

Title 7: Education K-12

Part 132: Health Sciences-Career Pathway-2014 Sports Medicine



2014 Sports Medicine

Mississippi Department of Education

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The Research and Curriculum Unit (RCU), located in Starkville, MS, as part of Mississippi State University, was established to foster educational enhancements and innovations. In keeping with the land grant mission of Mississippi State University, the RCU is dedicated to improving the quality of life for Mississippians. The RCU enhances intellectual and professional development of Mississippi students and educators while applying knowledge and educational research to the lives of the people of the state. The RCU works within the contexts of curriculum development and revision, research, assessment, professional development, and industrial training.

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Ms. Martha “Jackie” Murphy
Mr. Simon F. Weir II

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Kira Berch, Florence High School, Florence, MS

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Pam Hindman, Program Coordinator, Office of Career and Technical Education and Workforce Development, Mississippi Department of Education, Jackson, MS
phindman@mde.k12.ms.us

Standards

Standards are superscripted in each unit and are referenced in the appendices. Standards in the *Sports Medicine Curriculum Framework and Supporting Materials* are based on the following:

Board of Certification for the Athletic Trainer

The Board of Certification, Inc. (BOC) provides exceptional credentialing programs for healthcare professions and is responsible for the certification of Athletic Trainers. The BOC provides a certification program that confers an entry-level Athletic Trainer certification and establishes requirements for maintaining Athletic Trainer status. The BOC is the only accredited certification program for Athletic Trainers in the United States. For more information, please see:

http://bocatc.org/images/stories/resources/boc_standards_of_professional_practice_1212a_f.pdf

National Health Care Foundation Standards

The National Health Care Foundation Standards were developed by the National Consortium on Health Science Education (formerly the National Consortium on Health Science and Technology Education) and WestEd Regional Educational Laboratory West, in partnership with educators and health care employers. The standards were developed to inform current and future health care workers, employers, and educators what skills and knowledge workers need to succeed.

Common Core State Standards Initiative

The Common Core State Standards provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy. Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved. States and territories of the United States as well as the District of Columbia that have adopted the Common Core State Standards in whole are exempt from this provision, and no attribution to the National Governors Association Center for Best Practices and Council of Chief State School Officers is required. Reprinted from <http://www.corestandards.org/>.

National Educational Technology Standards for Students

From: *National Educational Technology Standards for Students: Connecting Curriculum and Technology*, Copyright 2007, International Society for Technology in Education (ISTE), 800.336.5191 (U.S. and Canada) or 541.302.3777 (International), iste@iste.org, www.iste.org. All rights reserved. Permission does not constitute an endorsement by ISTE.

21st Century Skills and Information and Communication Technologies Literacy Standards

In defining 21st-century learning, the Partnership for 21st Century Skills has embraced five content and skill areas that represent the essential knowledge for the 21st century: global awareness; civic engagement; financial, economic, and business literacy; learning skills that encompass problem-solving, critical-thinking, and self-directional skills; and information and communication technology (ICT) literacy.

Preface

Secondary career and technical education programs in Mississippi face many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing true learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, *Mississippi Code of 1972*, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, Ch. 487, §14; Laws, 1991, Ch. 423, §1; Laws, 1992, Ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act IV, 2007; and No Child Left Behind Act of 2001).

Mississippi Teacher Professional Resources

The following are resources for Mississippi teachers.

Curriculum, Assessment, Professional Learning, and other program resources can be found at The Research and Curriculum Unit's website: <http://www.rcu.msstate.edu>

Learning Management System: An online resource

Learning Management System information can be found at the RCU's website, under Professional Learning.

Should you need additional instructions, please call 662.325.2510.

My PLC: An online registration for all professional-development sessions

To register for any session, teachers will need an account in the registration system, MyPLC, <https://myplc.rcu.msstate.edu>. To create an account, click on the link and navigate to the "Request a Guest ID" link. The ID should be the teacher's first initial and last name and the last four (4) digits of the social security number. Teachers should complete the entire form, which will then be sent to a secure server. Upon activation of the teacher's account, he or she will receive an e-mail with login instructions. The teacher may then browse for the available sessions and register for the desired courses.

Should you need additional instructions, please call 662.325.2510.

Executive Summary

Pathway Description

The Sports Medicine pathway is a curriculum that provides an educational option for students who have successfully completed the Health Sciences Core (2 Carnegie credits). The Sports Medicine career pathway focuses on the aspects of the prevention and care of sports injuries. Students will learn the importance of prevention, evaluation, acute treatment and therapeutic care related to injuries in sports. Students will learn about the types of injuries that can occur and also be introduced to the emergency services associated with injuries in sports. Additionally, students will focus on rehabilitation settings and techniques to help a patient recover from sports injuries. The program offers students the opportunity to examine different careers associated with sports medicine along with workplace and employability skills associated with the sports medicine professions.

Industry Certification

Competencies and suggested performance indicators in the Sports Medicine course have been correlated to the Health Sciences Career Cluster Content Standards that have been reviewed and endorsed at the national level by the National Council on Health Sciences.

Assessment

The latest assessment blueprint for the curriculum can be found at <http://www.rcu.msstate.edu/Curriculum/CurriculumDownload.aspx>

Student Prerequisites

In order for students to be able to experience success in the Sports Medicine program, the following student prerequisites are suggested:

1. C or higher in English (the previous year)
2. C or higher in Math (last course taken or the instructor can specify the math)
3. C or higher in specified science course approved by the instructor
- or**
4. Instructor Approval

Teacher Licensure

The latest teacher licensure information can be found at

<http://www.mde.k12.ms.us/educator-licensure>

Professional Learning

If you have specific questions about the content of any training session provided, please contact the Research and Curriculum Unit at 662.325.2510, and ask for a professional learning specialist.

