

# 2023 Apes Frq

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

Point No Point - APES FRQ 2023 #1 (Set 1)

For each response written below, decide if the answer earns a point or not. There are no half points. Use the [rubric](#) provided by your teacher to guide your decisions.

(a) Identify the control group in this experiment.

1. The control group is the plot of unmodified beans.	____/1
2. Plot D	____/1
3. The control would be the amount of water.	____/1
4. The control group in the experiment would be Plot D.	____/1

(b) Identify the scientific question for the investigation.

1. Do GMO green beans affect crop yield?	____/1
2. Do genetically modified green beans yield a higher amount of beans than unmodified beans in arid regions?	____/1
3. How will green beans grown in the same environment be affected by different genetic modifications in terms of crop yields?	____/1
4. The scientific question would be which new variety of green beans produce a higher yield in arid regions.	____/1

(c) Researchers repeated the experiment modifying the length of time for the spray irrigation to 20 minutes per day. Explain how the results of the experiment could be altered with this modification.

1. By reducing the time for spray irrigation to 20 minutes this can effect the rate of which the experiment changes.	____/1
2. By reducing irrigation there will be fewer beans collected in the plots.	____/1
3. The crops would receive less water, which would help beans that can survive on little water thrive, while the other types wither, changing the results of the experiment.	____/1
4. Shorter irrigation time would mean less water to the plots which could create longer growing time.	____/1

(d) Based on the data in the table, identify the plot with the lowest soil temperature.

1. Plot C	____/1
2. The plot with the lowest temperature would be plot D (unmodified beans).	____/1
3. D (unmodified beans)	____/1
4. Plot D, the unmodified beans has the lowest temperature.	____/1

## 2023 APES FRQ: A Comprehensive Guide to Mastering the Free Response Questions

Are you a high school student staring down the barrel of the AP Environmental Science (APES) exam? The free-response questions (FRQs) can be daunting, accounting for a significant portion of your final grade. But don't panic! This comprehensive guide breaks down the 2023 APES FRQs, offering strategies, example questions, and insights to help you conquer this crucial part of the exam. We'll explore common themes, effective answering techniques, and provide you with the knowledge to significantly improve your score. Let's dive in!

### Understanding the APES FRQ Structure

The APES exam features three types of FRQs: data analysis, document-based, and synthesis questions. Each requires a different approach, demanding a thorough understanding of the course material and strong analytical skills.

# **1. Data Analysis FRQs (2023 APES FRQ Examples)**

These questions present you with data – graphs, charts, tables – and require you to interpret and analyze them. Expect questions about:

Trend identification: Spotting patterns and relationships within the data.

Calculation and interpretation: Performing simple calculations (e.g., percentages, averages) and explaining their significance.

Drawing conclusions: Formulating logical conclusions based on the data provided.

Example: A graph showing CO<sub>2</sub> levels over time might ask you to identify trends, explain possible causes, and predict future scenarios. Strong answers will clearly state the trend, provide supporting data points, and link the trend to relevant environmental concepts.

# **2. Document-Based FRQs (2023 APES FRQ Examples)**

These questions provide you with excerpts from articles, scientific studies, or other sources. You must then analyze the information presented, draw conclusions, and connect it to broader environmental principles.

Critical reading and comprehension: Understanding the main points and implications of the provided text.

Synthesis of information: Connecting information from multiple sources to create a cohesive argument.

Application of knowledge: Relating the information to the broader concepts covered in the APES curriculum.

Example: An excerpt about deforestation might ask you to analyze the environmental consequences, discuss economic factors contributing to it, and suggest potential solutions. A well-structured answer will summarize the document, connect its points to relevant APES concepts (e.g., biodiversity loss, carbon cycle), and propose solutions grounded in environmental science.

# **3. Synthesis FRQs (2023 APES FRQ Examples)**

These questions require you to synthesize information from multiple sources or apply your knowledge to a complex environmental problem. They often involve:

Problem identification: Clearly defining the environmental issue at hand.

Cause and effect analysis: Identifying the factors contributing to the problem and their consequences.

Solution development: Proposing feasible and well-supported solutions.

