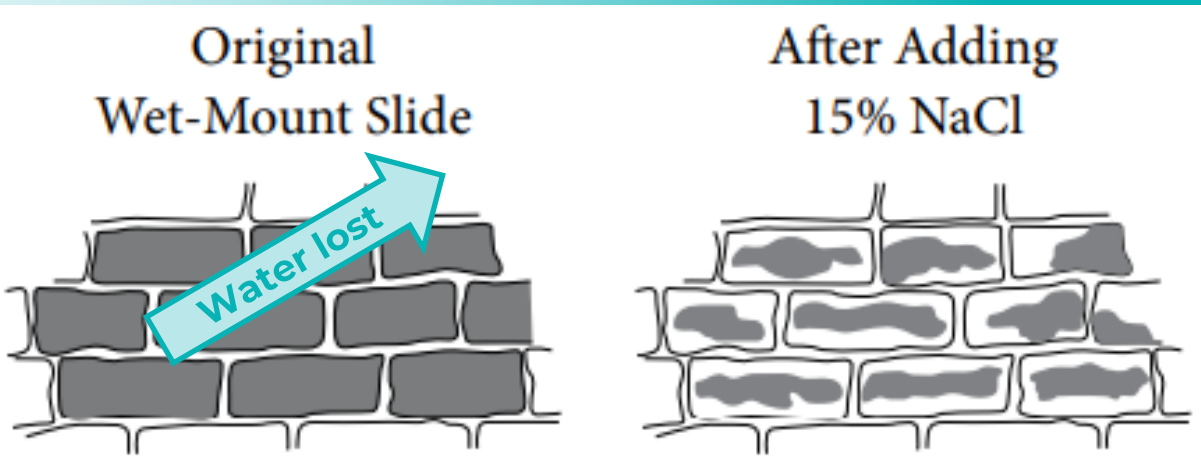


Figure 1. Student's observations of onion cells

Which of the following most directly explains the changes in the cells?

(A) The degradation of DNA in the nuclei of the cells

(B) The lysis of chloroplasts in the cells

The movement of water from the central vacuoles of the cells into the solution

(D) The movement of NaCl from the solution into the cytoplasm of the cells

Marco: Do you realize you talk a lot AP Bio Penguin?