Course Outlines

Option 1—Two One-Carnegie-Unit Courses

This curriculum consists of two one-credit courses, which should be completed in the following sequence after completion of the core course, Health Sciences (Core) (2 Carnegie units):

- 1. Sports Medicine: Theory and Application I—Course Code: 995202**
- 2. Sports Medicine: Theory and Application II —Course Code: 995203**

Course Description: Sports Medicine: Theory and Application I

The Sports Medicine: Theory and Application I course provides a foundation for careers in sports medicine fields. An emphasis is placed on students learning about healthcare administration, the athletic and sports medicine team, and medical emergencies as well as first aid, and CPR. The students will be introduced to sports equipment, protective gear, and bandaging, wrapping and taping techniques. Additional topics include therapeutic modalities, exercise in rehabilitation, and pharmacology in sports.

Course Description: Sports Medicine: Theory and Application II

The Sports Medicine: Theory and Application II course helps the student investigate medical aspects of sports medicine as a career choice. It covers injuries that may occur from different types of sports including injuries to the head, spine, chest, abdomen, upper extremities, and lower extremities. This course also examines the skills necessary in emergency medical response.

Sports Medicine: Theory and Application I — Course Code: 995202

| Unit | Unit Name | Hours |
|------|---|-------|
| 1 | Orientation (Reinforcement and Review) | 5 |
| 2 | The Sports Medicine Team and Health Care Administration | 30 |
| 3 | Assessment and Evaluation of Injuries and Emergencies | 30 |
| 4 | Protective Equipment and Techniques | 20 |
| 5 | Nutrition in Sports | 10 |
| 6 | Pharmacology and Drugs in Sports | 10 |

| | | |
|-------|--|-----|
| Total | | 105 |
|-------|--|-----|

Sports Medicine: Theory and Application II — Course Code: 995203

| Unit | Unit Name | Hours |
|-------|---|-------|
| 7 | Physical Fitness Conditioning and Assessment | 20 |
| 8 | Therapeutic Rehabilitation and Modalities | 40 |
| 9 | Injuries to the Head, Spine, Chest, and Abdomen | 25 |
| 10 | Injuries to the Upper and Lower Extremities | 20 |
| Total | | 105 |

Option 2—One, Two-Carnegie-Unit Course

This curriculum consists of the following 2-Carnegie-unit course, which should be taken after completion of the core course, Health Sciences (Core) (2 Carnegie units):

1. Sports Medicine —Course Code: 995200

Course Description: Sports Medicine

The Sports Medicine course establishes insight into careers in sports medicine. It covers healthcare administration, the athletic and sports medicine team, and medical emergencies such as first aid and CPR. The students are introduced to sports equipment, protective gear, bandaging, wrapping, and taping injuries. Additional topics include therapeutic modalities, exercise rehabilitation, and pharmacology. Students will gain useful information about injuries that may occur from different types of sports, including injuries to the head, spine, chest, abdomen, as well as upper and lower extremities. It will also examine the skills necessary for emergency medical response.

Sports Medicine—Course Code: 995200

| Unit | Unit Name | Hours |
|------|---|-------|
| 1 | Orientation (Reinforcement and Review) | 5 |
| 2 | The Sports Medicine Team and Health Care Administration | 30 |
| 3 | Assessment and Evaluation of Injuries and Emergencies | 30 |
| 4 | Protective Equipment and Techniques | 20 |
| 5 | Nutrition in Sports | 10 |
| 6 | Pharmacology and Drugs in Sports | 10 |
| 7 | Physical Fitness Conditioning and Assessment | 20 |
| 8 | Therapeutic Rehabilitation and Modalities | 40 |

| | | |
|-------|---|-----|
| 9 | Injuries to the Head, Spine, Chest, and Abdomen | 25 |
| 10 | Injuries to the Upper and Lower Extremities | 20 |
| Total | | 210 |

Research Synopsis

Introduction

This program is designed to provide classroom theory and practical application in tasks related to sports medicine. It prepares students for a variety of occupations in sports medicine including athletic trainers, physical therapists, emergency medical technicians and many others. Course content provides coherent and rigorous alignment with challenging academic standards and relevant technical knowledge needed to prepare for further education and careers in various fields related to sports medicine.

Needs of the Future Workforce

The Sports Medicine industry is projected to grow by 55% in Mississippi and nationwide by 2020 (SWIB, 2010). Students in this program will be prepared for multiple in-demand and competitive job opportunities. Data for this synopsis was compiled from employment projections prepared by the United States census Bureau, the U.S. Bureau of Labor Statistics (SWIB, 2010), and the Mississippi Department of Employment Security (US Bureau of Labor Statistics, 2011).

| Athletic Trainers | Employment 2010 | Projected employment 2020 | Change 2010–2020 | | Mean annual wage (in dollars) |
|-------------------|--------------------|---------------------------------|------------------|---------|-------------------------------------|
| | | | Number | Percent | |
| Mississippi Total | 73 | 113 | 40 | 55 | \$19.00 |
| National Total | 6,950 | 10,531 | 3,581 | 55 | \$20.00 |

