MARCO LEARNING®

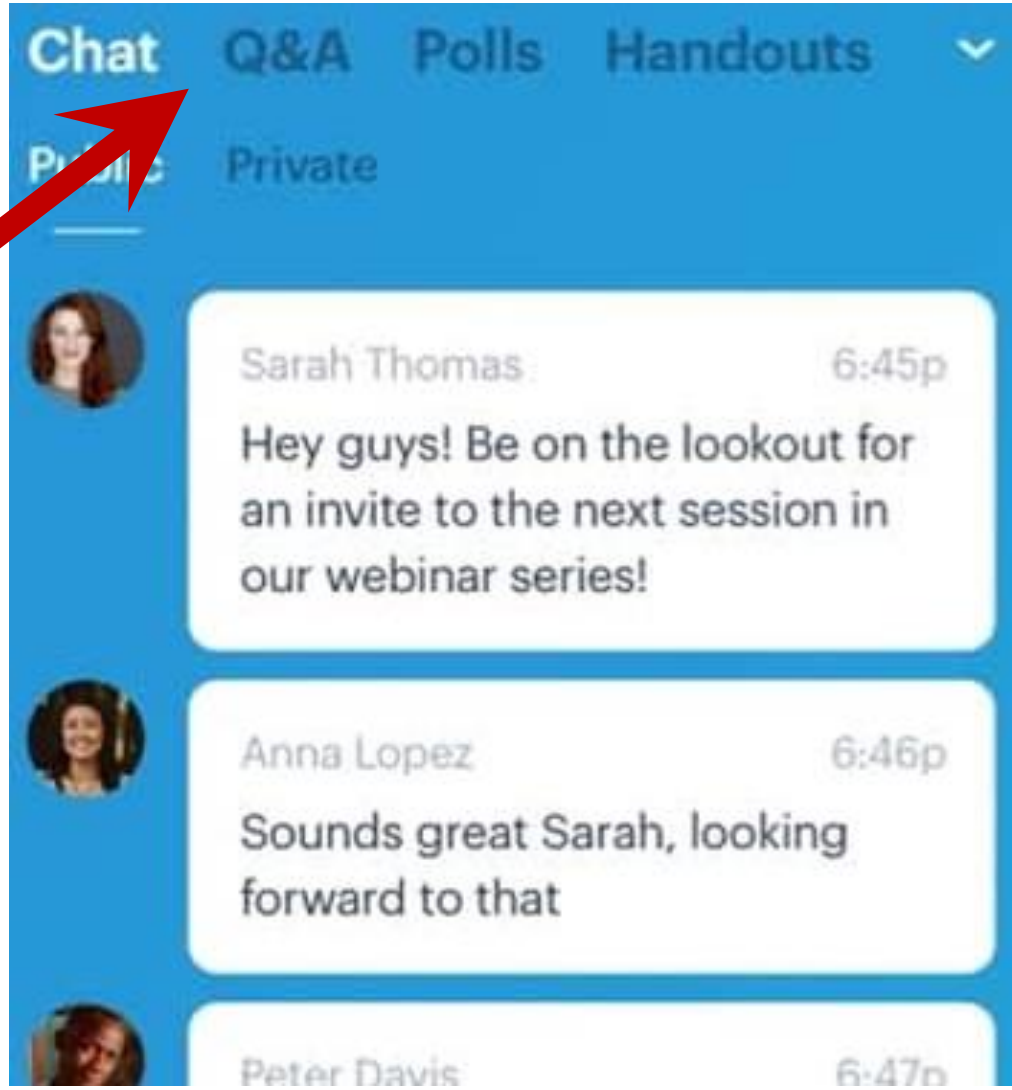
AP Biology Review

Tiffany Jones

Chat

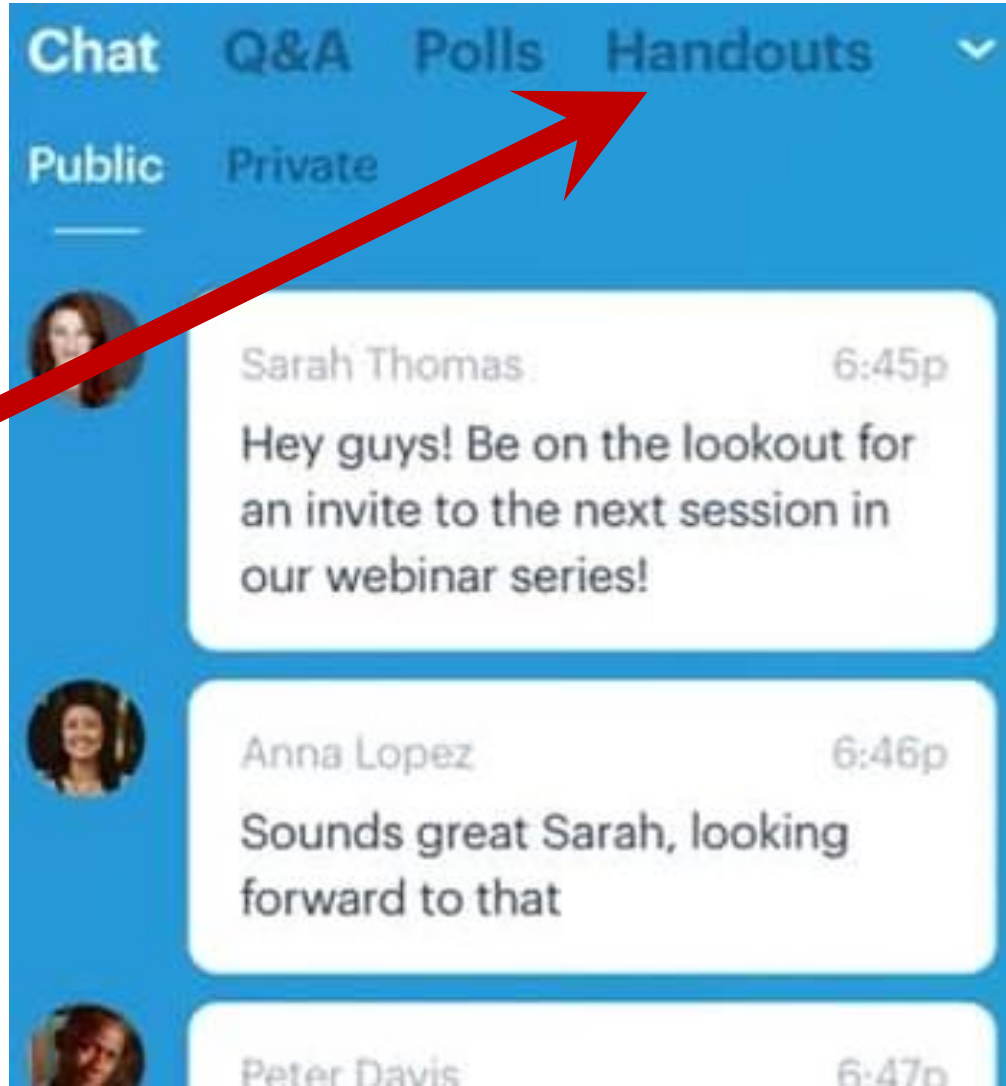
Don’t be shy! Talk to us in the **Chat** section

