

## Chapter 10 Section 2 Mendelian Genetics Study Guide Answers

Genetik und Evolutionsforschung, Genetik

The genetic information being unlocked by advances in genomic and high throughput technologies is rapidly revolutionizing our understanding of developmental processes in bovine species. This information is allowing researchers unprecedented insight into the genetic basis of key traits. Bovine Genomics is the first book to bring together and synthesize the information learned through the bovine genome sequencing project and look at its practical application to cattle and dairy production. Bovine Genomics opens with foundational chapters on the domestication of cattle and traditional Mendelian genetics. Building on these chapters, coverage rapidly moves to quantitative genetics and the advances of whole genome technologies. Significant coverage is given to such topics as epigenetics, mapping quantitative trait loci, genome-wide association studies and genomic selection in cattle breeding. The book is a valuable synthesis of the field written by a global team of leading researchers. Providing wide-ranging coverage of the topic, Bovine Genomic, is an essential guide to the field. The basic and applied science will be of use to researchers, breeders, and advanced students. Gore Vidal, known for such best-sellers as *The City and the Pillar*, *Burr*, *Lincoln*, and *Myra Breckinridge*, is a household name. The controversial Vidal ran for Congress in 1960, and set sparks flying with his public debates challenging William F. Buckley and Norman Mailer. Although one of America's most admired and prolific writers, Vidal has been steadfastly ignored or impugned by many critics. This is partly owing to the vast scope of his writings, which include more than twenty novels, half a dozen plays, dozens of screenplays, countless essays and book reviews, political commentary, and short stories; how do the critics approach such a writer? There has also been backlash against Vidal, whose radical polemics and undisguised contempt for those whom he has called "the hacks and hicks of academe" have hardly endeared him to the critical establishment. *Gore Vidal: Writer Against the Grain* is the first collection of critical essays to approach this important American writer in an attempt to rectify the unwarranted underestimation of his work. Jay Parini has drawn from the best of previously published criticism and commissioned fresh articles by leading contemporary critics to construct a comprehensive portrait of Vidal's multifaceted and memorable career. Writers as diverse as Harold Bloom, Stephen Spender, Catharine R. Stimpson, Richard Poirier, and Italo Calvino examine Vidal's work in their own highly individual ways, and each finds a different Vidal to celebrate, chide, recollect, or view close up. Also included is a recent interview with Parini in which Vidal discusses his career and his troubled relationship with the reviewers. The Vidal that finally emerges from these essays is a writer of undeniable weight and importance. As readers will agree, *Gore Vidal: Writer Against the Grain* establishes his rightful role as one of the premier novelists and leading critical observers of this century.

This book is suitable for undergraduate medical students, as part of their basic sciences training, but is also relevant to interested under- and postgraduate science and engineering students. There is a special focus on the application of molecular medicine in Africa and in developing countries elsewhere.

Iowa State Univ., Ames. Textbook for undergraduate biological science students. Very colorful and user-friendly format. Includes: chapter-end questions, boxed essays, tables, summaries, key terms, and suggested readings.

Preface p. ix Chapter 1 Biology and Its Philosophy p. 2 1.1 The Rise of Logical Positivism p. 2 1.2 The Consequences for Philosophy p. 4 1.3 Problems of Falsifiability p. 6 1.4 Philosophy of Science Without Positivism p. 8 1.5 Speculation and Science p. 10 Introduction to the Literature p. 11 Chapter 2 Autonomy and Provincialism p. 13 2.1 Philosophical Agendas