Penguin: Just part of my nature to squawk

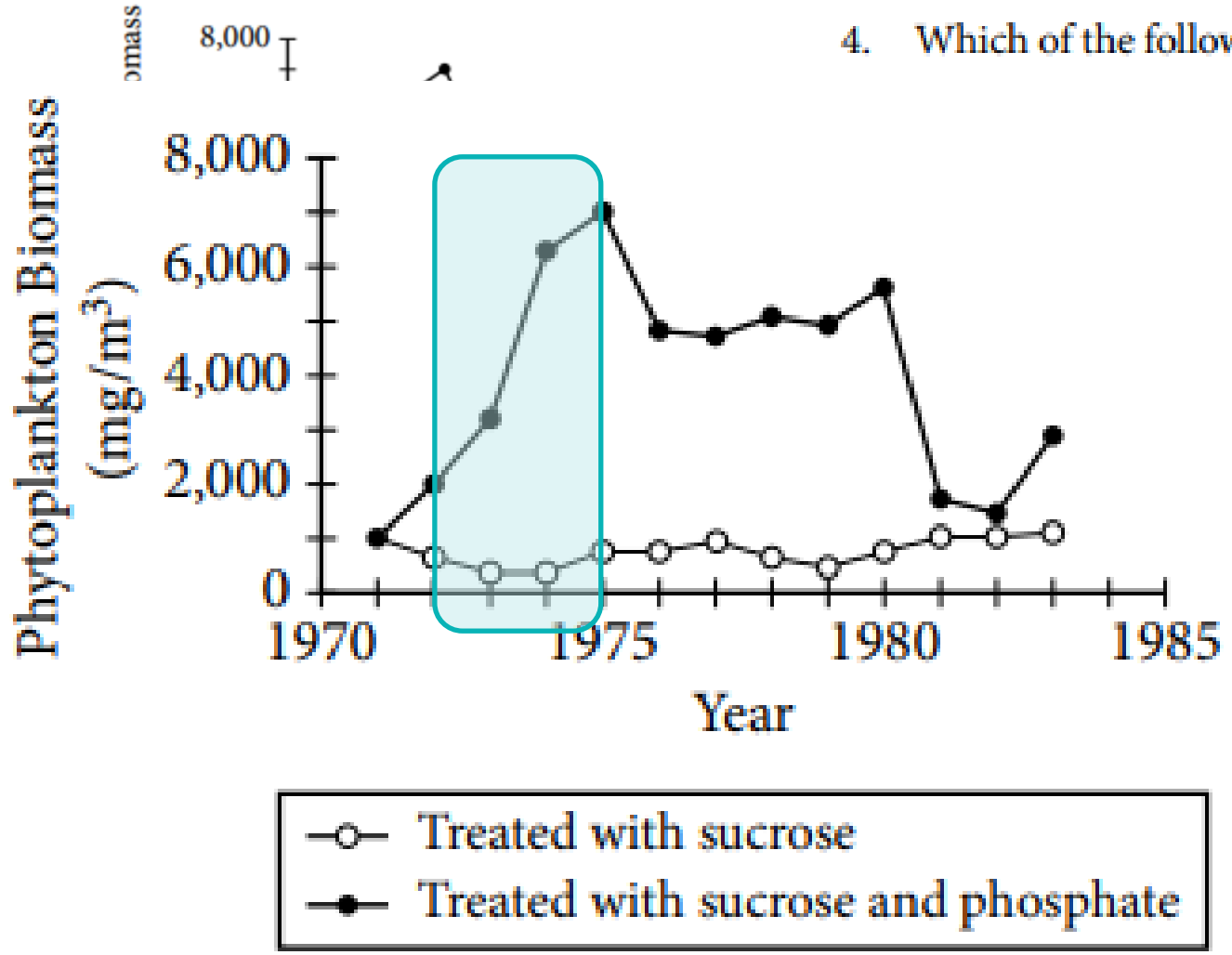
Strategy for Multiple Choice

Write on the graphs and show your work.

MARCO LEARNING

Sample Qs

Questions 4–7 refer to the following material.



4. Which of the following claims is best supported by the data?

factor for phytoplankton in the lake.

ing factor for phytoplankton in the lake.

hate were limiting factors for phytoplankton in the lake.

osphate was a limiting factor for phytoplankton in

the phytoplankton population from 1971 to 1975 in with sucrose and phosphate is closest to which of the

(1971, 1000) & (1975, 7000)

