### SCIENCE COMPETENCY CURRICULUM GUIDE

**Exit Competency B:** Students will demonstrate competency in understanding basic principles and theories of life science whether from biology, zoology, anthropology, botany, genetics, including:

<table>
<thead>
<tr>
<th>Objectives:</th>
<th>Assessment:</th>
<th>Possible Resources:</th>
<th>Possible Strategies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>By 9th grade, students will:</td>
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<tr>
<td>1. Trace the development of an organism from fertilization through the production of offspring using basic genetic concepts, by diagraming cellular reproduction, including:</td>
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<td></td>
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<tr>
<td>- chromosomes</td>
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<tr>
<td>- cell development</td>
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<tr>
<td>(See Competency A)</td>
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<td></td>
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<tr>
<td>Time: 12 to 14 hours (3 weeks)</td>
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</table>

**B-3 Assessment Examples**

**EXAMPLES OF THE TYPES OF ASSESSMENT ACTIVITIES THAT CAN BE USED TO ASSESS THE LEARNING OBJECTIVES**

1. Steve is five years old. His brother Bob is ten. Steve can wear clothes that used to fit Bob. Why do Bob’s clothes now fit Steve?

   - A. Bob’s clothes shrunk.
   - B. Old clothes fit well.
   - C. Steve is as big now as Bob once was.
   - D. Bob now wears different clothes.
   - E. Someone changed the size of Bob’s clothes.

**Provided Instructional Resources:**

- **Life Science (7):**
  - Adopted. 7th Grade and High School Remedial
- **Glencoe Science: Physical Science,** Glencoe/McGraw-Hill, 2005. 9th - 12th Adopted
- **Foundations of Science:**
  - Foundations of Science, Prentice Hall, 2000 Cells and Heredity )
  - Resource Pro CD ROM
  - Integrated Science Laboratory Manual
  - West Student-Centered Activity Book
  - Assessment Resources CD ROM
  - Program Planning Guide
  - Integrated Science Activity Books I and II
  - Swift scopes
  - CBL Systems (including CBL, AC Adapter, DIN Adapter, TI-82, Temperature probe, Voltage probe and Light sensor)
  - Electronic Balances
  - Hot Plates
  - Stand Supports
  - Life Science Interactive Student Tutorial CD-ROM
  - Life Science Videodiscs

**B3 Instructional Strategies could include:**

1. Activities - hands-on
   - Lab
   - Flipbook on Mitosis
   - Discussion/survey (on cloning)
   - Notes from board
   - TA Model of Meiosis
   - The Yeast Life Cycle
   - Cellular Development
   - DNA Replication
   - Chromosome replication

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June 17, 2006
### SCIENCE COMPETENCY CURRICULUM GUIDE

Exit Competency B: Students will demonstrate competency in understanding basic principles and theories of life science whether from biology, zoology, anthropology, botany, genetics, including:

1. Development of living organisms and basic classifications.

### Objectives: Assessment: Possible Resources: Possible Strategies:

<table>
<thead>
<tr>
<th>B-3 Assessment Examples (cont’d)</th>
<th>Biology:</th>
<th>1.  Supplementary Resources:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Recognize that different characteristics of living organisms are controlled through genes determined by the molecule DNA by applying basic genetic ratios to problems of heredity with punnet squares.</td>
<td>- Modern Biology, Holt, Rinehart and Winston, 1999</td>
<td></td>
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<tr>
<td></td>
<td>- Teaching Resources</td>
<td></td>
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<tr>
<td></td>
<td>- BioSources lab program</td>
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<td></td>
<td>- WARD’s materials ordering software</td>
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<td></td>
<td>- BioSources technology resources</td>
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<td></td>
<td>- BioSources teaching transparencies</td>
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<tr>
<td></td>
<td>- Holt Biology Videodiscs or Science in Action Videotapes</td>
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<tr>
<td></td>
<td>- Microscopes</td>
<td>- Supplementary Resources:</td>
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<tr>
<td></td>
<td></td>
<td>- “Immortal Thread” - Secret of Life video series - PBS 1993 text</td>
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<td></td>
<td></td>
<td>- “Geometry of Life” - The Infinite Voyage - Vestron 1988- video</td>
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<td></td>
<td></td>
<td>- “Twins” - 1996 - The Learning Channel - video</td>
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<tr>
<td></td>
<td></td>
<td>- BSCS Investigation 6.1</td>
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<tr>
<td></td>
<td></td>
<td>- BSCS Investigation 7.1</td>
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<tr>
<td></td>
<td></td>
<td>- BSCS Class discussion 7.1-7.2</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>B-3 Assessment Examples (cont’d)</th>
<th>2.  Group activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Lecture</td>
</tr>
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<td></td>
<td>- Guided practice with directed instruction</td>
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<td>- Notes</td>
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<td></td>
<td>- Taste-test paper strips for families</td>
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## SCIENCE COMPETENCY CURRICULUM GUIDE

Exit Competency B: Students will demonstrate competency in understanding basic principles and theories of life science whether from biology, zoology, anthropology, botany, genetics, including: 3: Development of living organisms and basic classifications.