Example: A question about sustainable agriculture might ask you to compare conventional and

sustainable farming practices, analyze their environmental impacts, and recommend strategies for promoting sustainable agriculture. High-scoring responses will demonstrate a thorough understanding of the issue, address multiple perspectives, and propose solutions supported by scientific evidence.

## **Mastering the APES FRQs: Key Strategies**

Regardless of the question type, several strategies will improve your performance on the 2023 APES FRQs:

**Practice, practice, practice:** Work through past FRQs to familiarize yourself with the question formats and develop your problem-solving skills.

**Understand the rubric:** Familiarize yourself with the scoring guidelines to understand what constitutes a high-scoring response.

**Organize your answers:** Use clear headings, bullet points, and concise language to make your answers easy to read and understand.

**Show your work:** Clearly show your calculations and reasoning to demonstrate your understanding.

**Use specific examples:** Support your answers with concrete examples and relevant data.

**Manage your time:** Allocate sufficient time for each question to ensure you can complete all sections.

## **Beyond the 2023 APES FRQs: Long-Term Preparation**

Success on the APES FRQs isn't just about cramming the night before. It's about developing a solid understanding of the core concepts throughout the year. Focus on:

**Mastering key concepts:** Ensure a strong grasp of fundamental principles like energy flow, nutrient cycling, population dynamics, and human impact on the environment.

**Developing critical thinking skills:** Practice analyzing data, interpreting information, and formulating solutions to complex environmental problems.

**Active learning:** Engage actively with the material through discussions, projects, and research.

## **Conclusion**

The 2023 APES FRQs may seem intimidating, but with careful preparation, effective strategies, and a solid understanding of the course material, you can significantly improve your chances of success. Remember to practice consistently, understand the question types, and clearly articulate your answers. Good luck!

# FAQs

1. Are there specific topics that frequently appear on the APES FRQs? Yes, common themes include climate change, biodiversity loss, pollution, resource management, and human population growth.
2. How much time should I allocate to each FRQ? You'll have a limited time for the entire FRQ section, so plan your time accordingly. Aim for roughly equal time allocation per question.
3. Can I use diagrams or charts in my FRQ answers? Absolutely! Visual aids can enhance your answers, particularly for data analysis questions. Make sure they are clearly labeled and relevant.
4. What if I don't know the answer to a question? Don't leave it blank! Attempt to answer what you do know, even if it's a partial answer. You might earn partial credit.
5. Where can I find past APES FRQs for practice? The College Board website is a great resource for past exams and practice questions. Your teacher might also provide additional practice materials.

**2023 apes frq:** AP Environmental Science Premium, 2022-2023: 5 Practice Tests + Comprehensive Review + Online Practice Gary S. Thorpe, 2022-02-01 Be prepared for exam day with Barron's. Trusted content from AP experts! Barron's AP Environmental Science Premium: 2022-2023 includes in-depth content review and online practice. It's the only book you'll need to be prepared for exam day. Written by Experienced Educators Learn from Barron's--all content is written and reviewed by AP experts Build your understanding with comprehensive review tailored to the most recent exam Get a leg up with tips, strategies, and study advice for exam day--it's like having a trusted tutor by your side Be Confident on Exam Day Sharpen your test-taking skills with 5 full-length practice tests--2 in the book, and 3 more online Strengthen your knowledge with in-depth review covering all Units on the AP Environmental Science Exam--fully updated for this edition to reflect the current course and exam! Reinforce your learning with practice questions at the end of each chapter Online Practice Continue your practice with 3 full-length practice tests and additional online labs on Barron's Online Learning Hub Simulate the exam experience with a timed test option Deepen your understanding with detailed answer explanations and expert advice Gain confidence with scoring to check your learning progress

**2023 apes frq:** Princeton Review AP Environmental Science Prep, 2021 The Princeton Review, 2020-10-13 Make sure you're studying with the most up-to-date prep materials! Look for the newest edition of this title, The Princeton Review AP Environmental Science Prep, 2022 (ISBN: 9780525570646, on-sale August 2021). Publisher's Note: Products purchased from third-party sellers are not guaranteed by the publisher for quality or authenticity, and may not include access to online tests or materials included with the original product.

