

STEM-CIP: Chip Off the Old Block (Complete Set)

Author(s): Hays B Lantz, Nancy Smaroff

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Format:	224-page A4 binder, CD-ROM
Age Group:	Years 5–10
Learning Areas:	Science; Maths; Technology
Categories:	Inquiry Learning; Activities and Exercises



Summary:

The revolutionary new practice of STEM teaches the related disciplines of Science, Technology, Engineering and Mathematics as one unit, emphasising their close relationship, rather than separately as in the past. In this biotechnology module, students explore basic concepts of cell structure, cell reproduction (mitosis and meiosis) and genetics, including DNA. Concepts of genetic engineering, including recombinant DNA, gene therapy, genetically engineered plants and the Human Genome Project are included.

Students demonstrate their understanding of these concepts by designing a hypothetical baby, deciding genetic characteristics and determining how they would manifest in a real person.

This binder and CD-ROM set holds the complete *Chip Off the Old Block* unit – Teacher's Guide, containing background information, questions and answers, and classroom implementation instructions; Student Curriculum Module, the primary student text containing information, readings and instructions; and the Student Data and Response section, where students record and evaluate their work as they progress.

The CD-ROM contains PowerPoint presentations that serve as visual enhancements to the activities, and a complete copy of the contents of the binder in PDF form for ease of reproduction.

Related Resources:

- *STEM CIP: Motoring with Magnets: Complete Set* (CUR5261)
- *STEM CIP: 3-2-1 Lift Off: Complete Set* (CUR5262)
- *STEM CIP: Riding on a Pendulum: Complete Set* (CUR5263)
- *STEM CIP: The Great Mixing Bowl: Complete Set* (CUR5264)

**Hawker Brownlow**
EDUCATION
PO Box 580
Moorabbin VIC 3189
Tel: +61 3 8558 2444
Fax: +61 3 8558 2400
Web: www.hbe.com.au
Email: orders@hbe.com.au

Chip Off the Old Block – Module Overview
Student Challenge – Design a hypothetical baby

<p>Module Intent</p> <ul style="list-style-type: none"> • Introduction to bioengineering. • Learning to write a detailed lab report. 	<p>Module Science Concepts</p> <ul style="list-style-type: none"> • Heredity and genetics • Mitosis & Meiosis 	<p>Module Maths Concepts</p> <ul style="list-style-type: none"> • Independent vs. Dependent variables • Types of graphs • Make predictions based on probability
<p>Module Engagement</p> <p>Introduce module challenge. Assess background knowledge.</p>	<p>Activity 4 – Language of Chromosomes</p> <p><i>Guided Inquiry – Students explore the structure of cells and chromosomes.</i></p> <p>Concepts: Diploid and Haploid</p>	<p>Activity 8 – In All Probability</p> <p><i>Structured & Guided Inquiry – Students practise combining alleles through the use of Punnett Squares.</i></p> <p>Concepts: Make predictions based on probability.</p>
<p>Scientific Investigation</p> <p>Activity 1 – Take a Gook Look at Yourself</p> <p><i>Structured Inquiry – Students conduct inventories of their own inherited traits.</i></p> <p>Concepts: Inherited traits. Simple random samples.</p>	<p>Activity 5 – Cell Cycle and Mitosis</p> <p><i>Structured Inquiry – Students explore where new cells come from when old cells die.</i></p> <p>Concepts: Mitosis. Cell Cycle</p>	<p>Activity 9 – Engineering a Hypothetical Baby</p> <p><i>Guided and Open Inquiry – Students engineer two hypothetical babies.</i></p> <p>Concepts: Well-structured inquiry. Learn to write a detailed lab report.</p>
<p>Activity 2 – What is Your Pedigree?</p> <p><i>Structured & Guided Inquiry – Students explore, explain and evaluate a pedigree chart.</i></p> <p>Concepts: Inherited traits. Analyse tables and graphs.</p>	<p>Activity 6 – A Different Type of Cell Division: Meiosis</p> <p><i>Structured & Guided Inquiry – Students explore the process by which sex cells are produced in plants and animals.</i></p> <p>Concepts: Meiosis.</p>	<p>Module Extension</p> <p>Activity 10 – DNA Fingerprinting</p> <p><i>Structured Inquiry – Students explore the structure of DNA</i></p> <p>Concepts: Chemical structure of DNA. Replication and structure of base pairs.</p>
<p>Activity 3 – Are You My Phenotype?</p> <p><i>Structured Inquiry – Students explore the phenotypes of genetic corn seedlings.</i></p> <p>Concepts: Dominant and recessive genes. Probability.</p>	<p>Design and Engineering</p> <p>Activity 7 – Dominant and Recessive Traits in Humans</p> <p><i>Structured & Guided Inquiry – Students begin designing their hypothetical baby.</i></p> <p>Concepts: Homozygous, Heterozygous and Punnett Squares. Dominant and recessive traits.</p>	<p>Activity 11 – Recombinant DNA</p> <p><i>Structured Inquiry – Students explore the technologies of recombinant DNA.</i></p> <p>Concepts: Present and future uses of recombinant DNA technology.</p>