VoCATS
Course Blueprint

Agricultural Education

6871- Biotechnology & Agriscience Research I
Revised 8/05

Public Schools of North Carolina
State Board of Education • Department of Public Instruction
Curriculum and School Reform Services
Division of Instructional Services

Raleigh, North Carolina
Summer 2005

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This blueprint has been reviewed by business and industry representatives for technical content and appropriateness for the industry. Contact Horace_Johnson@ncsu.edu *for more information.*

VoCATS Course Blueprint

A course blueprint is a document laying out the framework of the curriculum for a given course.

Shown on the blueprint are the units of instruction, the core competencies in each unit, and the specific objectives for each competency. The blueprint illustrates the recommended sequence of units and competencies and the cognitive and performance weight of the objective within the course.

The blueprint should be used by teachers to plan the course of work for the year, prepare daily lesson plans, construct instructionally valid interim assessments. Statewide assessments are aligned directly with the course blueprint.

For additional information about this blueprint, contact program area staff. For additional information about VoCATS, contact program area staff or VoCATS, Career-Technical Education, Division of Instructional Services, North Carolina Department of Public Instruction, 6358 Mail Service Center, Raleigh, North Carolina 27699-5358, 919/807-3876, email: rwelfare@dpi.state.nc.us.

Interpretation of Columns on VoCATS Course Blueprints

No.	Heading	Column information
1	Comp# Obj.#	Comp=Competency number (two digits); Obj.=Objective number (unique course identifier plus competency number and two-digit objective number).
2	Unit Titles/Competency and Objective Statements	Statements of unit titles, competencies per unit, and specific objectives per competency. Each competency statement or specific objective begins with an action verb and makes a complete sentence when combined with the stem “The learner will be able to. . .” (The stem appears once in Column 2.) Outcome behavior in each competency/objective statement is denoted by the verb plus its object.
3	Time Hrs	Space for teachers to calculate time to be spent on each objective based on the course blueprint, their individual school schedule, and analysis of students' previous knowledge on the topic.
4&5	Course Weight Cognitive Performance	Shows the relative importance of each objective, competency, and unit. Weight is broken down into two components: cognitive and performance. Add the cognitive and performance weights shown for an objective in columns 4 and 5 to determine its total course weight. Course weight is used to help determine the percentage of total class time that is spent on each objective. The breakdown in columns 4 and 5 indicates the relative amount of class time that should be devoted to cognitive and performance activities as part of the instruction and assessment of each objective. Objectives with performance weight should include performance activities as part of instruction and/or assessment.
6	Type Behavior	Classification of outcome behavior in competency and objective statements. (C=Cognitive; P=Performance)
7	Integrated Skill Area	Shows links to other academic areas. Integrated skills codes: A=Arts; E=English Language Arts; CD=Career Development; CS=Information/Computer Skills; H=Healthful Living; M=Math; SC=Science; SS=Social Studies.
8	Core Supp	Designation of the competencies and objectives as Core or Supplemental. Competencies and objectives designated "Core" must be included in the Annual Planning Calendar and are assessed on the statewide assessments..

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Agricultural Education

COURSE BLUEPRINT for **6871 Biotechnology & Agriscience Research I**

(Recommended hours of instruction: 135-180 of hours)