See State Workforce Investment Board for details:

<http://swib.ms.gov/DataCenter/PublicReports/OccupationAnalysis/OccupationReportByIndustry.aspx>

Table 1

| Description | Jobs, 2010 | Projected Jobs, 2020 | Change (Number) | Change (Percent) | Median Hourly Earning |
|---|-------------------|-----------------------------|------------------------|-------------------------|------------------------------|
| Physical Therapy Assistants | 352 | 467 | 115 | 32.67 | \$17.52 |
| Physical Therapists | 977 | 1,293 | 316 | 32.34 | \$34.98 |
| Athletic Trainers | 73 | 109 | 36 | 49.32 | \$18.97 |
| Recreational Therapists | 281 | 312 | 31 | 11.03 | \$14.60 |
| Occupational Therapist Assistant | 176 | 234 | 58 | 32.95 | \$22.96 |
| Emergency Medical Technicians and Paramedics | 1,097 | 1,191 | 94 | 8.57 | \$13.37 |
| Dietitians and Nutritionists | 318 | 345 | 27 | 8.49 | \$20.87 |
| Dietetic Technicians | 101 | 112 | 11 | 10.89 | \$8.96 |
| Massage Therapists | 235 | 310 | 75 | 31.91 | \$11.77 |
| Coaches and Scouts | 402 | 572 | 170 | 42.29 | \$19.83 |
| Fitness Trainers and Aerobics Instructors | 1,091 | 1,688 | 597 | 54.72 | \$12.50 |
| Chiropractor | 80 | 108 | 28 | 35.00 | \$21.91 |
| Respiratory Therapists | 799 | 955 | 156 | 19.52 | \$22.10 |
| Respiratory Therapy Technicians | 94 | 94 | 0 | 0.00 | \$17.46 |
| Cardiovascular Technologists and Technicians | 328 | 402 | 74 | 22.56 | \$18.75 |
| Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products | 777 | 821 | 44 | 5.66 | \$28.30 |
| Health Educators | 361 | 406 | 45 | 12.47 | \$16.82 |
| Physician Extender | | | | | |
| Radiologic Technologists and Technicians | 1,437 | 1,699 | 262 | 18.23 | \$21.15 |
| Orthotists and Prosthetists | 45 | 48 | 3 | 6.67 | \$40.93 |
| Cast techs | | | | | |
| Therapists, all other | 65 | 76 | 11 | 16.92 | \$25.96 |
| Surgical Technologists | 768 | 966 | 198 | 25.78 | \$15.25 |

Perkins IV Requirements

The Sports Medicine curriculum meets Perkins IV requirements of high-skill, high-wage, and/or high-demand occupations by introducing students to and preparing students for occupations. It also offers students a program of study including secondary, postsecondary, and IHL courses that will prepare them for occupations in these fields. Additionally, the Sports Medicine curriculum is integrated with academic common core standards. Lastly, the Sports Medicine curriculum focuses on ongoing and meaningful professional development for teachers as well as relationships with industry.

Curriculum Content

Summary of Standards

The standards to be included in the Sports Medicine curriculum are the National standards from the Board of Certification for the Athletic Trainer, 21st Century Skills, the Common Core Standards for Mathematics and Science, and the National Educational Technology Standards (NETS) for Students. Combining these standards to create this document will result in highly skilled, well-rounded students who are prepared to enter a secondary academic or career and technical program of study. They will also be prepared to academically compete nationally as the Common Core Standards are designed to prepare students for success in community colleges, Institutions of Higher Learning and careers.

Academic Infusion

The Sports Medicine curriculum is not only aligned with health care standards but is also tied to physical education. Students will also encounter history through learning about the administration of health care systems and the history of medicine. In addition, this curriculum prepares students for the modern workforce by incorporating the 21st Century Literacy Skills.

Academic Credit

If academic credit is awarded, please review the Research and Curriculum Unit link at

<https://www.rcu.msstate.edu/MDE/PathwaystoSuccess.aspx>.

Click “*Curriculum Enhancement List*”. Check this site often as it is updated frequently.

Transition to Postsecondary Education

The latest articulation information for Secondary to Postsecondary can be found at the

Mississippi Community College Board (MCCB) website <http://www.mccb.edu/>

Best Practices

Innovative Instructional Technologies

Recognizing that today’s students are digital learners, the classroom should be equipped with tools that will teach them in the way they need to learn. The Sports Medicine teacher’s goal should be to include teaching strategies that incorporate current technology. It is suggested that each classroom house a classroom set of desktop student computers and one teacher laptop. To make use of the latest online communication tools such as wikis, blogs, and podcasts, the classroom teacher is encouraged to use a learning management system, for example, the Sports Medicine Teacher LMS Content Management System, that introduces students to education in an online environment and places the responsibility of learning on the student.

Differentiated Instruction

Students learn in a variety of ways. Some are visual learners, needing only to read information and study it to succeed. Others are auditory learners, thriving best when information is read aloud to them. Still others are tactile learners, needing to participate actively in their learning experiences. Add the student’s background, emotional health, and circumstances, and a

very unique learner emerges. By providing various teaching and assessment strategies, students with various learning styles can succeed.

Career and Technical Education Student Organizations

Teachers should investigate opportunities to sponsor a student organization. There are several here in Mississippi that will foster the types of learning expected from the sports medicine curriculum. HOSA is the student's organization for sports medicine. HOSA provides students with growth opportunities and competitive events. It also opens the doors to the world of sports medicine and scholarships opportunities.