$$rate = slope = \frac{\Delta y}{\Delta x}$$

$$rate = \frac{(7000 - 1000)}{(1975 - 1971)}$$

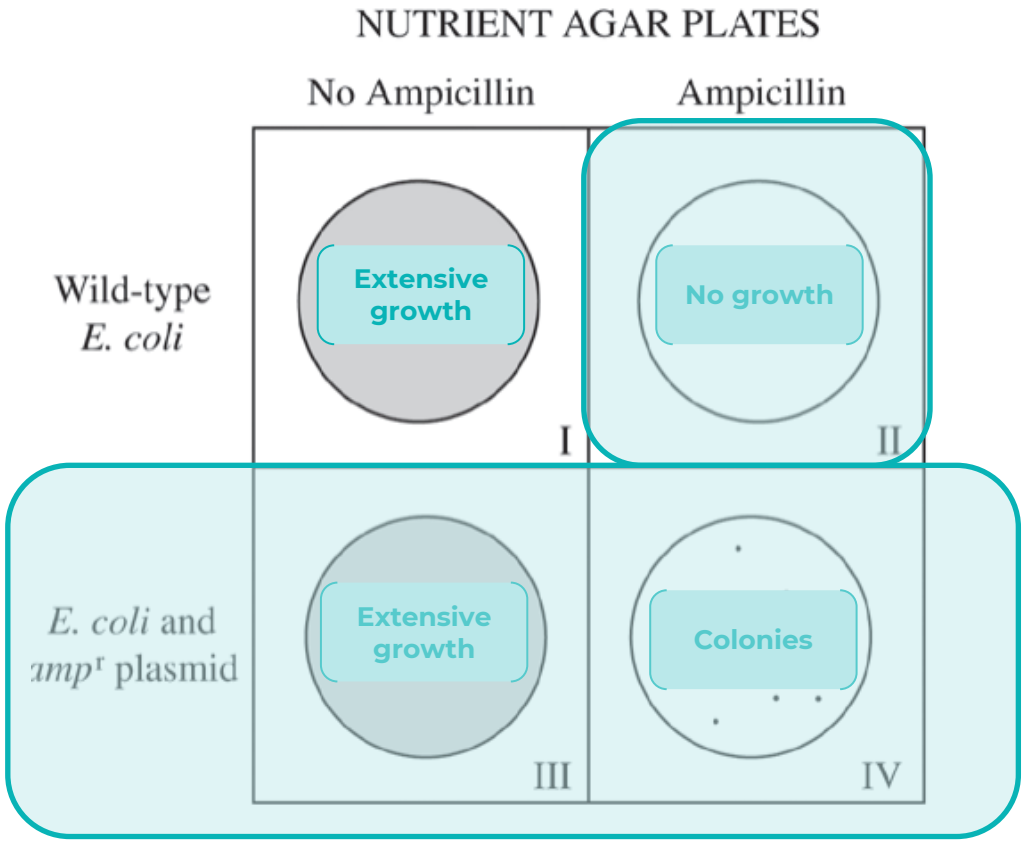
$$rate = \frac{6000}{4} = 1500$$

lake in two roughly equal halves with an impermeable curtain that was fastened and

Strategy for Multiple Choice

Make quick reference notes from prompts and figures

In a transformation experiment, a sample of *E. coli* bacteria was mixed with a plasmid containing the gene for resistance to the antibiotic ampicillin (*amp*^{r}). Plasmid was not added to a second sample. Samples were plated on nutrient agar plates, some of which were supplemented with the antibiotic ampicillin. The results of *E. coli* growth are summarized below. The shaded area represents extensive growth of bacteria; dots represent individual colonies of bacteria.



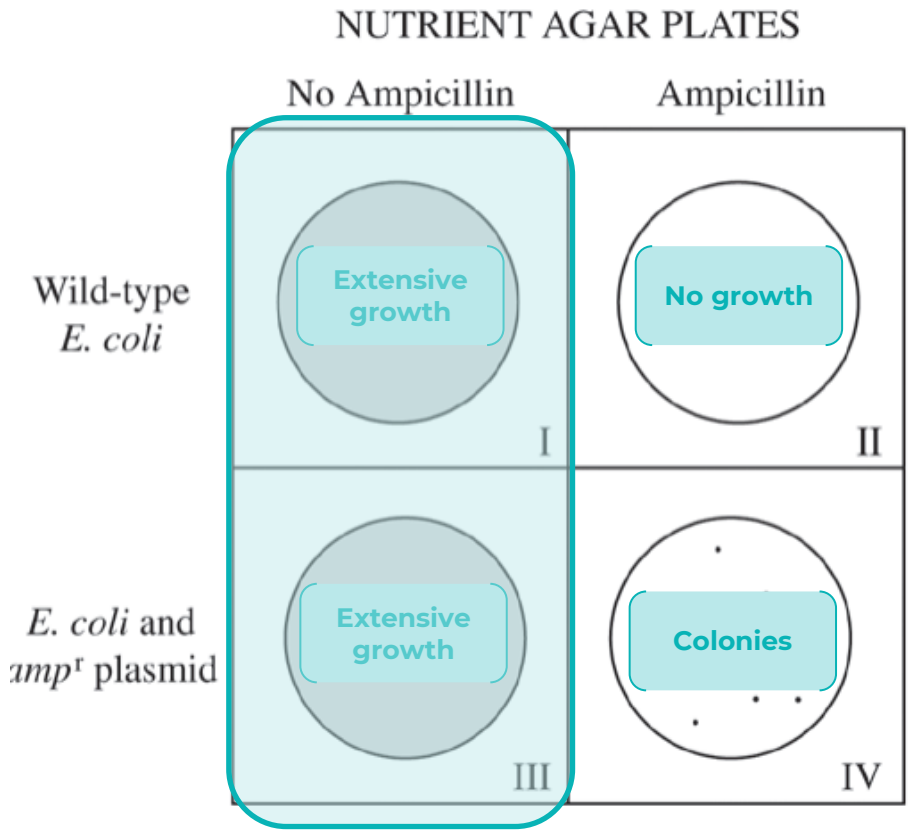
40. Plates that have only ampicillin-resistant bacteria growing include which of the following?

(A) I only
(B) III only
(C) IV only
(D) I and II

41. Which of the following best explains why there is no growth on plate II?

(A) The initial *E. coli* culture was not ampicillin-resistant.
(B) The transformation procedure killed the bacteria.
(C) Nutrient agar inhibits *E. coli* growth.
(D) The bacteria on the plate were transformed.

In a transformation experiment, a sample of *E. coli* bacteria was mixed with a plasmid containing the gene for resistance to the antibiotic ampicillin (*amp*^{r}). Plasmid was not added to a second sample. Samples were plated on nutrient agar plates, some of which were supplemented with the antibiotic ampicillin. The results of *E. coli* growth are summarized below. The shaded area represents extensive growth of bacteria; dots represent individual colonies of bacteria.



42. Plates I and III were included in the experimental design in order to

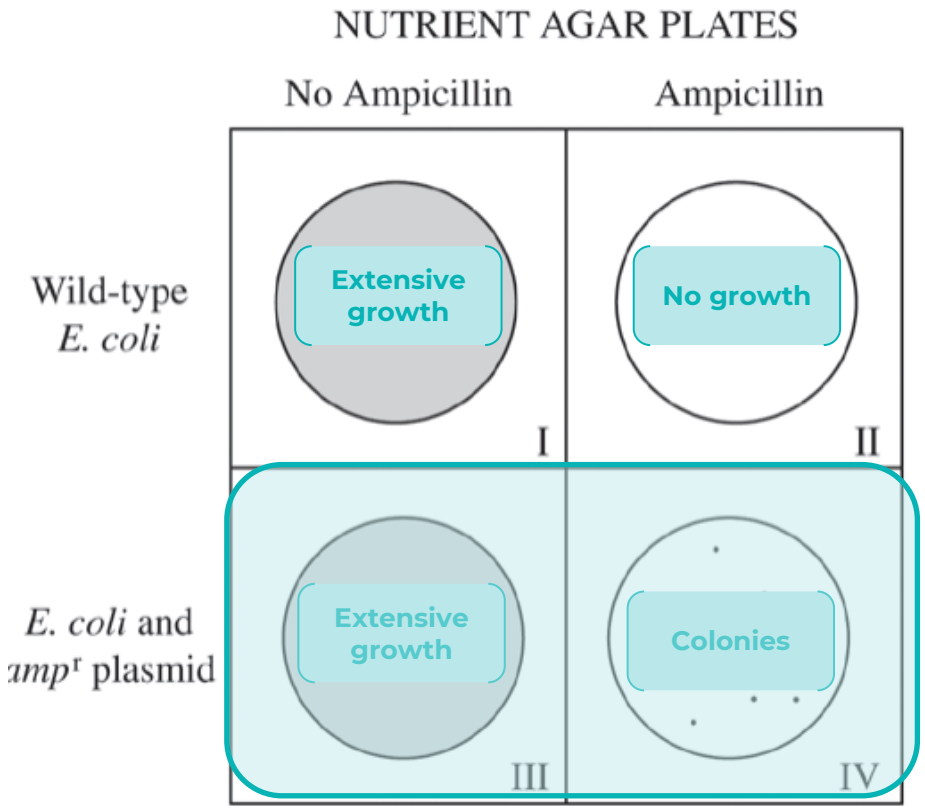
(A) demonstrate that the *E. coli* cultures were viable

(B) demonstrate that the plasmid can lose its *amp*^{r} gene

(C) demonstrate that the plasmid is needed for *E. coli* growth

(D) prepare the *E. coli* for transformation

In a transformation experiment, a sample of *E. coli* bacteria was mixed with a plasmid containing the gene for resistance to the antibiotic ampicillin (*amp*^{r}). Plasmid was not added to a second sample. Samples were plated on nutrient agar plates, some of which were supplemented with the antibiotic ampicillin. The results of *E. coli* growth are summarized below. The shaded area represents extensive growth of bacteria; dots represent individual colonies of bacteria.



43. Which of the following statements best explains why there are fewer colonies on plate IV than on plate III?

(A) Plate IV is the positive control.
(B) Not all *E. coli* cells are successfully transformed.
(C) The bacteria on plate III did not mutate.
(D) The plasmid inhibits *E. coli* growth.

44. In a second experiment, the plasmid contained the gene for human insulin as well as the *amp*^{r} gene. Which of the following plates would have the highest percentage of bacteria that are expected to produce insulin?

(A) I only
(B) III only
(C) IV only
(D) I and III

MARCO LEARNING®

Mark Your Calendars

AP Review Sessions:

Unit 1: 2/6
Unit 2: 2/20
Unit 3: 3/6
Unit 4&5: 3/20
Unit 5&6: 4/3
Unit 7: 4/24
Unit 8: 5/1

Subscribe to:
Marco Learning

Follow us on your favorite social media channels!

@marcolearning
@apbiopenguins

@marcolearning
@apbiopenguins

Marco Learning
AP Bio Insta-Review

MARCO LEARNING®

MARCO LEARNING

AP Bio Penguins are Dressed for Success

See you Sunday 2/6 at 4pm

We will do:
Biochemistry Review
Biochemistry Q&A