Post your questions in the **Q&A Section** and upvote your favorite questions.



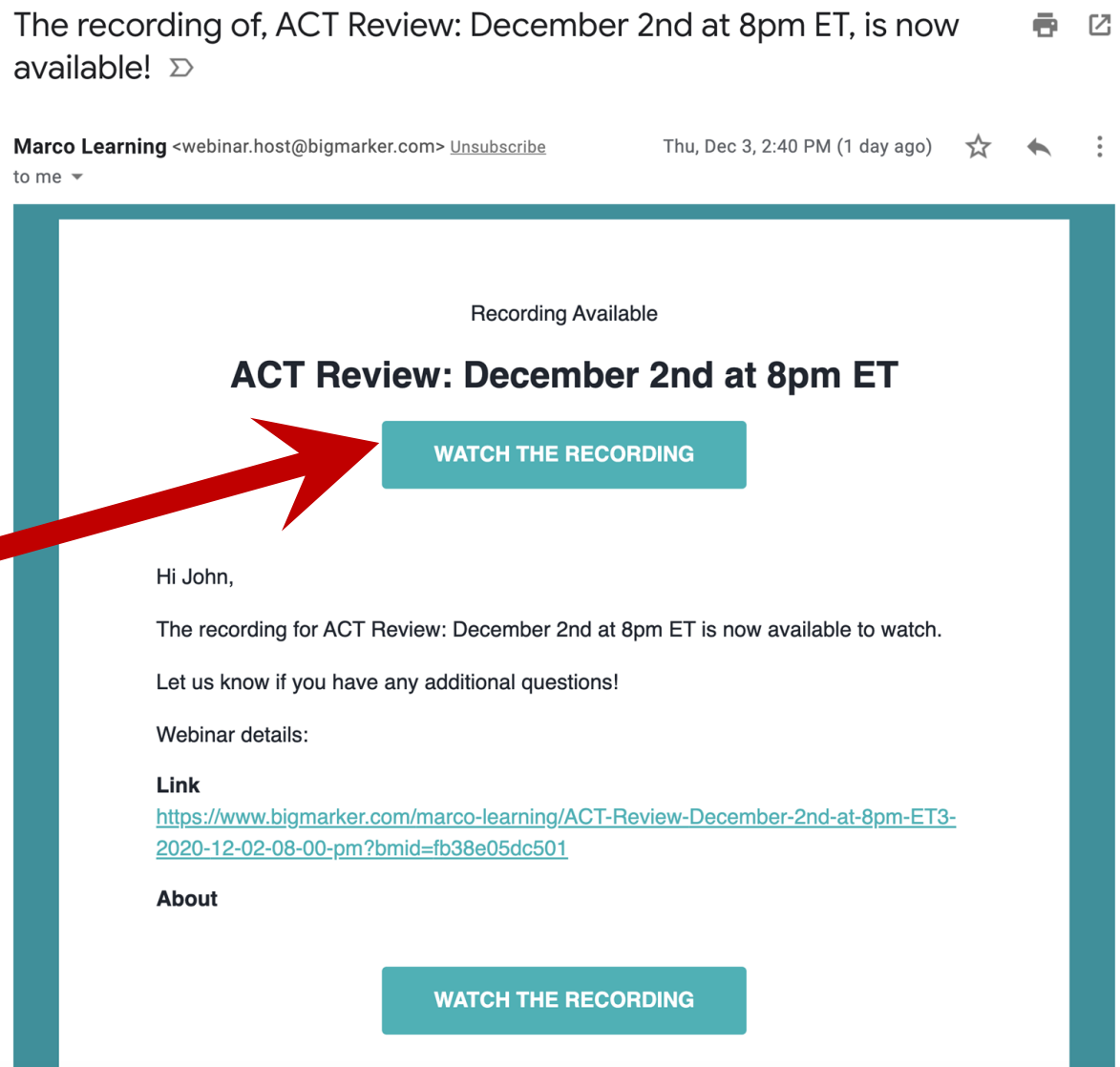
Handouts

Download your handouts and links in the **Handouts** tab.