**2023 apes frq:** Understanding by Design Grant P. Wiggins, Jay McTighe, 2005 What is understanding and how does it differ from knowledge? How can we determine the big ideas worth understanding? Why is understanding an important teaching goal, and how do we know when students have attained it? How can we create a rigorous and engaging curriculum that focuses on understanding and leads to improved student performance in today's high-stakes, standards-based environment? Authors Grant Wiggins and Jay McTighe answer these and many other questions in this second edition of Understanding by Design. Drawing on feedback from thousands of educators around the world who have used the UbD framework since its introduction in 1998, the authors have greatly revised and expanded their original work to guide educators across the K-16 spectrum in the design of curriculum, assessment, and instruction. With an improved UbD Template at its core, the

book explains the rationale of backward design and explores in greater depth the meaning of such key ideas as essential questions and transfer tasks. Readers will learn why the familiar coverage- and activity-based approaches to curriculum design fall short, and how a focus on the six facets of understanding can enrich student learning. With an expanded array of practical strategies, tools, and examples from all subject areas, the book demonstrates how the research-based principles of Understanding by Design apply to district frameworks as well as to individual units of curriculum. Combining provocative ideas, thoughtful analysis, and tested approaches, this new edition of Understanding by Design offers teacher-designers a clear path to the creation of curriculum that ensures better learning and a more stimulating experience for students and teachers alike.

**2023 apes frq: *Environmental Science for AP®*** Andrew Friedland, Rick Relyea, 2015-01-30 Written specifically for the AP® Environmental Science course, Friedland and Relyea Environmental Science for AP® Second Edition, is designed to help you realize success on the AP® Environmental Science Exam and in your course by providing the built-in support you want and need. In the new edition, each chapter is broken into short, manageable modules to help students learn at an ideal pace. Do the Math boxes review quantitative skills and offer you a chance to practice the math you need to know to succeed. Module AP® Review questions, Unit AP® Practice Exams, and a full length cumulative AP® Practice test offer unparalleled, integrated support to prepare you for the real AP® Environmental Science exam in May.

**2023 apes frq: *Barron's AP Psychology with CD-ROM*** Robert McEntarffer, Allyson J. Weseley, 2010-02-01 This updated manual presents one diagnostic test and two full-length practice tests that reflect the actual AP Psychology Exam in length, subject matter, and difficulty. All test questions are answered and explained. It also provides extensive subject review covering all test topics. Topics reviewed include research methods, the biological basis of behavior, sensation and perception, states of consciousness, learning, cognition, personality, abnormal psychology, and treatment of disorders. This manual also presents an overview of the test, extra multiple-choice practice questions, test-taking tips, and an analysis of the test's essay question with a sample essay. Enclosed with the manual is a CD-ROM that presents two more practice tests with answers, explanations, and automatic scoring, as well as extensive subject review.

**2023 apes frq: *Strive for a 5: Preparing for the AP Environmental Science Exam*** Andrew Friedland, Rick Relyea, 2020-06-22 Strive for a 5: Preparing for the AP(R) Environmental Science Examination is a workbook designed to help students evaluate their understanding of the material covered in the student textbook, to reinforce key concepts, and to prepare students for success on the AP(R) Environmental Science Exam. There are two sections in the Strive for a 5, a study guide section and a test preparation section. The study guide contains a detailed reading guide for students to use as they study the chapter with between 100 and 200 comprehension questions per chapter. There are also vocabulary exercises, math practice problems, and review questions, as well as FRQ practice questions and two full practice cumulative exams.

**2023 apes frq: *5 Steps to a 5 500 AP Environmental Science Questions to Know by Test Day*** Jane P. Gardner, Chris Womack, Stephanie Richards, Thomas A. editor - Evangelist, 2011-11-28 Organized for easy reference and crucial practice, coverage of all the essential topics presented as 500 AP-style questions with detailed answer explanations 5 Steps to a 5: 500 AP Environmental Science Questions to Know by Test Day is tailored to meet your study needs—whether you've left it to the last minute to prepare or you have been studying for months. You will benefit from going over the questions written to parallel the topic, format, and degree of difficulty of the questions contained in the AP exam, accompanied by answers with comprehensive explanations. Features: 500 AP-style questions and answers referenced to core AP materials Review explanations for right and wrong answers Additional online practice Close simulations of the real AP exams Updated material reflects the latest tests Online practice exercises

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on-sale August 2020). Publisher's Note: Products purchased from third-party sellers are not guaranteed by the publisher for quality or authenticity, and may not include access to online tests or materials included with the original product.