Cooperative Learning

Cooperative learning can help students understand topics when independent learning cannot. Therefore, you will see several opportunities in the sports medicine curriculum for group work. To function in today's workforce, students need to be able to work collaboratively with others and solve problems without excessive conflict. The Sports Medicine curriculum provides opportunities for students to work together and help each other to complete complex tasks.

Conclusions

Sports Medicine is one of Mississippi's most comprehensive health science curriculums. Students that complete these programs are well equipped for a variety of endeavors. Instructors are urged to encourage Sports Medicine students to pursue educational opportunities at community colleges and universities in Mississippi.

Professional Organizations

Association for Career and Technical Education

<https://www.acteonline.org>

Mississippi ACTE <http://www.mississippiacte.com/>

American Association of Medical Transcriptionist

4230 Kiernan Avenue
Suite 130
Modesto, CA 95356
800.982.2182 (toll free)
209.527.9620 (direct)
209.527.9633 (fax)
www.ahdionline.org
ahdi@ahdionline.org

www.ada.org

American Health Care Association

1201 L. Street, N.W.
Washington, DC 20005
202.842.4444
202.842.3860 (fax)
www.ahca.org

American Hospital Association

One North Franklin
Chicago, Illinois 60606-3421
312.422.3000
www.aha.org

American Association for Respiratory Care

9425 N. MacArthur Blvd.
Suite 100
Irving, TX 75063-4706
972.243.2272
www.aarc.org

American Medical Association

515 N. State Street
Chicago, IL 60610
800.621.8335
www.ama-assn.org

American College of Sports Medicine

401 West Michigan Street
Indianapolis, In. 46202-3233
317.637.9200
www.acsm.org
American Board of Sports Psychology
www.americanboardofsportspsychology.org

American Occupational Therapy Association

4720 Montgomery Lane
Bethesda, MD 20814
310.652.2682

American Dental Assistants Association

35 East Wacker Drive
Suite 1730
Chicago, IL 60601-2211
312.541.1550
312.541.1496 (fax)
www.dentalassistant.org

The American Physical Therapy Association

1111 North Fairfax Street
Alexandria, VA
(703)-684-2782

American Dental Association

211 East Chicago Ave.
Chicago, IL 60611-2678
312.440.2500

American Regulatory Agencies

1819 L. Street NW
Washington, DC. 20036
(202)293-8020
<http://www.ansl.org>

American Society for Testing Materials

100 Barr Harbor Drive

West Conshohocken, PA 19428-2959
<http://www.astm.org>

Arthroscopy Association of North America

6300 North River Road, Suite 104
Rosemont, IL 60018
www.aana.org

Association for Applied Sport Psychology

8365 Keystone Crossing, Suite 107
Indianapolis, IN 46240
317.205.9225 <http://appliedsportspsych.org>

College Athletic Trainers Society

PO Box 250325
Atlanta, Ga. 30325
www.collegeathletictrainer.org

Collegiate and Professional Sports Dietician Association

(708-974-3153
www.sportsrd.org

Red Cross National Headquarters

2025 E. Street NW
Washington, DC 20006
800.REDCROSS (toll free)
800.257.7575 (Español)
www.redcross.org

American Society of Radiologic Technologists

15000 Central Ave. SE
Albuquerque, NM 87123-3909
800.444.2778, Press 5 (toll free)
505.298.4500, Press 5 (direct)
(505) 298-5063 (fax)
www.asrt.org

Hospital Corporation of America

One Park Plaza
Nashville, TN 37203
615.344.9551
www.hcahealthcare.com

International Federation of Sports Medicine

Ae.De Rhodanie 54
CH- 1007 Lausanne
www.flms.org

International Society of Sports Nutrition

4511 NW 7th Street
Deerfield Beach, Florida 33442
www.sportsnutritionssociety.org

North American Society of Pediatric Exercise Medicine

www.naspem.org

National Association of Emergency Medical Technicians

P.O. Box 1400
Clinton, MS 39060-1400
Physical Address
132-A East Northside Dr
Clinton, MS 39056
1-800-34-NAEMT (toll free)
601.924.7744 (direct)
601.924.7325 (fax)
info@naemt.org
www.naemt.org