Recordings

All sessions **will be recorded** and sent to you via email.



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

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AP Biology

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

You are now an AP Bio Penguin!

Resources for Now...

- AP Biology Penguins Website:
  apbiopenguins.weebly.com
- 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

Topic Breakdown

Big Ideas	Approximate Exam Weighting	#Qs
Evolution	15% - 17%	9.3
Energetics	27% - 47%	23.7
Information Storage & Transmission	25% - 40%	18
Systems Interactions	12% - 18%	9

Based on the 2020 Practice Exams

Unit 1: Chemistry of Life

Water Properties & Biochemistry

- Hydrogen Bonds
- Proteins
- Lipids
- Nucleic Acids
- Carbohydrates

This is the foundational knowledge that we will build upon for all of AP Biology.

Unit 2: Cell Structure & Function

Topics: Organelles & Membrane Transport

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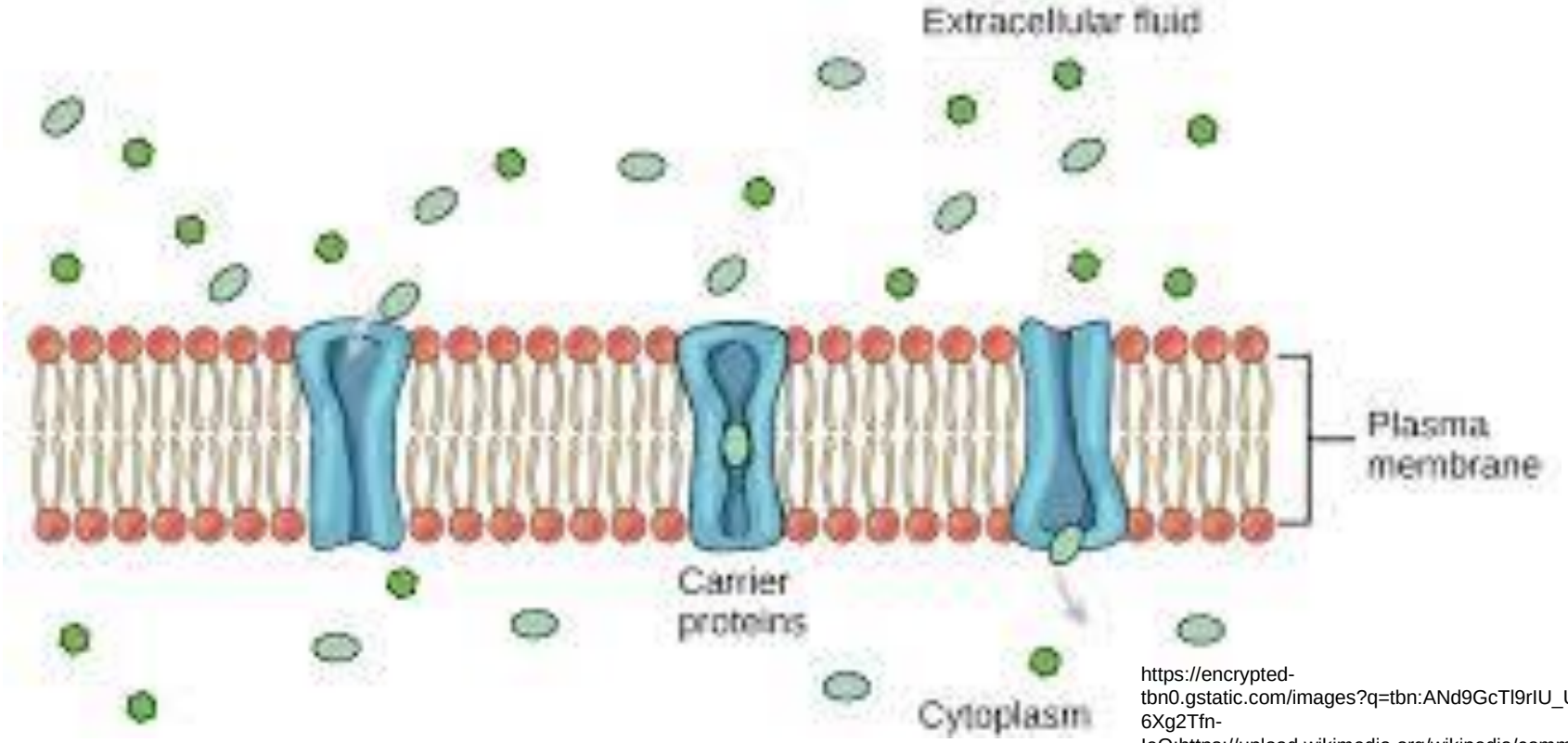
Unit 2: Cell Structure & Function

Organelles & Membrane Transport



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Unit 3: Cellular Energetics

Enzymes & Energy

- Proteins
- Cellular Respiration
- Photosynthesis

Don't get stuck on the minor details...

