EDUC 351 / EDUC 353 / EDUC 359: Methods of Teaching the Sciences

Lloyd Den Boer
Dordt College

Follow this and additional works at: https://digitalcollections.dordt.edu/fall2000

Part of the Science and Mathematics Education Commons

Recommended Citation

This Syllabi is brought to you for free and open access by the 2000 at Digital Collections @ Dordt. It has been accepted for inclusion in Fall 2000 by an authorized administrator of Digital Collections @ Dordt. For more information, please contact ingrid.mulder@dordt.edu.
### Tentative Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 31</td>
<td>Review syllabus; Introduction; and Perspective; Overhead; Read Ch.3</td>
</tr>
<tr>
<td>Sept. 5 &amp; 7</td>
<td>Critique; Overhead presentations&lt;br&gt;Class Observation - keep journal for class discussion&lt;br&gt;- set up with Professor L. Den Boer,</td>
</tr>
<tr>
<td>Sept. 12 &amp; 14</td>
<td>Science Literacy; National Standards; Science Curriculum</td>
</tr>
<tr>
<td>Sept. 19-21</td>
<td>Goals &amp; Objectives; Unit Plan &amp; DLP&lt;br&gt;Discrepant event; Read Ch. 12 &amp; 13</td>
</tr>
<tr>
<td>Sept. 26-28</td>
<td>Teaching Strategies; Read Ch. 5-9&lt;br&gt;Use of Key</td>
</tr>
<tr>
<td>Oct. 3</td>
<td>Lab safety (video)</td>
</tr>
<tr>
<td>Oct. 10 &amp; 12</td>
<td>Lab safety; Idea file; Class observation Discussion - Journal; Quiz Ch. 5-9</td>
</tr>
<tr>
<td>Oct. 17 &amp; 19</td>
<td>Textbooks &amp; Journal Evaluation</td>
</tr>
<tr>
<td>Oct. 24 &amp; 26</td>
<td>Technology; Read Ch. 10</td>
</tr>
<tr>
<td>Oct. 31 &amp; Nov. 2</td>
<td>Student Presentations; Gender &amp; Multicultural activities&lt;br&gt;Unit DLP; lecture, demonstration, laboratory</td>
</tr>
<tr>
<td>Nov. 7 &amp; 9</td>
<td>Tests &amp; Measurements; Grading; Read Ch. 14</td>
</tr>
<tr>
<td>Nov. 14 &amp; 16</td>
<td>Classroom Management; Read Ch. 11&lt;br&gt;Class observation Discussion - Journal</td>
</tr>
<tr>
<td>Nov. 21</td>
<td>Unit due.&lt;br&gt;Student Presentations from Unit plan</td>
</tr>
<tr>
<td>Nov. 28-30</td>
<td>Student Presentations from Unit Plan</td>
</tr>
<tr>
<td>Dec. 5 &amp; 7</td>
<td>Teaching and the art of Successful Student Teaching&lt;br&gt;Student Presentation: DLP (discussion); Read Ch. 19&lt;br&gt;Class Observation Discussion - Journal&lt;br&gt;First Aid (video); Sexual Harassment &amp; Schools (video); Quiz</td>
</tr>
<tr>
<td>Dec. 12 &amp; 14</td>
<td>Unit; Class Presentation; Wrap Up.</td>
</tr>
</tbody>
</table>
# SECONDARY METHODS

**DEALS: Students will be able to demonstrate**

<table>
<thead>
<tr>
<th>ACTIVITIES: Students will</th>
<th></th>
</tr>
</thead>
</table>

## FOUNDATIONAL

1. a biblical perspective on the purposes of education and the place of their discipline within that perspective. (4)*
   - Critique an article written from a non-Christian perspective (e.g. "From Death to Life", by Sherwin Nuland)

2. an understanding of the historical background of their discipline. (2)
   - Explain how the curriculum developments of the 1960's influenced science teaching. Identify specific programs developed during the decade.

3. an understanding of current issues and trends in secondary education in general and their discipline in particular. (5)
   - Review educational issues by researching journals and general periodicals (e.g. *U.S. News & World Report*)

## THE LEARNER

4. a developmentally appropriate understanding of the learner, motivation, learning theory, learning styles, and classroom management at the secondary level. (8, 9, 10, 11)
   - Demonstrate an understanding of these issues in their unit and daily lesson plans.

5. a sensitivity to multicultural issues. (9)
   - Evaluate cultural and gender sensitivity of textbooks using an appropriate evaluation instrument.