## Get Free Chapter 10 Section 2 Mendelian Genetics Study Guide Answers

versus Biological Agendas p. 13 2.2 Motives for Provincialism and Autonomy p. 18 2.3 Biological Philosophies p. 21 2.4 Tertium Datur? p. 25 2.5 The Issues in Dispute p. 30 2.6 Steps in the Argument p. 34 Introduction to the Literature p. 35 Chapter 3 Teleology and the Roots of Autonomy p. 37 3.1 Functional Explanations in Molecular Biology p. 39 3.2 The Search for Functions p. 43 3.3 Functional Laws p. 47 3.4 Directively Organized Systems p. 52 3.5 The Autonomy of Teleological Laws p. 59 3.6 The Metaphysics and Epistemology of Functional Explanation p. 62 3.7 Functional Explanation Will Always Be with Us p. 65 Introduction to the Literature p. 67 Chapter 4 Reductionism and the Temptation of Provincialism p. 69 4.1 Motives for Reductionism p. 69 4.2 A Triumph of Reductionism p. 73 4.3 Reductionism and Recombinant DNA p. 84 4.4 Antireductionism and Molecular Genetics p. 88 4.5 Mendel's Genes and Benzer's Cistrons p. 93 4.6 Reduction Obstructed p. 97 4.7 Qualifying Reductionism p. 106 4.8 The Supervenience of Mendelian Genetics p. 11 4.9 Levels of Organization p. 117 Introduction to the Literature p. 119 Chapter 5 The Structure of Evolutionary Theory p. 121 5.1 Is There an Evolutionary Theory? p. 122 5.2 The Charge of Tautology p. 126 5.3 Population Genetics and Evolution p. 130 5.4 Williams's Axiomatization of Evolutionary Theory p. 136 5.5 Adequacy of the Axiomatization p. 144 Introduction to the Literature p. 152 Chapter 6 Fitness p. 154 6.1 Fitness Is Measured by Its Effects p. 154 6.2 Fitness As a Statistical Propensity p. 160 6.3 The Supervenience of Fitness p. 164 6.4 The Evidence for Evolution p. 169 6.5 The Scientific Context of Evolutionary Theory p. 174 Introduction to the Literature p. 179 Chapter 7 Species p. 180 7.1 Operationalism and Theory in Taxonomy p. 182 7.2 Essentialism--For and Against p. 187 7.3 The Biological Species Notion p. 191 7.4 Evolutionary and Ecological Species p. 197 7.5 Species Are Not Natural Kinds p. 201 7.6 Species As Individuals p. 204 7.7 The Theoretical Hierarchy of Biology p. 212 7.8 The Statistical Character of Evolutionary Theory p. 216 7.9 Universal Theories and Case Studies p. 219 Introduction to the Literature p. 225 Chapter 8 New Problems of Functionalism p. 226 8.1 Functionalism in Molecular Biology p. 228 8.2 The Panglossian Paradigm p. 235 8.3 Aptations, Exaptations, and Adaptations p. 243 8.4 Information and Action Among the Macromolecules p. 246 8.5 Metaphors and Molecules p. 255 Bibliography p. 266 Index p. 273.

This simple guide to neurogenetics demystifies the overwhelming amount of information on the subject so you can identify key clinical features and understand your management options. Reach relevant differential diagnoses and provide appropriate counseling to your patients using the symptom-based approach. By integrating genetic and neurological approaches to diagnoses, this book ensures that the neurological consequences of a genetic diagnosis and the genetic consequences of a neurological diagnosis are clear and explicit. Concise and portable, this book is ideal for easy reference in clinical use. Details the underlying basic science and clinical features of genetic disorders by taking a symptom-based approach to provide you with a comprehensive understanding of the field. Focuses on the clinical application of neurogenetics to be of practical use to you in the clinic. Clarifies the neurological consequences of a genetic diagnosis and the genetic consequences of a neurological diagnosis by integrating genetic and neurological approaches to diagnoses. Discusses and evaluates necessary investigations so you know when to use them and when to refer. Highlights diagnostic and therapeutic tips so you can learn new concepts or refine your skills in practice. Refers to online sources, such as Online Mendelian Inheritance in Man (OMIM) and others, to help you supplement your knowledge.

This contributed volume presents an overview of concepts, methods, and applications used in several quantitative areas of drug research, development, and marketing. Chapters bring together the theories and applications of various disciplines, allowing

readers to learn more about quantitative fields, and to better recognize the differences between them. Because it provides a thorough overview, this will serve as a self-contained resource for readers interested in the pharmaceutical industry, and the quantitative methods that serve as its foundation. Specific disciplines covered include: Biostatistics Pharmacometrics Genomics Bioinformatics Pharmacoepidemiology Commercial analytics Operational analytics Quantitative Methods in Pharmaceutical Research and Development is ideal for undergraduate students interested in learning about real-world applications of quantitative methods, and the potential career options open to them. It will also be of interest to experts working in these areas.

Our CBSE Biology Term 1 Sample Paper MCQ Book includes 13 Sample Papers (Solved, Unsolved & Extra) for maximum Term 1 practice with MCQs that are based on the latest paper pattern. After 7 quality checks, these books make the most preferred final revision book for CBSE Class 12 Term 1 Boards.