What goes in?
What comes out?
Where?
Why is it important?

Unit 4: Cell Comm. & Cell Cycle

Signal Transduction & Mitosis

- Receptor, Transduction, Response
- Checkpoints
- Interphase
- Mitosis
- Cytokinesis

Unit 5: Heredity

Meiosis & Genetics

- Meiosis
- Comparison w/ Mitosis
- Mendelian Genetics
- Non-Mendelian Genetics

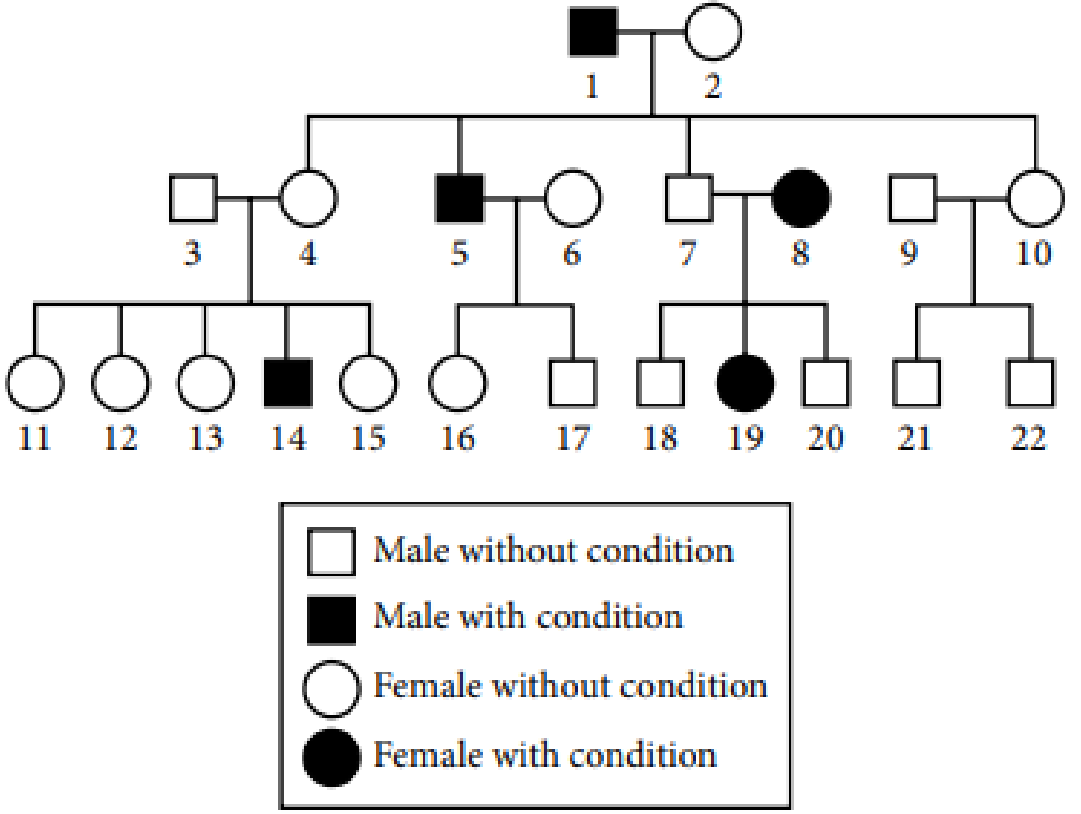


Figure 1. Inheritance of a particular condition over three generations of a family

Unit 6: Gene Express & Regulation

Molecular Genetics

- DNA vs. RNA
- Replication
- Transcription
- Translation
- Mutations
- BioTechnology

It's all about that central DOG-ma, right?

Unit 7: Natural Selection

Evolution

- Selection
- Hardy-Weinberg
- Phylogeny
- Evidence of Evolution

Unit 8: Ecology

- Energy Flow
- Population Ecology
- Community Ecology

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

Penguin: Just part of my nature to squawk

Multiple Choice Questions

Types of Questions

- Independent Questions
- Set Questions

Based on the 2020 Practice Exam

31 – 38 Independent Questions
22 – 29 Set Questions

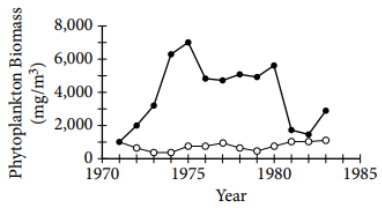
Multiple Choice Questions

Types of Questions

- Independent Questions
- Set Questions

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.

Questions 4–7 refer to the following material.