**2023 apes frq: Friedland and Relyea Environmental Science for AP\*** Andrew Friedland, Rick Relyea, David Courard-Hauri, 2011-06

**2023 apes frq: AP Environmental Science Premium, 2024: 5 Practice Tests + Comprehensive Review + Online Practice** Gary S. Thorpe, 2023-07-04 For more than 80 years, BARRON'S has been helping students achieve their goals. Prep for the AP® Environmental Science exam with trusted review from our experts.

**2023 apes frq: The Smartypants' Guide to the AP Environmental Science Exam** Michelle Mahanian, 2006-09 When it comes to scoring higher on the AP Environmental Science Exam, nobody prepares you better than Smartypants. This comprehensive, efficient study guide pinpoints everything you need to boost your score, from test-taking strategies to a complete review by topic. Features of this study guide include: a focused review of every topic on the AP exam, expert test-taking tips, a realistic full-length practice exam with answer key and thorough explanations, important graphs, charts, and diagrams, and a tune-up of key concepts and vocabulary terms. Compatible with virtually every standard textbook or course on the subject, this invaluable tool is what you need to score your best - and get the college credits you deserve For more about discounts on bulk orders, copy and paste the following into your browser: <http://www.bulkdiscounts.smartypantsguides.com> You can contact the author directly at [author@smartypantsguides.co](mailto:author@smartypantsguides.co)

**2023 apes frq: Barron's AP Microeconomics/Macroeconomics** Frank Musgrave, Elia Kacapyr, James Redelsheimer, 2015 This in-depth preparation for both AP economics exams provides a detailed review of all test topics. Includes two full-length practice tests--one in Microeconomics and one in Macroeconomics--with all test questions answered and explained.

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**2023 apes frq: Cracking the AP Human Geography Exam, 2016 Edition** Princeton Review (Firm), 2015-08 A guide to preparing for the human geography exam for advanced placement, featuring subject reviews, lists of key terms, maps and graphics, and two full-length practice tests with explained answers.

**2023 apes frq: Generosity and Jealousy** Charles Lindholm, 1982

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Review, 2021-08-03 Make sure you're studying with the most up-to-date prep materials! Look for the newest edition of this title, The Princeton Review AP Psychology Premium Prep, 2023 (ISBN: 9780593450871, on-sale August 2022). Publisher's Note: Products purchased from third-party sellers are not guaranteed by the publisher for quality or authenticity, and may not include access to online tests or materials included with the original product.

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**2023 apes frq: *The Sublime Quran* , 2007** This is the first translation of the Quran by an American woman. It is a universal and inclusive translation with the hope that Islam will be better understood in the West. She also challenges the use of the word to beat in 4: 34 as meaning to go away which is how the Prophet of Islam understood the word as it has historically justified violence against and abuse of Muslim women. This interpretation must change, she says, and revert to the way the Prophet understood it.

**2023 apes frq: Barron's AP Computer Science A with CD-ROM** Roselyn Teukolsky, 2015-01-01 This updated manual presents computer science test takers with— Three AP practice tests for the Level A course, including a diagnostic test Charts detailing the topics for each test question All test questions answered and explained A subject review covers static variables, the List interface, Integer. MAX\_VALUE, and Integer. MIN\_VALUE. The practice exams contain several new questions on two-dimensional arrays and reflect the new free-response style used on the 2012 AP exam. This manual comes with a CD-ROM that has two more model AP exams with answers, explanations, automatic scoring for multiple-choice questions, and a scoring chart. BONUS ONLINE PRACTICE TEST: Students who purchase this book or package will also get FREE access to one additional full-length online AP Computer Science A test with all questions answered and explained. System Requirements: This program will run on a PC with: 2.33GHz or faster x86-compatible processor, or Intel® Atom®, 1.6GHz or faster processor for netbooks Microsoft® Windows® Server 2008, Windows Vista® Home Premium, Business, Ultimate, or Enterprise (including 64 bit editions) with Service Pack 2, Windows 7, or Windows 8 Classic 512MB of RAM (1GB of RAM recommended) This program will run on a Mac® with: Intel Core®, Duo 1.83GHz or faster processor Mac OS X v10.6, v10.7, v10.8, or v10.9 512MB of RAM (1GB of RAM recommended)