How old are you? The more thought you bring to bear on the question, the harder it is to answer. For we age simultaneously in different ways: biologically, psychologically, socially. And we age within the larger framework of a culture, in the midst of a history that predates us and will outlast us. Looked at through that lens, many aspects of late modernity would suggest that we are older than ever, but Robert Pogue Harrison argues that we are also getting startlingly younger—in looks, mentality, and behavior. We live, he says, in an age of juvenescence. Like all of Robert Pogue Harrison's books, *Juvenescence* ranges brilliantly across cultures and history, tracing the ways that the spirits of youth and age have inflected each other from antiquity to the present. Drawing on the scientific concept of neotony, or the retention of juvenile characteristics through adulthood, and extending it into the cultural realm, Harrison argues that youth is essential for culture's innovative drive and flashes of genius. At the same time, however, youth—which Harrison sees as more protracted than ever—is a luxury that requires the stability and wisdom of our elders and the institutions. "While genius liberates the novelties of the future," Harrison writes, "wisdom inherits the legacies of the past, renewing them in the process of handing them down." A heady, deeply learned excursion, rich with ideas and insights, *Juvenescence* could only have been written by Robert Pogue Harrison. No reader who has wondered at our culture's obsession with youth should miss it.

Experiments which in previous years were made with ornamental plants have already afforded evidence that the hybrids, as a rule, are not exactly intermediate between the parental species. With some of the more striking characters, those, for instance, which relate to the form and size of the leaves, the pubescence of the several parts, etc., the intermediate, indeed, is nearly always to be seen; in other cases, however, one of the two parental characters is so preponderant that it is difficult, or quite impossible, to detect the other in the hybrid. from 4. The Forms of the Hybrid One of the most influential and important scientific works ever written, the 1865 paper *Experiments in Plant Hybridisation* was all but ignored in its day, and its author, Austrian priest and scientist GREGOR JOHANN MENDEL (1822-1884), died before seeing the dramatic long-term impact of his work, which was rediscovered at the turn of the 20th century and is now considered foundational to modern genetics. A simple, eloquent description of his 1856-1863 study of the inheritance of traits in pea plants Mendel analyzed 29,000 of them this is essential reading for biology students and readers of science history.

Cosimo presents this compact edition from the 1909 translation by British geneticist WILLIAM BATESON (1861-1926).

This book is entitled Classical and Molecular Genetics. The two major areas of genetics – classical genetics and molecular genetics – are covered in 15 chapters. The author has attempted to cover the basics of classical and molecular genetics, without exhaustive details or repetitive examples. Chapter 1 includes basic concepts of genetics, branches of genetics, development of the field of genetics, and the scope of genetics. Chapter 2 covers genetic terminology, and Mendel's principles. Chapter 3 focuses on modifications of Mendelian ratios, epistasis and non-epistatic inter-genic genetic interaction. Chapter 4 comprises cell cycle, and chromosome theory of heredity. Chapter 5 describes multiple alleles. Chapter 6 deals with genetic linkage, crossing over, and genetic mapping. Chapter 7 illustrates sex determining mechanisms, sex linkage, and sex related traits. Chapter 8 summarizes the molecular structure and replication of DNA, experimental proof of DNA as the genetic material, genetic code, and gene expression. Chapter 9 presents structure and organization of genes and chromosomes. Chapter 10 summarizes the importance of heredity and environment. Chapter 11 discusses gene mutations. Chapter 12 addresses chromosome mutations, and genetic disorders. Chapter 13 includes extranuclear genetics. Chapter 14 presents genetics of bacteria and viruses. Chapter 15 focuses on recombinant DNA technology. This book is especially prepared for the students of B.Sc. and M.Sc. of different Indian Universities as per UGC Model Curriculum. Students, preparing for Medical Entrance Examination, IAS, IFS, and PCS etc. will also be benefited by this book. At the end of some chapters of Genetic Engineering may enlighten the target readers. Entirely new information on Quantitative Genetics and Immunogenetics may enthral the readers. MCQ's and answers will also be helpful for the students to strengthen their self confidence. By the help of numerous figures, many tables, boxes and coloured photographs, this book has tried to serve a balanced account of Classical Genetics and Modern Molecular Genetics. • This book is for Graduate, P.G. students of Biophysics, Microbiology & Biological Sciences.