Comp # Obj #	Unit Titles/Competency and Objective Statements (The Learner will be able to:)	Time Hours	Course Weight		Type Behavior	Integrated Skill Area	Core Supp
			Cognitive	Performance			
1	2		4	5	6	7	8
			100%				
	Total Course Weight		**75%**	**25%**			
A	**LEADERSHIP IN CAREER DEVELOPMENT**		**11%**	**3%**			
BA01.00	**Investigate organizations related to the biotechnology industry.**		**2%**	**1%**	**C3P**	**CD**	**Core**
BA01.01	*Discuss opportunities for leadership development in the biotechnology industry.*		*2%*		*C2*	*CD*	*Core*
BA01.02	*Examine youth activities provided by biotechnology industry organizations.*			*1%*	*C3P*	*CD*	*Core*
BA02.00	**Demonstrate the process used in conducting business meetings in biotechnology industry organizations.**		**2%**	**1%**	**C3P**	**CD/SS**	**Core**
BA02.01	*Explain the role of parliamentary procedure in conducting business meetings in biotechnology industry organizations.*		*2%*		*C2*	*CD/SS*	*Core*
BA02.02	*Demonstrate parliamentary procedure abilities used in a business meeting.*			*1%*	*C3P*	*CD/SS*	*Core*
BA03.00	**Use appropriate techniques in public speaking.**		**2%**	**1%**	**C3P**	**CD**	**Core**
BA03.01	*Discuss the fundamentals of public speaking and speech development.*		*2%*		*C2*	*CD*	*Core*
BA03.02	*Deliver a speech that addresses agriscience and the biotechnology industry.*			*1%*	*C3P*	*CD*	*Core*
BA04.00	**Discuss skills needed for careers in the biotechnology industry.**		**5%**		**C2**	**CD/SC**	**Core**
BA04.01	*Identify biotechnology careers and related employment opportunities.*		*3%*		*C1*	*CD/SC*	*Core*
BA04.02	*Explain various skills and credentials needed for employment in the biotechnology industry.*		*2%*		*C2*	*CD/SC*	*Core*
B	**RECORDS IN THE BIOTECHNOLOGY INDUSTRY**		**4%**	**4%**			
BA05.00	**Examine the Supervised Agricultural Experience component of the Biotechnology & Agriscience Research I course.**		**3%**	**3%**	**C3P**	**CD/M/SC**	**Core**
BA05.01	*Identify the component parts of the Supervised Agricultural Experience Record used in the biotechnology course.*		*3%*		*C1*	*CD/M*	*Core*
BA05.02	*Properly maintain a current S.A.E. Record Sheet.*			*1%*	*C3P*	*CD/M*	*Core*
BA05.03	*Demonstrate the use of the scientific method in the planning and development of an experimental S.A.E. Project.*			*2%*	*C3P*	*CD/SC*	*Core*

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1	2		4	5	6	7	8
BA06.00	**Explore methods of financial record keeping in the biotechnology industry.**		**1%**	**1%**	**C3P**	**CD/M**	**Core**
BA06.01	*Define terminology used in financial record keeping systems.*		*1%*		*C1*	*CD/M*	*Core*
BA06.02	*Record entries in a financial record system.*			*1%*	*C3P*	*CD/M*	*Core*
C	**INTRODUCTION TO BIOTECHNOLOGY**		**11%**				
BA07.00	**Explain the historical development of the biotechnology industry.**		**5%**		**C2**	**CD/M/SC**	**Core**
BA07.01	*Identify important historical achievements in biotechnology and agriscience research.*		*1%*		*C1*	*CD/SC*	*Core*
BA07.02	*Discuss the importance of the biotechnology industry.*		*2%*		*C2*	*CD/SS/SC /M*	*Core*
BA07.03	*Discuss the historical impact of biotechnology on the field of agriculture.*		*2%*		*C2*	*CD/SC/SS*	*Core*
BA08.00	**Interpret the role of biotechnology in agriscience.**		**6%**		**C2**	**CD/SC**	**Core**
BA08.01	*Define terminology related to biotechnology.*		*2%*		*C1*	*CD/SC*	*Core*
BA08.02	*Discuss potential applications for biotechnology in production agriculture.*		*2%*		*C2*	*CD/SC*	*Core*
BA08.03	*Summarize the relationship between the various divisions of biotechnology and agriscience.*		*2%*		*C2*	*CD/SC*	*Core*
D	**AGRICULTURAL LAB EQUIPMENT & SAFETY**		**9%**	**7%**			
BA09.00	**Demonstrate safety principles in a biotechnology laboratory.**		**6%**	**4%**	**C3P**	**CD/SC**	**Core**
BA09.01	*Explain safety rules for a biotechnology laboratory.*		*3%*		*C2*	*CD/SC*	*Core*
BA09.02	*Outline procedures for achieving and maintaining aseptic conditions during biotechnology laboratories.*		*3%*		*C2*	*C/SC/M*	*Core*
BA09.03	*Prepare reagents and solutions while observing safe laboratory protocol in accordance with Material Safety Data Sheets.*			*2%*	*C3P*	*CD/SC*	*Core*
BA09.04	*Implement safety practices in a laboratory setting.*			*2%*	*C3P*	*CD/SC*	*Core*
BA10.00	**Evaluate equipment and technology utilized in agricultural laboratories.**		**3%**	**3%**	**C3P**	**CD/SC/CS**	**Core**
BA10.01	*Describe the proper name of, and use for, common biotechnology laboratory equipment.*		*3%*		*C1*	*CD/SC*	*Core*
BA10.02	*Demonstrate approved safety practices while conducting scientific experiments in a biotechnology laboratory.*			*2%*	*C3P*	*CD/SC*	*Core*
BA10.03	*Use computer technology to prepare scientific documents.*			*1%*	*C3P*	*CD/SC/CS*	*Core*