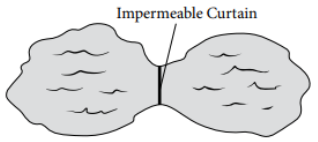


Figure 1. Phytoplankton biomass in two sides of a small lake that is divided by an impermeable curtain

In the early 1970s, researchers hypothesized that carbon was the limiting nutrient in many aquatic ecosystems. To test this hypothesis, the researchers divided a small lake in two roughly equal halves with an impermeable curtain that was fastened and

4. Which of the following claims is best supported by the data?
   (A) Carbon was a limiting factor for phytoplankton in the lake.
   (B) Phosphate was a limiting factor for phytoplankton in the lake.
   (C) Both carbon and phosphate were limiting factors for phytoplankton in the lake.
   (D) Neither carbon nor phosphate was a limiting factor for phytoplankton in the lake.
5. The average growth rate of the phytoplankton population from 1971 to 1975 in the side of the lake treated with sucrose and phosphate is closest to which of the following?
   (A) 125 (mg/m³)/year
   (B) 1,000 (mg/m³)/year
   (C) 1,500 (mg/m³)/year
   (D) 6,000 (mg/m³)/year

Multiple Choice Questions

- Independent Questions

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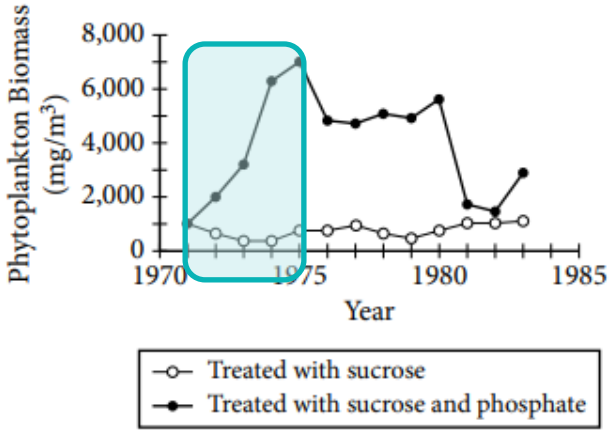
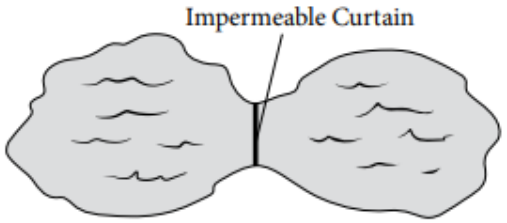
Sample Qs

Multiple Choice Questions

Set Questions

Questions 4–7 refer to the following material.





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(C) 1,500 (mg/m³)/year

(D) 6,000 (mg/m³)/year

(1971, 1000) & (1975, 7000)

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

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

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

Free Response Questions

Long FRQs (8 – 10 points)

- Q1: Interpreting and Evaluating Experimental Results
- Q2: Interpreting and Evaluating Experimental Results with Graphing

Short FRQs (4 points)

- Q3: Scientific Investigation
- Q4: Conceptual Analysis
- Q5: Analyze Model or Visual Representation
- Q6: Analyze Data

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Task Verbs

AP Biology CED pg. 206

Calculate: Perform mathematical steps to arrive at a final answer, including algebraic expressions, properly substituted numbers, and correct labeling of units and significant figures.

Construct/Draw: Create a diagram, graph, representation, or model that illustrates or explains relationships or phenomena. Labels may or may not be required.

Describe: Provide relevant characteristics of a specified topic.

Determine: Decide or conclude after reasoning, observation, or applying mathematical routines (calculations).

Evaluate: Judge or determine the significance or importance of information, or the quality or accuracy of a claim.

Explain: Provide information about how or why a relationship, process, pattern, position, situation, or outcome occurs, using evidence and/or reasoning to support or qualfiy a claim. Explain "how" typically requires analyzing the relationship, process, pattern, position, situation, or outcome; whereas explain "why" typically requires analysis of motivations or reasons for the relationship, process, pattern, position, situation, or outcome.

Identify: Indicate or provide information about a specified topic, without elaboration or explanation.

Justify: Provide evidence to support, qualify, or defend a claim, and/or provide reasoning to explain how that evidence supports or qualifies the claim.

Make a claim: Make an assertion that is based on evidence or knowledge.

Predict/Make a prediction: Predict the causes or effects of a change in, or disruption to, one or more components in a relationship, pattern, process, or system.

Represent: Use appropriate graphs, symbols, words, illustrations, and/or tables of numerical values to describe biological concepts, characteristics, and/or relationships.

State (the null/alternative hypothesis): Indicate or provide a hypothesis to support or defend a claim about a scientifically testable question.

Support a claim: Provide reasoning to explain how evidence supports or qualifies a claim.

Strategies for Questions

FRQ Writing

- Read the question, Read the question, Read the …
- Label your responses (a), (b), (c) & (d)
- Write in knowledge order
- Beware of contradictions
- Use the diagrams
- Define your terms
- Cross out
- Pen, Pencil, Crayon, Marker – doesn't matter

Strategies for Questions

Practice… Practice… Practice

- AP Central → AP Biology → The Exam
- 1999 – 2019, 2021 Released FRQs
    - Questions
    - Scoring Guidelines
    - Student Responses
    - Chief Readers Report
- AP Classroom

Practice Free Response (#5)

In humans, the gene that determines a particular condition has only two alleles, one of which (B) is completely dominant to the other (b). The phenotypes of three generations of a family with respect to the condition are shown in the pedigree in Figure 1. Individuals are numbered.