Get a quick, expert overview of the fast-changing field of perinatal genetics with this concise, practical resource. Drs. Mary Norton, Jeffrey A. Kuller, Lorraine Dugoff, and George Saade fully cover the clinically relevant topics that are key to providers who care for pregnant women and couples contemplating pregnancy. It's an ideal resource for Ob/Gyn physicians, maternal-fetal medicine specialists, and clinical geneticists, as well as midwives, nurse practitioners, and other obstetric providers. Provides a comprehensive review of basic principles of medical genetics and genetic counseling, molecular genetics, cytogenetics, prenatal screening options, chromosomal microarray analysis, whole exome sequencing, prenatal ultrasound, diagnostic testing, and more. Contains a chapter on fetal treatment of genetic disorders. Consolidates today's available information and experience in this important area into one convenient resource.

Perinatal Genetics Elsevier Health Sciences

The Selected Works of C. H. Waddington reissues seven titles from Waddington's impressive oeuvre. The titles in question cover a range of topics, from genetics and embryology to ethics in science and contemporary biological thought.

The rapid progress of science is shedding new light on the eternal questions of philosophy. Alain Stahl provides an exhaustive and coherent examination of the big questions that physics and the life sciences raise today. This book is a translation of the second French edition (2010), updated and expanded to include the most recent scientific findings. It will be of interest to anyone studying, working in, or thinking about science and philosophy. The author,

## Get Free Chapter 10 Section 2 Mendelian Genetics Study Guide Answers

Dr. Alain Stahl, a scientist by training, spent his outstanding professional career working as a chief technical officer and then managing director of several large French chemical companies. After retiring, he has focused his efforts on integrating insights from scientific and philosophical advances, and the present volume is the culmination of this synthesis.

Raising hopes for disease treatment and prevention, but also the specter of discrimination and "designer genes," genetic testing is potentially one of the most socially explosive developments of our time. This book presents a current assessment of this rapidly evolving field, offering principles for actions and research and recommendations on key issues in genetic testing and screening. Advantages of early genetic knowledge are balanced with issues associated with such knowledge: availability of treatment, privacy and discrimination, personal decisionmaking, public health objectives, cost, and more. Among the important issues covered: Quality control in genetic testing. Appropriate roles for public agencies, private health practitioners, and laboratories. Value-neutral education and counseling for persons considering testing. Use of test results in insurance, employment, and other settings.

Pediatric Ophthalmology and Strabismus is your one-stop source for comprehensive coverage of all the pediatric ophthalmic conditions you are likely to encounter in practice. Extensively updated with expert contributions from leaders in the field and now featuring online instructional videos, this ophthalmology reference delivers all the state-of-the-art guidance you need to effectively diagnose and manage even the most challenging eye diseases and disorders seen in children. Take a holistic approach to patient management that considers the family and ensures optimal doctor-patient relationships. Get a balanced view of etiology, diagnosis, and management, and access unique guidance on the practical problems encountered in real-life clinical cases. Impresses the importance of systemic disease in diagnosis and management. Apply all the latest clinical advances through updated coverage of strabismus diagnosis, management and complications; retinal dystrophies; imaging & investigation; AIDS in children; developmental biology; cerebral visual impairment; child abuse; severe developmental glaucoma; and corneal dystrophies. Get rich visual guidance in diagnosis and management from over 1,700 full-color illustrations. Access advice from the experts with contributions from several new top researchers and clinicians. Find the answers you need quickly and easily through a consistent chapter organization and highly accessible clinical information. Browse the complete contents of Pediatric Ophthalmology and Strabismus online, download all the images, and watch brand-new procedural videos at [www.expertconsult.com](http://www.expertconsult.com).

Concepts of Biology is designed for the single-semester introduction to biology course for non-science majors, which for many students is their only college-level science course. As such, this course represents an important opportunity for students to develop the necessary knowledge, tools, and skills to make informed decisions as they continue with their lives. Rather than being mired down with facts and vocabulary, the typical non-science major student needs information presented in a way that is easy to read and understand. Even more importantly, the content should be meaningful. Students do much better when they understand why biology is relevant to their everyday lives. For these reasons, Concepts of Biology is grounded on an evolutionary basis and includes exciting features that highlight careers in the biological sciences and everyday applications of the concepts at hand. We also strive to show the interconnectedness of topics within this extremely broad discipline. In order to meet the needs of today's instructors and students, we maintain the overall organization and coverage found in most syllabi for this course. A strength of Concepts of Biology is that instructors can customize the book, adapting it to the approach that works best in their classroom. Concepts of Biology also includes an innovative art program that incorporates critical thinking and clicker questions to help students understand--and apply--key concepts.