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**2023 apes frq: *The Maglemose Culture*** Ole Grøn, 1995 Subtitled 'the reconstruction of the social organization of a mesolithic culture in Northern Europe', this book is based on a structural analysis of the Ulkestrup Huts in Central Zealand. The distribution patterns of microliths and arrangement of hearths, bark floors and other patterned evidence are compared with all the available evidence from northern Europe to suggest some general patterns and possible future directions for research.

**2023 apes frq: *AP® Human Geography Crash Course, Book + Online*** Christian Sawyer, 2020-11-17 AP® Human Geography Crash Course® - updated for the current exam! A Higher Score in Less Time! At REA, we invented the quick-review study guide for AP® exams. A decade later, REA's Crash Course® remains the top choice for AP students who want to make the most of their study time and earn a high score. Here's why more AP® teachers and students turn to REA's AP® Human Geography Crash Course®: Targeted, Focused Review - Study Only What You Need to Know REA's all-new 2nd edition addresses all the latest test revisions. Our Crash Course® is based on an in-depth analysis of the revised AP® Human Geography course description outline and sample AP® test questions. We cover only the information tested on the exam, so you can make the most of your

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**2023 apes frq: Program Summary Report** , 1978

**2023 apes frq: POGIL Activities for AP Biology** , 2012-10

**2023 apes frq: AQA GCSE Electronics** Chris Newbould, David Faithfull, David Swinscoe, 2014-11 'GCSE AQA Electronics' is the only resource to have been developed with and exclusively endorsed by AQA. With a real focus on tracking individual progress, you can improve your students' chance of exam success through a unique blend of print and electronic resources.

**2023 apes frq: Silent Spring** Rachel Carson, 2020-03-26 Now recognized as one of the most influential books of the twentieth century, *Silent Spring* exposed the destruction of wildlife through the widespread use of pesticides. Rachel Carson's *Silent Spring* alerted a large audience to the environmental and human dangers of pesticides, spurring revolutionary changes in the laws affecting our air, land, and water. Despite condemnation in the press and heavy-handed attempts by the chemical industry to ban the book, Carson succeeded in creating a new public awareness of the environment which led to changes in government and inspired the ecological movement. It is thanks to this book, and the help of many environmentalists, that harmful pesticides such as DDT were banned from use in the US and countries around the world. This Penguin Modern Classics edition includes an introduction by Lord Shackleton, a preface by World Wildlife Fund founder Julian Huxley, and an afterword by Carson's biographer Linda Lear.

**2023 apes frq: Experimental Design for Biologists** David J. Glass, 2007 The effective design of scientific experiments is critical to success, yet graduate students receive very little formal training in how to do it. Based on a well-received course taught by the author, *Experimental Design for Biologists* fills this gap. *Experimental Design for Biologists* explains how to establish the framework for an experimental project, how to set up a system, design experiments within that system, and how to determine and use the correct set of controls. Separate chapters are devoted to negative controls, positive controls, and other categories of controls that are perhaps less recognized, such as assumption controls and experimentalist controls. Furthermore, there are sections on establishing the experimental system, which include performing critical system controls. Should all experimental plans be hypothesis-driven? Is a question/answer approach more appropriate? What was the hypothesis behind the Human Genome Project? What color is the sky? How does one get to Carnegie Hall? The answers to these kinds of questions can be found in *Experimental Design for Biologists*. Written in an engaging manner, the book provides compelling



lessons in framing an experimental question, establishing a validated system to answer the question, and deriving verifiable models from experimental data. *Experimental Design for Biologists* is an essential source of theory and practical guidance in designing a research plan.