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<th>Objectives:</th>
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<th>Possible Resources:</th>
<th>Possible Strategies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time: 12 hours</td>
<td>- Sample Data of Life”</td>
<td>- Genetics and Heredity by David E. Newton, blackline masters, 1989</td>
<td>- Lab to test families</td>
</tr>
<tr>
<td>3. Understand how variations found within the DNA of populations may or may not affect the characteristics of an organism and/or population by citing several examples of genetic variations and mutations in individuals or populations over time.</td>
<td>- “Fly Genetics” - Discovery Channel - 1995</td>
<td>- Continuous &amp; discontinuous genetic variation</td>
<td></td>
</tr>
<tr>
<td>Time: Concept that runs throughout genetics unit takes approx. 1 ½ months of class time</td>
<td>- “Mouse that Laid the Golden Egg” video 1993 from The Secret of Life Video Series</td>
<td>- Abnormal chromosome &amp; inheritance</td>
<td></td>
</tr>
<tr>
<td>4. Trace the path of individual characteristics from parent to offspring, including sex determination by solving pedigree problems relating to real life.</td>
<td>- “Dwarfism” video - Discovery Channel 1995</td>
<td>- Genes direct biosynthesis</td>
<td></td>
</tr>
<tr>
<td>Time: (#2,3&amp;4) 22 hours spent on Applied “Genetics” (4 ½ weeks)</td>
<td>- BSCS Investigation 8.1</td>
<td>- Genetic Variation Within a single species</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- BSCS Investigation 8.3</td>
<td>- Human Gene Manipulation</td>
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<tr>
<td></td>
<td>- Teacher-generated activity</td>
<td>- Notes</td>
<td></td>
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<td></td>
<td>- Flinn Scientific</td>
<td>- Video</td>
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<td></td>
<td>- Teacher-generated activity</td>
<td>- Handouts</td>
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<td></td>
<td>- BSCS discussion from 8.11</td>
<td>- Class discussion</td>
<td></td>
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<tr>
<td></td>
<td>- BSCS discussion from 8.10</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Various teacher generated activities</td>
<td></td>
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<td></td>
<td>- NSTA Issue Paper</td>
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</table>

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B-3 Assessment Examples (cont’d)

June 17, 2006
### SCIENCE COMPETENCY CURRICULUM GUIDE

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- **3:** Development of living organisms and basic classifications.

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<tr>
<td><strong>5.</strong> Understand that the concept of common ancestry includes:</td>
<td><strong>5.</strong> By looking at the beak of a bird, you can tell</td>
<td><strong>5.</strong> Supplementary Resources</td>
<td><strong>5.</strong> Teacher guided group activities on natural section, etc.</td>
</tr>
<tr>
<td>- genetic variation</td>
<td>A. how fast the bird flies.</td>
<td>- Video - “Search for the Lost Mammoth” - The Leaning Channel</td>
<td>- Notes, guided practice of Queen Elizabeth</td>
</tr>
<tr>
<td>- heredity</td>
<td>B. what types of feathers the bird has.</td>
<td>- Video - “Evolution of the Dog” - Discover Channel</td>
<td>- Hemophilia</td>
</tr>
<tr>
<td>- natural selection</td>
<td>C. where the bird has flown.</td>
<td>- CD Rom - Evolution - 1995 Clearvue, Inc.</td>
<td>- Discuss genetic counseling as career</td>
</tr>
<tr>
<td>- DNA sequencing</td>
<td>✔️ D. what type of food the bird usually eats.</td>
<td>- Teacher-generated activity</td>
<td>- Video with follow-up discussion</td>
</tr>
<tr>
<td>by analyzing and explaining examples, using the above factors.</td>
<td>E. how many birds live together.</td>
<td>- BSCS modified activity</td>
<td>- A human genetic variation</td>
</tr>
</tbody>
</table>

**Time:** 19 hours (3 ½ weeks)

**B-3 Assessment Examples (cont’d)**

<table>
<thead>
<tr>
<th>6. Explain how biological classifications demonstrate the relationship of organisms by applying dichotomous keys.</th>
<th>6. Milk, orange juice, water, and oil are all members of the same</th>
<th>6. Supplementary Resources:</th>
<th>6. Direct instruction with guided practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>- “Classification of Living”</td>
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## Objectives: Exit Competency B: Students will demonstrate competency in understanding basic principles and theories of life science whether from biology, zoology, anthropology, botany, genetics, including:

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<td>3: Development of living organisms and basic classifications.</td>
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## Assessment:

*Population.* Which is also a member of this population?

- A. glass
- B. straw
- C. lemonade
- D. ice cream
- E. orange

## Possible Resources:

- Things’ video - 1992 - Understanding Science, Vol 5
- Teacher-made resources
- Lecture
- Classification Act
- Worksheet: Fun with Fictitious Animals
- Classification of Living Things film
- Teacher materials
- Scientific field guides

## Possible Strategies:

- Lecture with notes
- Video with discussion
- Prentice Hall: Life Science text Ch. ?
- Resource Folder
- Keying activity in class
- Film and discussion
- Text reading
- Guided practice as group
- Group activities (shoe key)
- Individual work

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Time: 5-6 hours (1 week)

Five class periods

Homework - 30-40 min.

Topic begins just before the Christmas break and is finished by the third week of February. Throughout this period, students have nightly homework that includes reading, concept reviews, application questions and laboratory write ups.