Genomics of Rare Diseases: Understanding Disease Genetics Using Genomic Approaches, a

new volume in the Translational and Applied Genomics series, offers readers a broad understanding of current knowledge on rare diseases through a genomics lens. This clear understanding of the latest molecular and genomic technologies used to elucidate the molecular causes of more than 5,000 genetic disorders brings readers closer to unraveling many more that remain undefined and undiscovered. The challenges associated with performing rare disease research are also discussed, as well as the opportunities that the study of these disorders provides for improving our understanding of disease architecture and pathophysiology. Leading chapter authors in the field discuss approaches such as karyotyping and genomic sequencing for the better diagnosis and treatment of conditions including recessive diseases, dominant and X-linked disorders, de novo mutations, sporadic disorders and mosaicism. Compiles applied case studies and methodologies, enabling researchers, clinicians and healthcare providers to effectively classify DNA variants associated with disease and patient phenotypes Discusses the main challenges in studying the genetics of rare diseases through genomic approaches and possible or ongoing solutions Explores opportunities for novel therapeutics Features chapter contributions from leading researchers and clinicians

Presents the Terminology and Methods of Mendelian Randomization for Epidemiological Studies Mendelian randomization uses genetic instrumental variables to make inferences about causal effects based on observational data. It, therefore, can be a reliable way of assessing the causal nature of risk factors, such as biomarkers, for a wide range of disease

- Chapter wise and Topic wise introduction to enable quick revision.
- Coverage of latest typologies of questions as per the Board latest Specimen papers
- Mind Maps to unlock the imagination and come up with new ideas.
- Concept videos to make learning simple.
- Latest Solved Paper with Topper's Answers
- Previous Years' Board Examination Questions and Marking scheme Answers with detailed explanation to facilitate exam-oriented preparation.
- Examiners comments & Answering Tips to aid in exam preparation.
- Includes Topics found Difficult & Suggestions for students.
- Dynamic QR code to keep the students updated for 2021 Exam paper or any further CISCE notifications/circulars

In the nearly 60 years since Watson and Crick proposed the double helical structure of DNA, the molecule of heredity, waves of discoveries have made genetics the most thrilling field in the sciences. The study of genes and genomics today explores all aspects of the life with relevance in the lab, in the doctor's office, in the courtroom and even in social relationships. In this helpful guidebook, one of the most respected and accomplished human geneticists of our time communicates the importance of genes and genomics studies in all aspects of life. With the use of core concepts and the integration of extensive references, this book provides students and professionals alike with the most in-depth view of the current state of the science and its relevance across disciplines. Bridges the gap between basic human genetic understanding and one of the most promising avenues for advances in the diagnosis, prevention and treatment of human disease. Includes the latest information on diagnostic testing, population screening, predicting disease susceptibility, pharmacogenomics and more Explores ethical, legal, regulatory and economic aspects of genomics in medicine. Integrates historical (classical) genetics approach with the latest discoveries in structural and functional genomics

This second edition of a very successful text reflects the tremendous pace of human genetics research and the demands that it places on society to understand and absorb its basic implications. The human genome has now been officially mapped and the cloning of animals is becoming a commonplace scientific discussion on the evening news. Join authors Julia Richards and Scott Hawley as they examine the biological foundations of humanity, looking at the

science behind the sensation and the current and potential impact of the study of the genome on our society. The Human Genome, Second Edition is ideal for students and non-professionals, but will also serve as a fitting guide for the novice geneticist by providing a scientific, humanistic, and ethical frame of reference for a more detailed study of genetics. New in this edition: · 60% new material, including data from the Human Genome Project and the latest genetics and ethics discussions · Several new case studies and personal stories that bring the concepts of genetics and heredity to life · Simplified treatment of material for non-biology majors · New full-color art throughout the text · New co-author, Julia Richards, joins R. Scott Hawley in this revision

This book provides a comprehensive coverage of the state of the art in precision medicine in stroke. It starts by explaining and giving general information about precision medicine. Current applications in different strokes types (ischemic, haemorrhagic) are presented from diagnosis to treatment. In addition, ongoing research in the field (early stroke diagnosis and estimation of prognosis) is extensively discussed. The final part provides an in-depth discussion of how different interdisciplinary areas like artificial intelligence, molecular biology and genetics are contributing to this area. Precision Medicine in Stroke provides a practical approach to each chapter, reinforcing clinical applications and presenting clinical cases. This book is intended for all clinicians that interact with stroke patients (neurologists, internal medicine doctors, general practitioners, neurosurgeons), students and basic researchers.

New chapters, new editors and contributors make Taylor and Hoyt's Pediatric Ophthalmology and Strabismus, 5th Edition, the most current and complete reference available in this evolving field. Editors Scott R. Lambert and Christopher J. Lyons, both globally recognized leaders, provide authoritative coverage of all the pediatric ophthalmic conditions you're likely to encounter in practice, including the latest clinical advances in etiology, diagnosis, and medical and surgical management. Expert guidance on the complete spectrum of childhood eye disorders and strabismus, including a unique "practical problems" section designed to help you handle difficult patient situations. More than 1,800 high-quality images and artworks provide visual guidance in diagnosis and management. A practical "how to" perform strabismus surgery chapter with extensive step-by-step artworks for complete visual guidance. Consult this title on your favorite e-reader, conduct rapid searches, and adjust font sizes for optimal readability. Comprehensive updates of all topics, with nine brand-new chapters covering significant advances in the management of refractive errors in children; binocular vision; conjunctival tumors; optimal approaches to patient-family communication, and a unique chapter on the impact of mobile apps for the pediatric ophthalmologist. State-of-the-art coverage of key areas such as OCT and all of the newest imaging techniques for the eye, orbit and visual pathways; anti-VEGF treatment for retinopathy of prematurity; and minimally invasive strabismus surgery.

In 1865, Gregor Mendel presented "Experiments in Plant-Hybridization," the results of his eight-year study of the principles of inheritance through experimentation with pea plants. Overlooked in its day, Mendel's work would later become the foundation of modern genetics. Did his pioneering research follow the rigors of real scientific inquiry, or was Mendel's data too good to be true—the product of doctored statistics? In *Ending the Mendel-Fisher Controversy*, leading experts present their conclusions on the legendary controversy surrounding the challenge to Mendel's findings by British statistician and biologist R. A. Fisher. In his 1936 paper "Has Mendel's Work Been Rediscovered?" Fisher suggested that Mendel's data could have been falsified in order to support his expectations. Fisher attributed the falsification to an unknown assistant of Mendel's. At the time, Fisher's criticism did not receive wide attention. Yet beginning in 1964, about the time of the centenary of Mendel's paper, scholars began to publicly discuss whether Fisher had successfully proven that Mendel's data was falsified. Since that time, numerous articles, letters, and comments have been published on the controversy. This self-contained volume includes everything the reader will need to know about the subject: an overview of the controversy; the original papers of Mendel and Fisher; four of the most important papers on the debate; and new updates, by the authors, of the latter four papers. Taken together, the authors contend, these voices argue for an end to the controversy—making this book the definitive last word on the subject.

Genomics is a rapidly growing scientific field with applications ranging from improved disease resistance to increased rate of growth. *Aquaculture Genome Technologies* comprehensively covers the field of genomics and its applications to the aquaculture industry. This volume looks to bridge the gap between a basic understanding of genomic technology to its practical use in the aquaculture industry.

Chapter wise and Topic wise introduction to enable quick revision. Coverage of latest typologies of questions as per the Board latest Specimen papers Mind Maps to unlock the imagination and come up with new ideas. Concept videos to make learning simple. Latest Solved Paper with Topper's Answers Previous Years' Board Examination Questions and Marking scheme Answers with detailed explanation to facilitate exam-oriented preparation. Examiners comments & Answering Tips to aid in exam preparation. Includes Topics found Difficult & Suggestions for students. Dynamic QR code to keep the students updated for 2021 Exam paper or any further CISCE notifications/circulars

[Copyright: 1649cde6e329ae137a00a173319d12b1](https://www.topperlearning.com/copyright/1649cde6e329ae137a00a173319d12b1)