National Athletic Trainer's Association

2952 Stemmons Freeway #200
Dallas, TX 75247
214.637.6282
214.637-2206 (fax)
www.nata.org

LifeWorks: Explore Health and Medical Science Careers Early

<http://science.education.nih.gov/lifeworks>

National Collegiate Athletic Association

700 W. Washington Street
PO BOX 6222
Indianapolis, Indiana 46206-6222
Phone (317) 9176888
www.ncaa.org

National Association of Intercollegiate Athletics

6120 S. Yale Avenue
Suite 1450
Tulsa, OK. 74136
.918.494.8828
<http://www.naia.org>

National Federation of State High School Athletic Association

PO Box 690
Indianapolis, IN 46200
317.972.6900
<http://www.nfhs.org>

National Operating Committee on Standards for Athletic Equipment

PO Box 12290
Overland, KS 66282-2290
<http://www.nocsae.org>

National Center for Catastrophic Sports Injury Research

www.unc.edu

National Safety Council

1121 Spring Lake Dr.
Itasca, Il 60143 -3201
800.621.7615
www.nsc.org

National Health Council

1730 M Street, NW
Suite 500
Washington, DC 20036
202.785.3910
202.785.5923 (fax)
www.nationalhealthcouncil.org

Nurses for a Healthier Tomorrow

www.nursesource.org

Nursing Spectrum

www.nurse.com

St. Jude Children's Research Hospital

332 N. Lauderdale
Memphis, TN 38105
901.495.3300
www.stjude.org

Le Bonheur Children's Medical Center

50 N. Dunlap Street
Memphis, TN 38103
901.287.KIDS (5437)
info@lebonheur.org

Mississippi Nurses Association

31 Woodgreen Place
Madison, MS 39110
601.898.0670
601.898.0190 (fax)
<http://www.msnurses.org/>

American Heart Association

440 E. Pass Road Gulfport, MS, 39507
609 Corinne Street Hattiesburg, MS, 39401
4830 McWillie Circle Jackson, MS, 39206
www.americanheart.org

The Center for Health and Health Care in Schools

2121 K Street, NW Suite 250
Washington, DC 20037
202.466.3396
chhcs@gwu.edu
www.healthinschools.org

The Diabetes Foundation of Mississippi

16 Northtown Drive
Suite 100
Jackson, MS 39211
601.957.7878
601.957.9555 (fax)
www.msdiabetes.org

**Mississippi Office of Healthy Schools —
A Division of Mississippi Department of
Education**

Central High School
359 Northwest Street

P.O. Box 771
Jackson, MS 39205-0771
www.healthyschoolsms.org
www.rxlist.com
www.PDR.net

American Lung Association of Mississippi

P.O. Box 2178
Ridgeland, MS 39158
731 Pear Orchard Road
Suite 18
Ridgeland, MS 39157
800.586.4872 (toll free)
601.206.5810 (direct)
330.678.1601
330.678.4526 (fax)
asha@ashaweb.org
www.ashaweb.org

National School Boards Association

1680 Duke Street
Alexandria, VA 22314
703.838.6722
703.683.7590 (fax)
info@nsba.org
www.nsba.org

National Strength and Conditioning Association

1885 Bob Johnson Dr.
Colorado, Springs, CO. 80906
www.nsca-lift.org

Association for Professionals in Infection Control and Epidemiology

1275 K St., NW, Suite 1000
Washington, D.C. 20005-4006
202.789.1890
202.789.1899 (fax)
www.apic.org

The American Assembly for Men in Nursing

AAMN 6700 Oporto-Madrid Blvd.
Birmingham, AL 35206
(205) 956-0146 (phone)

601.206.5813 (fax)
www.alams.org

American Speech-Language-Hearing Association

2200 Research Boulevard
Rockville, MD 20850-3289
800.638.8255
www.asha.org

American School Health Association

7263 State Route 43
P.O. Box 708
Kent, Ohio 44240
www.aamn.org

Association of Allied Health Programs

4400 Jenifer Street, NW Suite 333
Washington, D.C. 20015
(202) 237-6481 (phone)
(202) 237-6485 (fax)
www.asahp.org

Health Professions Network

1850 Samuel Morse Drive
Reston, VA 20190-5316
(703) 708-9000 (phone)
(703) 708-9015 (fax)
membership@healthpronet.org
www.healthpronet.org

American Health Information

Management Association- AHIMA
233 N. Michigan Avenue, 21st Floor
Chicago, IL 60601-5800
(312) 233-1100
www.ahima.org

US Consumer Product Safety Commission

4330 East-west Highway
Bethesda, MD 20814-4408
301-504-0990
<http://www.cpsc.gov>

Youth Sports Safety Alliance
2952 Stemmons Freeway #200
Dallas, Tx 75247

(214) 637-6282
fax (214) 637-2206
www.youthsportssafetyalliance.org

Using This Document

Suggested Time on Task

This section indicates an estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75–80% of the time in the course.

Competencies and Suggested Objectives

A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies. The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.

Integrated Academic Topics, 21st Century Skills and Information and Communication Technology Literacy Standards, ACT College Readiness Standards, and Technology Standards for Students

This section identifies related academic topics as required in the Subject Area Testing Program (SATP) in Algebra I, Biology I, English II, and U.S. History from 1877, which are integrated into the content of the unit. Research-based teaching strategies also incorporate ACT College Readiness standards. This section also identifies the 21st Century Skills and Information and Communication Technology Literacy skills. In addition, national technology standards for students associated with the competencies and suggested objectives for the unit are also identified.

References

A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested, and the list may be modified or enhanced based on needs and abilities of students and on available resources.

Unit 1: Orientation (Reinforcement and Review)