## THE CURRICULUM

6. an understanding of the content, skills, values, and current issues unique to their discipline. (12, 21)
   - Review the science education journals and identify research supporting appropriate science teaching issues.

7. a familiarity with and an ability to examine and evaluate curricular materials within their discipline, including software. (15)
   - Evaluate a current textbook by using a textbook evaluation instrument. Evaluate current software with an appropriate instrument.

8. the ability to write a course syllabus that fits appropriately within a secondary course of study. (13)
   - Write a course syllabus that communicates effectively to students and parents.

9. the ability to write a unit, with sample lesson plans, that reflects program goals. Ideally, the unit is to be taught during student teaching. (14)
   - Write a twenty day teaching unit; teach a selected lesson from the unit.

## PEDAGOGY

10. an understanding of the theoretical basis and research supporting specific instructional methods and strategies. (16, 17)
    - Define and evaluate the "hands on" approach to science teaching. Can it be supported biblically and by research?

11. the ability to use various pedagogical methods or strategies that are appropriate to their discipline and reflect the uniqueness of both the learner and the teacher. (17)
    - Incorporate teaching strategies that are appropriate to science and reflect the uniqueness of both the learner and the teacher.

12. the ability to integrate technology with the teaching-learning process. (17)
    - Incorporate appropriate electronic technology applications in their unit. (e.g. computer, laser video disc, video tape, transparencies)

13. an understanding of the purposes and procedures of both traditional and innovative evaluation at the secondary level. (18)
    - Write formative (quiz) and summative (exam) evaluation instruments.

## SKILLS AND CONTENT

14. the ability to engage effectively in a simulated teaching experience. (14, 20)
    - Teach a daily lesson plan from their unit to their peers or junior and senior high students.

## PROFESSIONAL

- an awareness of the various professional organizations, journals, and conferences in their discipline area. (22, 23)
  - Review science education journals; attend an ISTA convention.

* the number(s) of corresponding education department goal(s)

Note: These activities are provided as suggestions. You may have other activities to meet the secondary methods course goals.
<table>
<thead>
<tr>
<th>GOAL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FOUNDATIONAL</strong></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>articulate main biblical themes as they relate to education.</td>
</tr>
<tr>
<td>2.</td>
<td>identify and describe historical trends in education.</td>
</tr>
<tr>
<td>3.</td>
<td>'critique' the prevailing worldviews in education (i.e. understand how each is distinct and contrasts to their own worldview).</td>
</tr>
<tr>
<td>4.</td>
<td>develop a coherent, biblical Reformed worldview that includes an understanding of the role of education in society.</td>
</tr>
<tr>
<td>5.</td>
<td>understand the implications of educational trends for current practice.</td>
</tr>
<tr>
<td>6.</td>
<td>articulate a Christian philosophy of education that includes a biblical view of the child.</td>
</tr>
<tr>
<td>7.</td>
<td>understand child and adolescent development.</td>
</tr>
<tr>
<td><strong>THE LEARNER</strong></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>articulate a biblical view of the learner and the learning process.</td>
</tr>
<tr>
<td>9.</td>
<td>understand how diversity (e.g. of culture, gender, ethnicity, learning differences) influences child development and learning.</td>
</tr>
<tr>
<td>10.</td>
<td>understand principles of motivation.</td>
</tr>
<tr>
<td>11.</td>
<td>understand how to discipline students.</td>
</tr>
<tr>
<td><strong>CURRICULUM</strong></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>articulate a biblical view of curriculum.</td>
</tr>
<tr>
<td>13.</td>
<td>understand scope and sequence of curriculum for grade levels.</td>
</tr>
<tr>
<td>14.</td>
<td>write and teach lesson/unit plans.</td>
</tr>
<tr>
<td>15.</td>
<td>evaluate and select instructional material.</td>
</tr>
<tr>
<td><strong>PEDAGOGY</strong></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>articulate a biblical view of teaching practices.</td>
</tr>
<tr>
<td>17.</td>
<td>select and implement appropriate teaching strategies.</td>
</tr>
<tr>
<td>18.</td>
<td>select and implement evaluation procedures to improve the learning of students.</td>
</tr>
<tr>
<td>19.</td>
<td>select and implement classroom management techniques.</td>
</tr>
<tr>
<td><strong>SKILLS AND CONTENT</strong></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>demonstrate appropriate skills in communication, thinking, and problem solving.</td>
</tr>
<tr>
<td>21.</td>
<td>demonstrate appropriate knowledge of content.</td>
</tr>
<tr>
<td><strong>PROFESSIONAL</strong></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>demonstrate a strong sense of professionalism.</td>
</tr>
<tr>
<td>23.</td>
<td>demonstrate a commitment to ongoing professional development in the areas of philosophy of education, curriculum, teaching strategies, and skills.</td>
</tr>
</tbody>
</table>
Texts:

Required:


Class Periods:

    Time and location: C-158; 28 & 29; 48 & 49

Instructional Strategies:

    (stress informality and flexibility)

    Independent study
    Class discussion
    Field experience
    Instructor/student conferences
    Student presentations (oral and written)
    Lecture
    Quizzes
    Readings and Student projects

Evaluation:

    Readings and quizzes------------------25%
    Presentations------------------------25%
    Unit--------------------------------25%
    Projects and Assignments----------25%

    (there will be no final exam)
Goals for the Science Curriculum

I. Goals that help students understand content.

- the students will be able to name the three types of rocks (material).
- the students will be able to identify ten different insects (organisms).
- the students will be able to list the different nutrients we need in our diets (diversity).
- the students will be able to explain why sunlight is the energy source for plant and animal growth and activity (energy).
- the students will be able to explain the reasons for seasonal differences (change).
- the students will be able to explain why the planets remain in orbit around the sun (balance).

II. Goals that help students carry out science activities.

- the students will observe that exercise increases the pulse and breathing rate (observation).
- the students will count and record the pulse and breathing rate before and after exercise (measuring, gathering and recording data).
- the students will write a brief summary explaining the results of exercise on the pulse and breathing rate (communication).
- the student will be able to state what long term influence exercise will have on the heart & lungs (predicting).
- finding a dead earthworm on the sidewalk on a sunny day after a shower, the students will be able to explain why the earthworm died (inferring).

III. Goals that help students make decisions & live obediently

- knowing that smoking is harmful the student will not take up smoking (stewardship-care for all things God created).
- the student will carefully complete each of the five steps of the lab assignment (perseverance).
- the student will gather his/her own data rather than ask for the information from another student (integrity).
- four students will work together to develop & explain a laboratory report (cooperation).
- the student will state to you that the assignment was completed on time and that he/she feels good about it. (self-respect).
- the student will walk outside on a clear, starry night and say "The Heavens declare the glory of God" (wonder and delight).
DAILY LESSON PLAN

NAME ________________________________

Subject ________________________________ Grade Level ______ Date ________________

Topic ________________________________ Text ________________________________

Reference Materials ________________________________

---

I. What are the goals? objective? (state objectives in terms of student performance)
   A. Goals - that help students understand content:
   
   B. Goals - that help students do appropriate subject activities:
   
   C. Goals - that help students make decisions and live obediently:

II. How are you going to achieve the goals? objectives? (content, materials, teaching strategies, motivational techniques)
   A. How are you going to gain the students interest?
   
   B. List different teaching strategies:
   
   C. Materials needed:
   
   D. Content outline:

III. Did you achieve the goals? (formal and Informal evaluation)
   A. What evaluation technique will be used?
   
   B. Was this a good/bad lesson? Why?
   
   C. How would you modify this lesson the next time you teach it?
EDUC 351

UNIT PLAN FORMAT

A. Title Page
   - title
   - name
   - grade level for which the unit is designed
   - approximate time to be devoted to the unit (3-4 weeks)

B. Goals and Objectives (see handout)
   1. Goals that help students understand content (12)
   2. Goals that help students carry out discipline activities (8)
   3. Goals that help students make decisions and live obediently (8)

C. Overview
   - A brief statement on the nature and scope of the unit. (75-100 words)

D. Approach
   - How will the unit be introduced? What are your plans for day one? A lesson or activity that will grab the student's attention and motivate them toward further study.

E. Working Periods
   - This section must include the learning activities for each day of the unit. Use the objectives written under B to develop the lessons. Every objective should be covered in the unit. Use the Daily Lesson Plan format. It includes objectives for the day, the lesson, and evaluation techniques.

F. Evaluation
   - informal: comment on checking homework, asking questions and nonverbal communication
   - formal: write two (2) quizzes.
   - write final test. Use a "test writer". Include 25 multiple choice, 10 fill in the blanks, and essay items.

G. Bibliography
   List three (3) texts and four(4) periodicals that serve as a unit reference.

H. Instructional Aids and Sources
   - List names and suppliers of films, filmstrips, records, tapes, CDs, CD-ROM, transparencies and other AV aids.

THE UNIT MUST BE TYPED AND IS DUE:
PLAN TO TEACH ONE OF THE LESSONS TO THE CLASS: