

**LIFE SCIENCES GRADE 12 - PAPER 2**  
**(Answers from past Assessment Guidelines)**

**MEIOSIS**

**STRUCTURE AND ARRANGEMENT OF CHROMOSOMES IN A NORMAL HUMAN KARYOTYPE**

- Each chromosome comprises two chromatids✓
- held together by a centromere✓
- There are 23 pairs✓/46 chromosomes in
- human somatic cells✓/body cells
- which are arranged into homologous pairs✓
- that are similar in length✓
- carry genes for the same characteristics✓
- have alleles of a particular gene at the same loci✓and
- have the same centromere position✓
- Each somatic cell has 22 pairs/44 autosomes✓and
- a pair/2 gonosomes✓/sex chromosomes/X and Y chromosomes
- Autosomes are arranged in pairs from largest to smallest✓ in a karyotype
- Males have XY chromosomes✓
- Females have XX chromosomes✓
- The X chromosome is larger than the Y chromosome✓

**BEHAVIOUR OF THE CHROMOSOMES DURING THE DIFFERENT PHASES OF MEIOSIS I**

- During prophase✓ I
- chromosomes pair✓ up/homologous pairs /bivalents form
- Crossing over✓/exchange of genetic material occurs
- between chromatids✓/adjacent chromosome pairs
- During metaphase✓ I of meiosis
- homologous chromosomes✓/chromosome pairs are arranged
- at the equator✓ of the cell
- in a random✓ way
- with the chromosome attached to the spindle fibre✓
- During anaphase✓ I
- chromosome pairs separate✓/chromosomes move to opposite poles
- During telophase✓ I
- the chromosomes reach the poles of the cell✓

**EVENTS THAT LEAD TO DOWN SYNDROME**

- Non-disjunction occurred✓./A homologous pair of chromosomes
- at position 21✓
- failed to separate✓
- during anaphase✓
- resulting in one gamete with 24 chromosomes✓ / an extra chromosome /
- chromosomes at position 21
- The fertilisation of this gamete with a normal gamete✓/gamete
- with 23 chromosomes /1 chromosome at position 21
- results in a zygote with 47 chromosomes✓
- There are 3 chromosomes✓/an extra chromosome at position 21/ this is Trisomy 21

# Grade 1 exemplar Paper Life Science

**Joseph S. Krajcik, Charlene M. Czerniak**

## **Grade 1exemplar Paper Life Science:**

Science Lessons And Investigations, Grade 3 Evan-Moor Educational Publishers,2022-10-14 Inspire your students with the help of Evan Moor Science Lessons and Investigations for third grade This teaching resource is packed with helpful materials and ideas that support Next Generation Science Standards NGSS in life earth and physical science

**Teaching Science in Elementary and Middle School** Joseph S. Krajcik,Charlene M. Czerniak,2014-01-23 Teaching Science in Elementary and Middle School offers in depth information about the fundamental features of project based science and strategies for implementing the approach In project based science classrooms students investigate use technology develop artifacts collaborate and make products to show what they have learned Paralleling what scientists do project based science represents the essence of inquiry and the nature of science Because project based science is a method aligned with what is known about how to help all children learn science it not only helps students learn science more thoroughly and deeply it also helps them experience the joy of doing science Project based science embodies the principles in A Framework for K 12 Science Education and the Next Generation Science Standards Blending principles of learning and motivation with practical teaching ideas this text shows how project based learning is related to ideas in the Framework and provides concrete strategies for meeting its goals Features include long term interdisciplinary student centered lessons scenarios learning activities and Connecting to Framework for K 12 Science Education textboxes More concise than previous editions the Fourth Edition offers a wealth of supplementary material on a new Companion Website including many videos showing a teacher and class in a project environment

**Resources for Teaching Elementary School Science** National Science Resources Center of the National Academy of Sciences and the Smithsonian Institution,1996-03-28 What activities might a teacher use to help children explore the life cycle of butterflies What does a science teacher need to conduct a leaf safari for students Where can children safely enjoy hands on experience with life in an estuary Selecting resources to teach elementary school science can be confusing and difficult but few decisions have greater impact on the effectiveness of science teaching Educators will find a wealth of information and expert guidance to meet this need in Resources for Teaching Elementary School Science A completely revised edition of the best selling resource guide Science for Children Resources for Teachers this new book is an annotated guide to hands on inquiry centered curriculum materials and sources of help in teaching science from kindergarten through sixth grade Companion volumes for middle and high school are planned The guide annotates about 350 curriculum packages describing the activities involved and what students learn Each annotation lists recommended grade levels accompanying materials and kits or suggested equipment and ordering information These 400 entries were reviewed by both educators and scientists to ensure that they are accurate and current and offer students the opportunity to Ask questions and find their own answers Experiment productively Develop patience persistence and confidence in their own ability to solve real problems The entries in the curriculum section are grouped by scientific area Life