| Competencies and Suggested Objectives | |
|--|---|
| 1. | Describe local program and vocational center expectations, policies, and procedures. ^{DOK 1} a. Describe local program and vocational center policies and procedures including dress code, attendance, academic requirements, discipline, shop/lab rules and regulations, and transportation regulations. b. Give a brief overview of the course. Explain to students what Construction Technology is, why it is important, and how it will be delivered. c. Compare and contrast local program and school policies to expectations of employers. d. Preview course objectives, program policy, and the industry standards. |
| 2. | Describe employment opportunities and responsibilities. ^{DOK 1, BOC 7} a. Describe employment opportunities including potential earnings, employee benefits, job availability, working conditions, educational requirements, required technology skills, and continuing education/training. b. Describe basic employee responsibilities and appropriate work ethics. c. Compare and contrast employment responsibilities and expectations to local school and program policies and expectations. d. Demonstrate computer systems and their uses in the Sports Medicine industry. e. Define effective relationship skills and workplace issues to include but not limited to sexual harassment, stress, and substance abuse. |
| 3. | Research, design, and conduct a project that will integrate the knowledge and skills learned in the Sports Medicine course in a real-world, unpredictable environment. ^{DOK3, BOC 7} a. Demonstrate effective team-building and leadership skills. b. Explore leadership skills and personal development opportunities provided to students by student organizations to include HOSA. c. Work as a team to design a community service project for which the knowledge and skills learned in the course can be used to improve the lives of others. |
| 4. | Apply personal and environmental safety practices. ^{DOK 1, BOC 2} a. Apply principles of body mechanics. b. Apply safety techniques in the work environment in order to prevent accidents and injuries. |
| 5. | Utilize emergency procedures and protocols. ^{DOK 2, BOC 3} a. Practice fire safety in a healthcare setting. b. Apply principles of basic emergency response in natural disasters and other emergencies. |
| 6. | Explain the importance of maintaining transmission-based isolation precautions. ^{DOK 1, BOC 2} a. Identify the precautions needed to prevent the spread of communicable diseases. b. Utilize the proper procedure for applying Personal Protective Equipment (PPE). |
| 7. | Explain standard precaution based on Occupational Safety and Health Administration |

(OSHA) and Centers for Disease Control (CDC) regulations. ^{DOK 1, BOC 2}

- a. Understand OSHA's blood-borne pathogen standards.

Scenario

Unit 1

No Performance Task is needed for the Orientation Unit.

Attachments for Scenarios

None

Unit 2: The Sports Medicine Team and Health Care Administration

| Competencies and Suggested Objectives | |
|---|--|
| 1. Define sports medicine and discuss its historical background and future emphasis. ^{DOK} | |
| <ul style="list-style-type: none"> a. Identify where has sport originated - Greek and Roman Civilizations b. Evolution of athletic trainers and the field of sports medicine | |
| 2. Identify the difference between professional organizations dedicated to athletic training and sports medicine. ^{DOK 1, BOC 7} | |
| <ul style="list-style-type: none"> a. Identify organizations common grounds devotion to achieving health and safety in sports. b. Identify the professional organizations that support health and safety in sports. c. Identify universal competencies. | |
| 3. Differentiate the role of the athletic trainer, team physician, support personnel, and coach. ^{DOK 1, BOC 7} | |
| <ul style="list-style-type: none"> a. Identify the five performance domains and tasks of the sports medicine team including the following: <ul style="list-style-type: none"> • Prevention of athletic injuries • Recognition, evaluation and immediate care of injuries • Rehabilitation and reconditioning of athletic injuries • Healthcare administration • Professional development and responsibility b. Explain the preferred qualities of a sports medicine professional to include: <ul style="list-style-type: none"> • Stamina and ability to adapt • Empathy • Sense of Humor • Intellectual curiosity • Ethics c. Differentiate some sports medicine personnel roles to include: <ul style="list-style-type: none"> • Team physician • Coach (team, strength, conditioning, etc.) • Nurse • Physical and occupational therapist • School health services • Dentist • Physician assistant • Biomechanist • Nutritionist/dietician • Sport psychologist • Exercise physiologist • Equipment managers • Referees | |
| 4. Identify various employment settings for sports medicine personnel to include: ^{DOK 1, BOC 7} | |

| |
|---|
| <ul style="list-style-type: none"> • Secondary schools • School districts • Colleges and universities • Professional sports • Recreational sports • Industrial setting |
| <p>5. Identify the responsibilities of a healthcare professional outside of providing medical care to include: ^{DOK 1, BOC 7}</p> <ul style="list-style-type: none"> • Facility design for multi-services provided • Budget maintenance • Supply and equipment inventory • Record keeping • Injury record • SOAP Notes • Treatment logs <p>Insurance – personal and secondary, catastrophic</p> |
| <p>6. Identify the steps to administering pre-participation physical examination to include: ^{DOK 2, BOC 4}</p> <ul style="list-style-type: none"> • Obtaining a medical history • Giving a primary physical examination • Assessing the maturity level of the patient <p>Obtaining an orthopedic assessment</p> |
| <p>7. Identify unique ethical issues in sports medicine. ^{DOK 1, BOC 6}</p> <p>a. Discuss the epidemiological approach to recording sports injury data.</p> |
| <p>8. Explain the difference between an accident, an injury, and a catastrophic injury. ^{DOK 1, BOC 4}</p> |

Scenario

Unit 2

- 1) Ask the students to research possible professions within the sports medicine field as well as places of employment. Have them design a tri-fold display to highlight their sports medicine career choice. Areas students should focus on include: Education, certifications, testing requirements, job qualifications/skills, and population of provided care, etc. Students will provide descriptions and pictures to express the profession to its fullest. (See HOSA - career Health Display.)
- 2) Have students interact with a member of the sports medicine profession and identify the characteristics that are unique to that profession. Have them compare other professionals in the healthcare field.
- 3) Have the students identify why athletic training rooms, locker rooms, hydrations rooms, water bottles etc. must be sanitary, why these environments are often neglected and what should be done about it.

- 4) Divide the students into groups and have them debate conditions that constitute good grounds for medical disqualification from a sport.
- 5) Students can volunteer at a free sports physical clinic or host the schools own free sports physical clinic. Students can contact local physicians in different specialty areas and assist in obtaining blood pressure, eye exams, height and weight, etc.
- 6) Students discuss some legal concerns of the coach and athletic trainer in sports. Situations include working with opposite genders, negligence of patient's injury complaints, etc.

