



2011/2012 Student Competency Record
CTE503 -- Biotechnology Engineering
 36 weeks

Student	School Year
Grade	Term (fall, spring)
School	Teacher Signature

Mastery is a level of performance that indicates a student has demonstrated the knowledge, skills, and abilities for a unit of instruction or subject area as defined by a recognized standard. DoDEA defines mastery as being competent in the task and non-mastery as needing task remediation.

As students complete each competency, the student or teacher should assess the student's level of performance and mark the appropriate column next to the competency. This record should be used to provide information about competencies mastered to employer, student-employee, or another school/teacher.

CTE 503 36 weeks	Biotechnology Engineering TASKS/COMPETENCIES	Mastery	Non - Mastery
Implement DoDEA's CTE Course Requirements			
• 001	Demonstrate DoDEA's Workplace Readiness Skills in course activities. (See Workplace Readiness Competencies List)		
• 002	Identify Internet safety issues and procedures for complying with acceptable use standards.		
• 003	Identify issues relating to this field of study that affect the environment and impact local and global communities.		
Set Expectations for Student Success			
• 004	Demonstrate an understanding of the expectations for successful completion of Biotechnology Engineering course.		
• 005	Demonstrate an understanding of classroom policies and procedures.		
• 006	Identify and document personal learning goals.		
Relating Safety to Biotechnology Engineering			
• 007	Identify safety precautions necessary when using tools and materials.		
• 008	Match Personal Protective Equipment (PPE) to specific activities.		
• 009	Adhere to accepted laboratory safety practices.		
• 010	Locate and refer to Material Safety Data Sheets (MSDS).		
History and Development of Biotechnology Engineering			
• 011	Describe and evaluate Biotechnology Engineering contributions to scientific discoveries.		
Communicating Technical / Scientific Information			



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• 012	Present technical / scientific information to peers and professionals.		
• 013	Present technical / scientific information in an oral report.		
• 014	Present technical / scientific information in an electronic format.		
• 015	Write a business letter to request information or material.		
Engineers as Problem Solvers			
• 016	Identify engineering role models, including minorities and women.		
• 017	Identify problems that engineers may solve in the future.		
• 018	Define attributes associated with being a successful engineer.		
Careers & Certifications in Biotechnology Engineering			
• 019	Identify National certification agencies such as ABET, state level agencies regulation the practice of biotechnological engineering.		
• 020	Summarize the characteristics of professional engineers and scientists.		
• 021	Examine regulatory examinations and the applicable state competencies require to obtain a variety of levels of professional credentials.		
• 022	Explain and/or demonstrate the correct use of industry terms, behaviors, methods and best practices.		
• 023	Research and create career and educational prospectus for the general field of biotechnology engineering.		
Using the Design Process			
• 024	Use brainstorming as a strategy for problem solving.		
• 025	Use self reflection as a tool to evaluate performance.		
• 026	Determine sources of information available for problem solving.		
• 027	Participate on an engineering team working together to solve problems.		
• 028	Create or update a portfolio containing representative samples of student work.		
• 029	Explain how ethics influences the engineering process.		
• 030	Explain how social, environmental and financial constraints influence the engineering process.		
Ethical Aspects of Biotechnology Engineering			
• 031	Review a Biotechnology Ethics Case Study and identify and project the social impact of the outcome of the case.		
• 032	Identify ethical issues in each of the fields of Biotechnology.		
• 033	Justify both the pros and cons of a Biotechnology ethics issue.		
DNA Technology			
• 034	Evaluate the history and development of DNA technologies, their uses and applications.		
• 035	Extract and manipulate DNA		
• 036	Model DNA using physical or virtual modeling techniques.		
• 037	Identify, explore, defend, refute ethical dilemmas associated with DNA Technology.		
Forensic Biotechnology			



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• 038	Identify the developmental history components of forensic technologies.		
• 039	Model the use of DNA serology in the identification of organisms.		
• 040	Use DNA imaging to compare “finger” prints to match an unknown DNA sample to a known sample in a DNA database.		
• 041	Explore, discuss, defend, and refute ethical dilemmas associated with forensic biotechnology engineering.		
Medical & Pharmaceutical Biotechnology			
• 042	Identify and explain the implications of the scientific understanding of mapping the Human Genome.		
• 043	Identify and demonstrate understanding of biomedical biotechnology in the identification and eradication of human disease.		
• 044	Identify and explain the implications of the scientific understanding of stem cells.		
• 045	Explain trends in the development and utilization of gene therapy.		
• 046	Explain trends in the development and utilization of Biotechnology to augment human physiology.		
• 047	Predict the future applications of biotechnology engineered medical devices, products and or experimentation and their social implications.		
Agricultural Biotechnology			
• 048	Identify methods used to produce GM Foods		
• 049	Identify the potential applications of cloning.		
• 050	Compare transgenic animals and plants.		
• 051	Infer the implication of and practical application of the use of transgenic animals and plants.		
• 052	Appraise the value of soil bioremediation for crop production.		
• 053	Defend or refute the ethics of cloning.		
• 054	Forecast and compare the effects of GM Food in their current state and their future impact on society.		
Industrial Biotechnology			
• 055	Assess the value of materials produced using biotechnology.		
• 056	Compare and contrast the development and impact of the industrial Biotechnology engineering revolution with the industrial revolution.		
• 057	Provide and communicate evidence of the utilization of biotechnology engineering for the creation of bioenergy, modifying crops, or the growth of fungi in the production of medicines.		
• 058	Discuss the application of bioremediation in industrial production and manufacturing.		
Bioinformatics			
• 059	Explain bioinformatics.		
• 060	Explain phylogenetics.		
• 061	Construct phylogentic trees based upon DNA and protein sequence		



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	information.		
• 062	Hand biometrics technology.		
• 063	Identify and explain the implications of the bioinformatics on society.		
Capstone Project / Threaded Case Study			
• 064	Apply Biotechnology Engineering to solve a problem.		