Science Earth Science Physical Science and Multidisciplinary and Applied Science and by type core materials supplementary materials and science activity books Additionally a section of references for teachers provides annotated listings of books about science and teaching directories and guides to science trade books and magazines that will help teachers enhance their students science education Resources for Teaching Elementary School Science also lists by region and state about 600 science centers museums and zoos where teachers can take students for interactive science experiences Annotations highlight almost 300 facilities that make significant efforts to help teachers Another section describes more than 100 organizations from which teachers can obtain more resources And a section on publishers and suppliers give names and addresses of sources for materials The guide will be invaluable to teachers principals administrators teacher trainers science curriculum specialists and advocates of hands on science teaching and it will be of interest to parent teacher organizations and parents

**Harcourt Science: Life science, [grade] 3, units A and B, teacher's ed** ,2000 Science Lessons And Investigations, Grade 6 Evan-Moor Educational Publishers,2022-10-14 Bring an exciting element to science class when you use Evan Moor s Science Lessons and Investigations for sixth grade This teacher s edition follows Next Generation Science Standards NGSS in life earth and physical science throughout 14 engaging science units

**Teaching About Evolution and the Nature of Science** National Academy of Sciences,Division of Behavioral and Social Sciences and Education,Board on Science Education,Working Group on Teaching Evolution,1998-05-06 Today many school students are shielded from one of the most important concepts in modern science evolution In engaging and conversational style Teaching About Evolution and the Nature of Science provides a well structured framework for understanding and teaching evolution Written for teachers parents and community officials as well as scientists and educators this book describes how evolution reveals both the great diversity and similarity among the Earth s organisms it explores how scientists approach the question of evolution and it illustrates the nature of science as a way of knowing about the natural world In addition the book provides answers to frequently asked questions to help readers understand many of the issues and misconceptions about evolution The book includes sample activities for teaching about evolution and the nature of science For example the book includes activities that investigate fossil footprints and population growth that teachers of science can use to introduce principles of evolution Background information materials and step by step presentations are provided for each activity In addition this volume Presents the evidence for evolution including how evolution can be observed today Explains the nature of science through a variety of examples Describes how science differs from other human endeavors and why evolution is one of the best avenues for helping students understand this distinction Answers frequently asked questions about evolution Teaching About Evolution and the Nature of Science builds on the 1996 National Science Education Standards released by the National Research Council and offers detailed guidance on how to evaluate and choose instructional materials that support the standards Comprehensive and practical this book brings one of today s educational challenges into focus in a balanced and

reasoned discussion It will be of special interest to teachers of science school administrators and interested members of the community *The Scottish sabbath school teachers' book. Grade 1(-3). Ed. by T. Nicol (A. Stewart, J. Robertson). Scotland Church of gen. assembly, comm. on sabbath schools,1890* Resources in Education ,1986 *Educating Young Children from Preschool Through Primary Grades* Laverne Warner,Judith Sower,2005 Catering to the first time teacher the authors provide day to day challenges of what it means to teach young children in the classroom while fostering a mentoring environment for pre service teachers entering the field Chapter 4 addresses children with special needs and commonly used modifications for each of the disabilities A unique chapter on teaching fourth graders chapter 10 has been included that may be covered or skipped depending upon state requirements Lesson planning is emphasized throughout and sample lesson plans and mini lessons have been included for every grade level and subject area *Life Science, Grades 6-7* Tony Wright,1994-07-13 **School and Home Education** ,1896 *The Public-school Journal* ,1895 **Harcourt Science: Physical science, [grade] 3, units E and F, teahcer's ed** ,2000 **Harcourt Science: Earth science, [grade] 5, Units C and D, teacher's ed** ,2000 Science and Art of Mining ,1928 *China Sunday School Journal* ,1919 **Sessional Papers** Ontario. Legislative Assembly,1874 **Harcourt Science** ,2000 *Constitution and Contest Rules* University Interscholastic League (Tex.),1997 **The First Days of School** Harry K. Wong,Rosemary Tripi Wong,2009 A guide for teachers at any level shares ideas on classroom management and designing lessons for academic success

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