Attachments for Scenarios

http://www.hosa.org/nlc/career_health_display_projects.htm

Unit 3: Assessment and Evaluation of Injuries and Emergencies

| Competencies and Suggested Objectives | |
|--|---|
| 1. | Describe the components of on-the-field acute care and emergency procedures. ^{DOK 1, BOC 3} a. Describe the importance of an emergency action plan for sports medicine settings. |
| 2. | Explain off-the-field injury evaluation. ^{DOK 1, BOC 4} a. Identify and describe standard musculoskeletal anatomy and assessment terms. b. Describe a systematic process for injury evaluation and differentiate between recognition, assessment, and diagnoses. c. Describe the process of documenting an injury evaluation. d. Discuss the diagnostic tests that are used by a physician for an injury evaluation. |
| 3. | Explain the characteristics of sports trauma. ^{DOK 1, BOC 3, BOC 4, BOC 5} a. Identify the risk factors and causes associated with specific activities and conditions of individuals engaged in sports and physical activity. b. Describe and distinguish between the major biomechanical forces occurring in sports injuries. c. Identify the anatomical structures of skin, describe the mechanical forces that cause skin trauma, and discuss how skin injuries are classified. d. Identify the anatomical structures of a skeletal muscle, describe the mechanical forces that cause skeletal muscle trauma, and discuss how skeletal muscle injuries are classified. e. Identify the anatomical structures of a synovial joint, describe the mechanical forces that cause synovial joint trauma, and discuss how synovial joint injuries are classified. f. Identify the anatomical structures of bone, describe the mechanical forces that cause bone trauma, and discuss how bone injuries are classified. g. Identify the anatomical structures of nerve tissue, describe the mechanical forces that cause nerve trauma, and discuss how nerve injuries are classified. h. Explain common risk factors and causes of athletic injuries in various sports. i. Identify and describe standard terminology of sports trauma. |
| 4. | Review the criteria for blood-borne pathogen certification according to the AHA. ^{DOK 1, BOC 2} a. Review the infection chain. b. Define blood-borne pathogens and describe the transmission, symptoms, signs and treatment of hepatitis A, B, C, D, E, and the HIV virus. c. Describe how blood-borne pathogens affect athletic participation at all levels of competition including rules and purposes. d. List the universal precautions as mandated by the Occupational Safety and Health Administration (OSHA) and how they apply to the healthcare provider. e. Discuss HIV risk reduction in sports. |

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| 5. Discuss the supplies that should be included in a basic first aid kit or athletic emergency kit. ^{DOK 1, BOC 3} |
| 6. Discuss the environmental considerations in medical emergencies. ^{DOK 1, BOC 3} a. Explain the causes, prevention, assessment, and treatment of heat-related illnesses. b. Describe the causes, prevention, assessment, and treatment of cold-related illnesses. c. Discuss the causes, prevention, assessment, and treatment of altitude, sun, and lightning conditions. |
| 7. Review common medical emergencies. ^{DOK 1, BOC 3} a. Identify common breathing problems and describe the first aid actions. b. Identify common reasons for chest pain and pressure and describe the first aid actions for these. c. Identify common reasons for fainting and describe the first aid actions that should be taken. d. Identify reasons for low blood sugar and describe the first aid actions that should be taken. e. List the signs for stroke and describe the first aid actions that should be taken. f. Identify causes for seizures and describe the first aid actions that should be taken. |
| 8. Review the most common physical injuries. ^{DOK 1, BOC 4} a. Identify frequent musculoskeletal injuries. b. Discuss and the application of splinting an injury. c. Explain the applications of sling and swathe. d. List the different types of external bleeding and describe the first aid actions for these. e. Define shock and describe the first aid actions to reduce its severity. f. List the signs or symptoms that indicate internal bleeding and describe the first aid actions that should be taken. g. List different types of head and spine injuries that are common in sporting and their resulting signs and describe the first aid actions. h. Identify the different types of bone, muscle and joint injuries and describe the first aid actions. i. List and identify burn types and describe the first aid actions for each. |
| 9. Review the fundamentals of adult basic life support. ^{DOK 1, BOC 3} a. Identify the risks, signs, and symptoms of a heart attack. b. Describe the AHA chain of survival. c. Demonstrate one-person adult CPR and foreign body airway obstruction removal techniques. |
| 10. Review the basics of pediatric basic life support. ^{DOK 1, BOC 3} a. Identify the risks associated with cardiac or respiratory arrest in children and steps for preventing injuries. b. Describe the AHA chain of survival for pediatrics. c. Demonstrate one-person child CPR and foreign body airway obstruction removal techniques. |

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|--|
| <p>11. Demonstrate cardiopulmonary resuscitation (CPR).^{DOK 2, BOC 5}</p> <ol style="list-style-type: none"> List and discuss the AHA's first two steps of the chain of survival. Discuss how to assess a victim's breathing and check for signs of circulation. Demonstrate how to call 911. Demonstrate how to perform mouth-to-mouth and mouth-to-barrier rescue breathing. Demonstrate how to perform one-rescuer CPR. |
| <p>12. Explain the procedure of automatic external defibrillation (AED).^{DOK 1, BOC 5}</p> <ol style="list-style-type: none"> Discuss when someone should go get an AED. List the steps of using an AED. Demonstrate the techniques of using an AED. |
| <p>13. Demonstrate the process of spine boarding a patient.^{DOK 2, BOC 5}</p> <ol style="list-style-type: none"> List the steps of stabilizing the head, neck, and spine. Explain the use of spine board equipment. Demonstrate the log-roll technique. Demonstrate the six-man lift. Explain the importance of face mask removal techniques. Demonstrate the safe spine board lifting technique. |

