

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

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Terry C. Jones



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Table of Contents 14 Life Science Essay P1 Matric

1. Understanding the eBook 14 Life Science Essay P1 Matric
 - The Rise of Digital Reading 14 Life Science Essay P1 Matric
 - Advantages of eBooks Over Traditional Books
2. Identifying 14 Life Science Essay P1 Matric
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an 14 Life Science Essay P1 Matric
 - User-Friendly Interface
4. Exploring eBook Recommendations from 14 Life Science Essay P1 Matric
 - Personalized Recommendations
 - 14 Life Science Essay P1 Matric User Reviews and Ratings
 - 14 Life Science Essay P1 Matric and Bestseller Lists
5. Accessing 14 Life Science Essay P1 Matric Free and Paid eBooks
 - 14 Life Science Essay P1 Matric Public Domain eBooks
 - 14 Life Science Essay P1 Matric eBook Subscription Services
 - 14 Life Science Essay P1 Matric Budget-Friendly Options
6. Navigating 14 Life Science Essay P1 Matric eBook Formats

- ePub, PDF, MOBI, and More
- 14 Life Science Essay P1 Matric Compatibility with Devices
- 14 Life Science Essay P1 Matric Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of 14 Life Science Essay P1 Matric
 - Highlighting and Note-Taking 14 Life Science Essay P1 Matric
 - Interactive Elements 14 Life Science Essay P1 Matric
- 8. Staying Engaged with 14 Life Science Essay P1 Matric
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers 14 Life Science Essay P1 Matric
- 9. Balancing eBooks and Physical Books 14 Life Science Essay P1 Matric
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection 14 Life Science Essay P1 Matric
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine 14 Life Science Essay P1 Matric
 - Setting Reading Goals 14 Life Science Essay P1 Matric
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of 14 Life Science Essay P1 Matric
 - Fact-Checking eBook Content of 14 Life Science Essay P1 Matric
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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