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E	**MICROBIOLOGY IN AGRISCIENCE AND PRODUCTION AGRICULTURE**		**8%**	**2%**			
BA11.00	**Analyze the impact of cells on the formation and function of living organisms.**		**8%**	**2%**	**C3P**	**CD/SC**	**Core**
BA11.01	*Explain the difference between viruses and prokaryotic cells in order to distinguish characteristics of life.*		*2%*		*C2*	*CD/SC*	*Core*
BA11.02	*Outline the role of bacteria in agriculture and the importance of microorganisms in agricultural biotechnology.*		*3%*		*C2*	*CD/SC*	*Core*
BA11.03	*Discuss the structure and function of eukaryotic cells and the role of these cells in the formation of life.*		*2%*		*C2*	*CD/SC*	*Core*
BA11.04	*Apply laboratory skills in the culturing of microorganisms and cells.*		*1%*	*2%*	*C3P*	*CD/SC*	*Core*
F	**SIMPLE MENDELIAN GENETICS**		**6%**				
BA12.00	**Explore concepts of Mendelian genetics and inheritance related to plant and animal breeding.**		**6%**		**C3P**	**SC**	**Core**
BA12.01	*Define key genetic terms related to agriscience research and biotechnology.*		*2%*		*C1*	*SC*	*Core*
BA12.02	*Use Punnett Squares to investigate the transition of inherited traits in plant and animal breeding.*		*1%*		*C3P*	*SC*	*Core*
BA12.03	*Explain the role of heredity on the development of plant and animal offspring.*		*3%*		*C2*	*CD/SC*	*Core*
G	**DNA & GENETICS IN AGRICULTURAL BIOTECHNOLOGY**		**16%**	**7%**			
BA13.00	**Explain the role of DNA in sexual reproduction.**		**10%**		**C2**	**CD/SC**	**Core**
BA13.01	*Discuss the structure and function of DNA in relation to sexual reproduction in organisms.*		*3%*		*C2*	*SC*	*Core*
BA13.02	*Explain the relationship between DNA, gene sequences, traits, and the genome.*		*2%*		*C2*	*SC*	*Core*
BA13.03	*Summarize the role of DNA in genetic disorders and mutations.*		*2%*		*C2*	*SC*	*Core*
BA13.04	*Outline the processes of mitosis and meiosis in plant and animal cells.*		*3%*		*C2*	*CD/SC*	*Core*
BA14.00	**Evaluate the role of sexual reproduction in agricultural breeding programs.**		**2%**	**2%**	**C3P**	**SC**	**Core**
BA14.01	*Explain the mechanics of natural selection and selective breeding, including the role of each in agriculture.*		*2%*		*C2*	*CD/SC*	*Core*
BA14.02	*Evaluate animal and plant specimens for breeding potential based on phenotypic and genotypic value.*			*2%*	*C3P*	*CD/SC*	*Core*

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BA15.00	**Explore nucleic acid techniques utilized in agriculture.**		**4%**	**5%**	**C3P**	**SC**	**Core**
BA15.01	*Identify methods and goals of DNA analysis in production agriculture and agriscience.*		*2%*		*C1*	*SC*	*Core*
BA15.02	*Explore the process of DNA extraction in order to observe the structure of DNA.*			*3%*	*C3P*	*SC*	*Core*
BA15.03	*Interpret a written protocol for restriction digest and gel electrophoresis.*		*2%*		*C2*	*SC*	*Core*
BA15.04	*Apply appropriate procedures in restriction digests and gel electrophoresis.*			*2%*	*C3P*	*SC*	*Core*
H	**APPLIED GENETICS IN AGRICULTURE AND AGRISCIENCE**		**10%**	**2%**			
BA16.00	**Analyze simple techniques for genetic manipulation in agricultural biotechnology.**		**10%**	**2%**	**C3P**	**SC**	**Core**
BA16.01	*Discuss sexual reproduction in both plants and animals.*		*2%*		*C2*	*SC*	*Core*
BA16.02	*Summarize the process and purpose of selective breeding techniques.*		*3%*		*C2*	*SC*	*Core*
BA16.03	*Discuss asexual reproduction and the use of cloning to improve genetics in plant and animal lines.*		*2%*		*C2*	*SC*	*Core*
BA16.04	*Demonstrate proper technique in simple asexual propagation of plants.*			*2%*	*C3P*	*SC*	*Core*
BA16.05	*Explain methods of gene insertion used in the creation of transgenic organisms.*		*3%*		*C2*	*SC*	*Core*