Practice Free Response (#5)

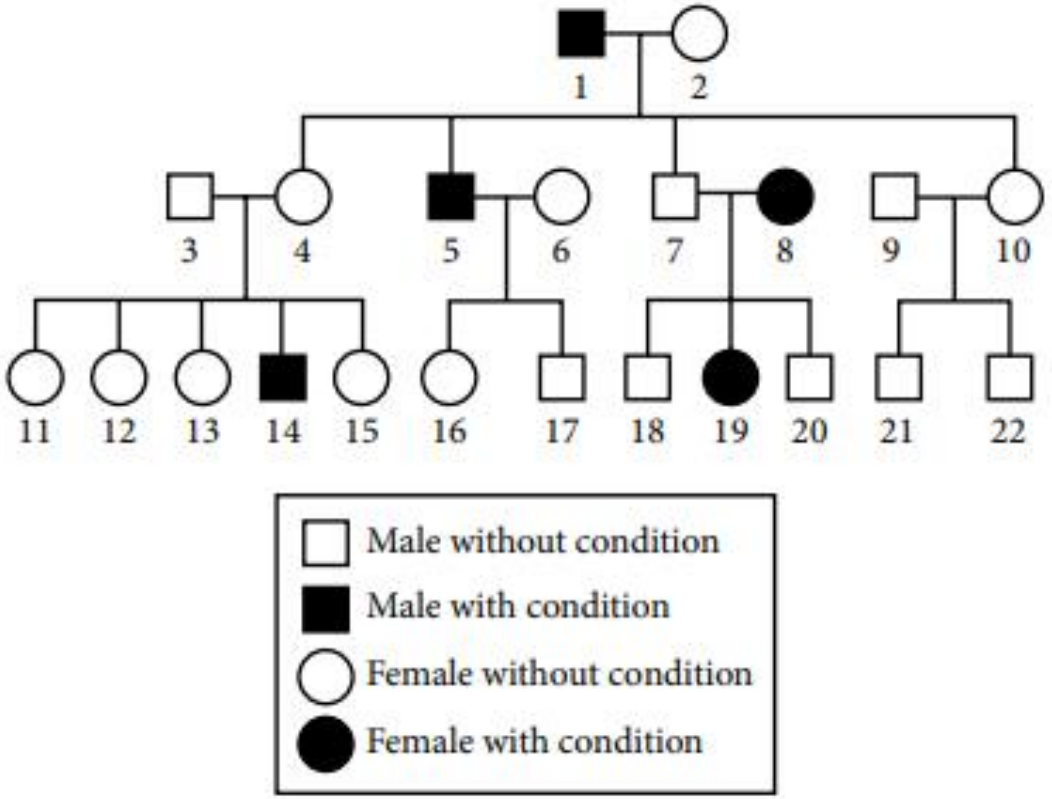


Figure 1. Inheritance of a particular condition over three generations of a family

Practice Free Response (#5)

(a) **Describe** the process in eukaryotes that ensures that the number of chromosomes will not double from parent to offspring when gametes fuse during fertilization.

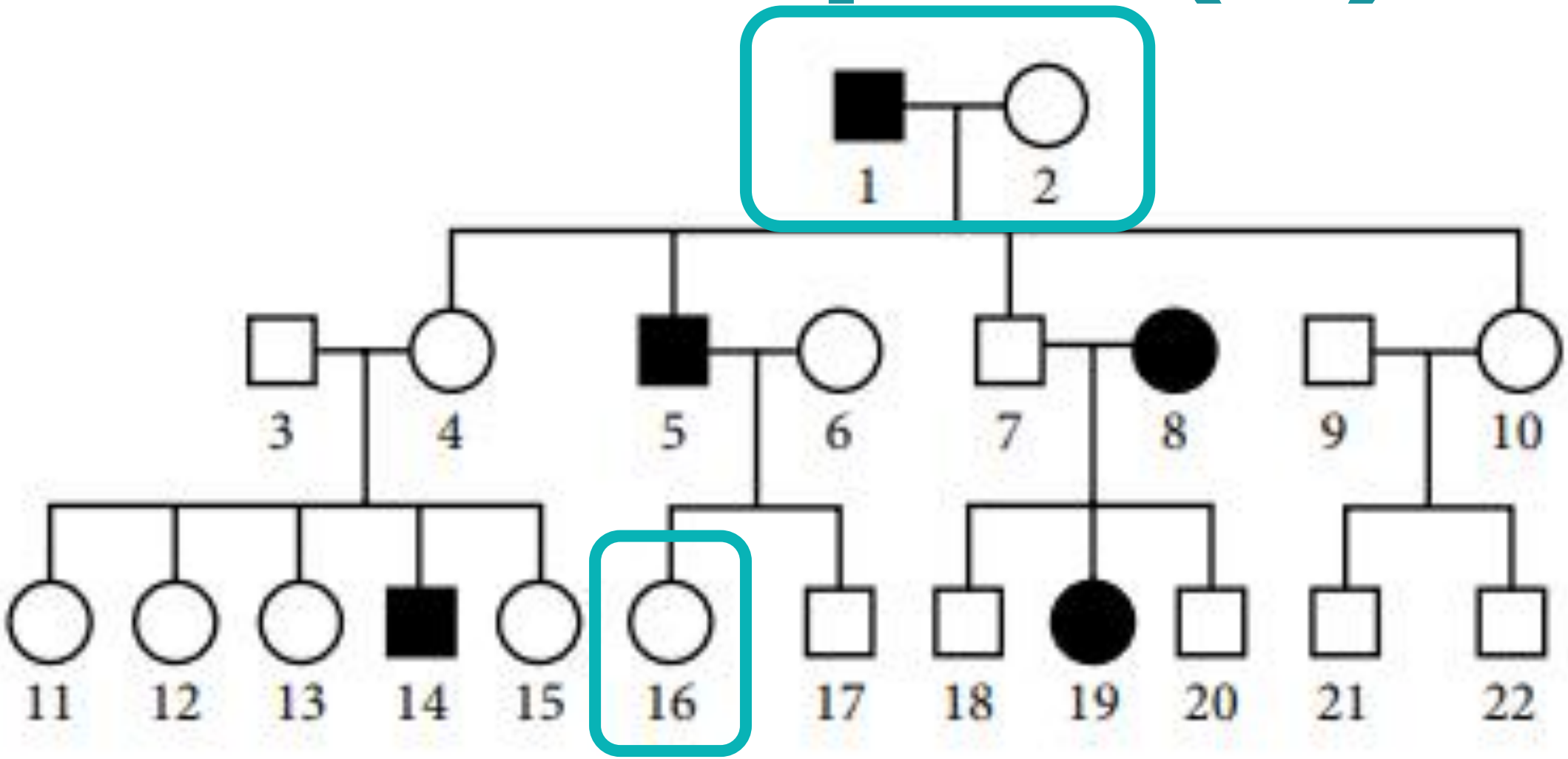
Practice Free Response (#5)

Homologous pairs of chromosomes separate in meiosis I, so the gametes are haploid (n), and each gamete receives only one member of each chromosome pair

Practice Free Response (#5)

(b) **Explain** how any one chromosome in individual 16 contains DNA that came from <u>both</u> individuals 1 and 2.

Practice Free Response (#5)



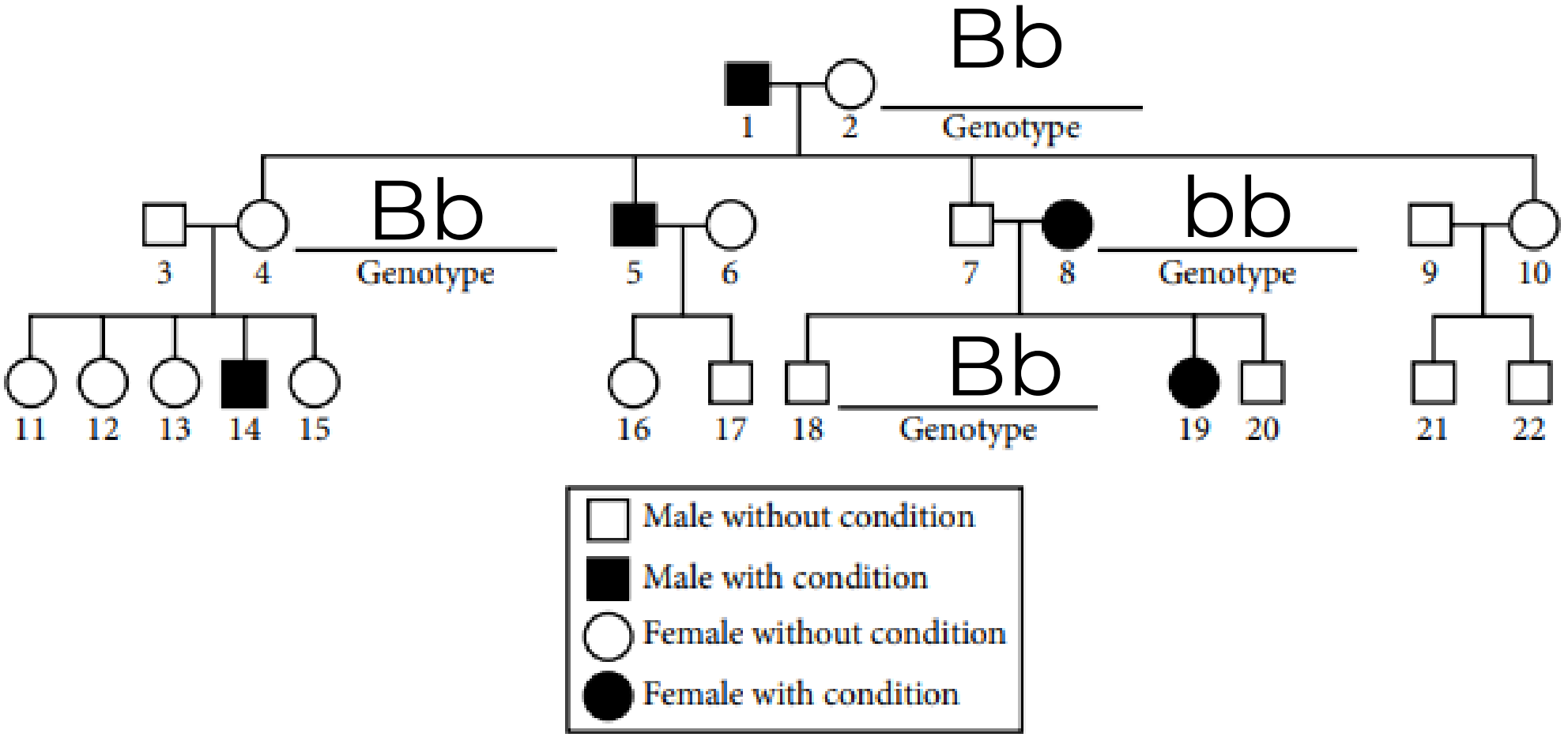
Practice Free Response (#5)

Individual 5 inherited one member of each homologous pair of chromosomes from individuals 1 and 2. During gamete formation in individual 5, crossing over occurred between non-sister chromatids in each homologous pair. Thus each chromosome formed and passed on to individual 16 contains DNA from both 1 and 2.