**2023 apes frq:** Coral Reef Ecology Yuri I. Sorokin, 2013-03-12 Coral reef communities are among the most complex, mature and productive ecosystems on earth. Their activity resulted in the creation of vast lime constructions. Being extremely productive and having the function of a powerful biofilter, coral reefs play an important role in global biogeochemical processes and in the reproduction of food resources in tropical marine regions. All aspects of coral reef science are covered systematically and on the basis of a holistic ecosystem approach. The geological history of coral reefs, their geomorphology as well as biology including community structure of reef biota, their functional characteristics, physiological aspects, biogeochemical metabolism, energy balance, environmental problems and management of resources are treated in detail.

**2023 apes frq:** Agriculture and the Nitrogen Cycle Arvin Mosier, J. Keith Syers, John R. Freney, 2013-04-10 Nitrogen is an essential element for plant growth and development and a key agricultural input-but in excess it can lead to a host of problems for human and ecological health. Across the globe, distribution of fertilizer nitrogen is very uneven, with some areas subject to nitrogen pollution and others suffering from reduced soil fertility, diminished crop production, and other consequences of inadequate supply. *Agriculture and the Nitrogen Cycle* provides a global assessment of the role of nitrogen fertilizer in the nitrogen cycle. The focus of the book is regional, emphasizing the need to maintain food and fiber production while minimizing environmental impacts where fertilizer is abundant, and the need to enhance fertilizer utilization in systems where nitrogen is limited. The book is derived from a workshop held by the Scientific Committee on Problems of the Environment (SCOPE) in Kampala, Uganda, that brought together the world's leading scientists to examine and discuss the nitrogen cycle and related problems. It contains an overview chapter that summarizes the group's findings, four chapters on cross-cutting issues, and thirteen background chapters. The book offers a unique synthesis and provides an up-to-date, broad perspective on the issues of nitrogen fertilizer in food production and the interaction of nitrogen and the environment.

**2023 apes frq:** 5 Steps to a 5: AP U.S. History 2018, Elite Student Edition Daniel P. Murphy, Stephen Armstrong, 2017-08-11 Get ready to ace your AP U.S. History Exam with this easy-to-follow, multi-platform study guide *5 Steps to a 5: AP U.S. History 2018 Elite Student Edition* introduces an effective 5-step study plan to help you build the skills, knowledge, and test-taking confidence you need to achieve a high score on the exam. This popular test prep guide matches the latest course syllabus and latest exam. You'll get online help, six full-length practice tests (three in the book and three online), detailed answers to each question, study tips, and important information on how the exam is scored. Because this guide is accessible in print and digital formats, you can study online, via your mobile device, straight from the book, or any combination of the three. With the new "5 Minutes to a 5" section, you'll also get an extra AP curriculum activity for each school day to help reinforce the most important AP concepts. With only 5 minutes a day, you can dramatically increase your score on exam day! *5 Steps to a 5: AP U.S. History 2018 Elite Student Edition* features: • New: "5 Minutes to a 5"—Concise activities reinforcing the most important AP concepts and presented in a day-to-day study format • Access to the entire Cross Platform Prep Course in U.S. History • 6 Practice Exams (3 in the book + 3 online) • Powerful analytics you can use to assess your test readiness • Flashcards, games, social media support, and more

**2023 apes frq:** "I Love Learning; I Hate School" Susan D. Blum, 2016-01-13 Frustrated by her students' performance, her relationships with them, and her own daughter's problems in school, Susan D. Blum, a professor of anthropology, set out to understand why her students found their educational experience at a top-tier institution so profoundly difficult and unsatisfying. Through her research and in conversations with her students, she discovered a troubling mismatch between the goals of the university and the needs of students. In *I Love Learning; I Hate School*, Blum tells two intertwined but inseparable stories: the results of her research into how students learn contrasted with the way conventional education works, and the personal narrative of how she herself was

transformed by this understanding. Blum concludes that the dominant forms of higher education do not match the myriad forms of learning that help students—people in general—master meaningful and worthwhile skills and knowledge. Students are capable of learning huge amounts, but the ways higher education is structured often leads them to fail to learn. More than that, it leads to ill effects. In this critique of higher education, infused with anthropological insights, Blum explains why so much is going wrong and offers suggestions for how to bring classroom learning more in line with appropriate forms of engagement. She challenges our system of education and argues for a reintegration of learning with life.

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