Practice Free Response (#5)

(c) **Use the template** figure of the pedigree and the allele designations *B* and *b* to **indicate** the genotypes of individuals 2, 4, 8, and 18.

Practice Free Response (#5)



Practice Free Response (#5)

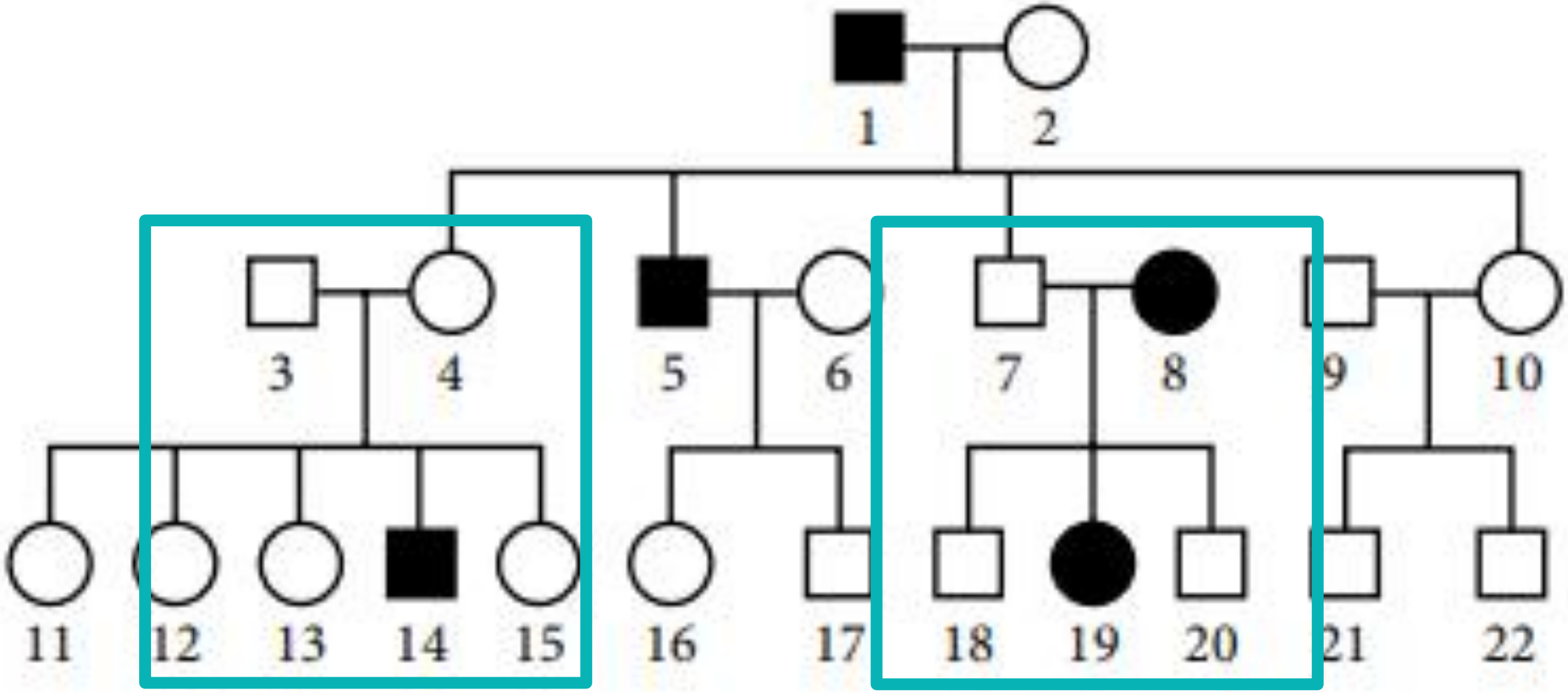
Individual 2, 4, and 18: The genotype of all three is Bb.

Individual 8: The genotype is bb.

Practice Free Response (#5)

(d) Based on the pedigree, **explain** whether the inheritance pattern of the condition is sex-linked or autosomal and dominant or recessive.

Practice Free Response (#5)



Practice Free Response (#5)

The disease phenotype is recessive and is autosomal/not sex-linked. It cannot be dominant because individuals 3 and 4 do not have it, but their offspring 14 does. It is not sex-linked because if it was Y-linked, all male offspring of males with the disease phenotype would have the trait, and they do not.

Q&A

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AP Student Support

with feedback

Practice makes perfect.

@apbiopenguins for daily review in the Instagram Stories starting Feb 1 & Live Sessions

Quick Quizizz Games for Quick Checks

Practice Multiple Choice & Free Responses in the AP Biology Review Guide

Follow us on your favorite social media channels!

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