Scenario

Unit 3

- Students will interview and work with an athletic team coach or athletic director to develop an ideal EAP for their sport. They will identify the location of a land line to call 911, identify a street address, the best ways to gain access to locked gates, who will control the crowds, and supplies needed in case of an emergency. The plan shall be outlined and evaluated by a supervising athletic trainer who can utilize the detailed plan as an annual update requirement.
- Students will role-play about an athlete who has sustained an injury. They will follow a HOPS systematic assessment protocol. Each student will discuss and develop a variety of techniques used to obtain a history, what to look for in an observation, and what to feel for, perform basic ROM tests to extremities. (Students will learn a variety of special test in later lessons). The students will be responsible for submitting their findings to the instructor as the head athletic trainer/sports medicine professional
- Have the students interview someone recovering from a sports-related injury. Ask the person to describe how the injury was noticed, noting the mechanism, body position, sounds, smells, and sensations. As the interview continues ask questions about the healthcare the client received, when was an assessment received, questions asked, techniques used in the evaluation, how the patient received the evaluation (satisfied/unsatisfied). Evaluate the treatment process and decisions and the overall progress to return the client to activity. The students will then prepare a presentation to be

discussed in class focused on primary care assessments and how first aid should be presented.

- 4) Tell the students that they will be presented with a \$1000.00 first aid equipment budget. Using supply catalogs and the Internet to research supplies and cost, students will generate a supply list necessary for an ideal sports medicine first aid kit. Students must indicate the supply costs and justify how the supplies will be used for patient care. If the students over budget, they should brainstorm ways to fundraise for the necessary supplies.
- 5) Students will evaluate and discuss a variety of documentation used in sports medicine and other medical facilities to care for sports related injuries. The discussion will look at how forms make documentation simple, easy to flow, items they like and dislike and how they differentiate according to different health care environments.
- 6) Students will utilize the CDC website to discuss how blood borne pathogens spread in the workplace. They will role play about how simple daily mistakes can affect a healthcare worker and then they will develop creative ways to avoid these common mistakes with better procedures, obtaining proper medical history, avoiding rushed scenarios, etc.
- 7) Read the following scenario to the students: The football team is practicing on the outdoor field. The students notice that the weather is rapidly worsening becoming dark and the wind is blowing harder. Twenty minutes are left in the practice session and the coach intends on finishing practice. It is noticed that there is a bolt of lightning in the sky and an immediate burst of thunder.
Have the students discuss how to manage this extremely dangerous situation. How will they measure the lightning distance (flash to bang or device) and how will they appropriately inform the coach about bringing the players in-doors? Key points include calm, authoritative, educative, use of an EAP.
- 8) Students should practice basic life support techniques along with AHA video instruction for CPR and AED procedures. Following the instructional video, students will partner up and role play scenarios that mimic what was learned in the lessons. As they role play, each take turns in the situation as a rescuer and victim would be represented in real-life situations. Students can video tape the roles or demonstrate them in the classroom as they have learned.
- 9) Students will be given a traumatic athletic scenario of a football player who lowered his head when making contact with an opponent. The patient is unresponsive but showing signs of life with an adequate pulse and breathing. Students will demonstrate how to obtain proper access to the victim's airway without removal of the helmet and properly prepare the athlete for transport with position onto a spine board. Students work through the scenario as a team without error.

Attachments for Scenarios

None

Unit 4: Protective Equipment and Techniques

| Competencies and Suggested Objectives | |
|--|--------------|
| 1. Discuss the safety standards and legal concerns of protective equipment. | DOK 1, BOC 2 |
| 2. Differentiate between the good and bad features of selective protective devices. | DOK 1, BOC 2 |
| 3. Contrast the advantages and disadvantages of customized versus off-the-shelf devices. | DOK 1, BOC 2 |
| 4. Rate the protective value of various materials used in sports to make protective padding and orthotic devices. | DOK 1, BOC 2 |
| 5. Identify the steps in making a customized foam with a therma-moldable shell. | DOK 1, BOC 2 |
| 6. Identify types of protective devices for variety of body parts and the proper application | DOK 1, BOC 2 |
| 7. Identify the limitations and risks of protective sports equipment. | DOK 1, BOC 2 |
| 8. Identify the purpose of bandaging, wrapping, and taping, and the supplies needed. | DOK 1, BOC 5 |
| <ul style="list-style-type: none"> a. Practice the skills of elastic bandage wrapping. b. Identify the indications and contraindications of elastic bandage wrapping. | |
| 9. Demonstrate taping and the basic skills needed for taping in sports. | DOK 1, BOC 5 |
| <ul style="list-style-type: none"> a. Describe the steps of application for a variety of bandages and identify the various materials used. b. Describe the purpose, types and application of non-elastic and elastic adhesive tape. c. Describe body positioning when taping in sports. d. Explain the steps and techniques used in the skill of taping for the upper extremity. e. Explain the steps and techniques used in the skill of taping for the lower extremity. | |
| 10. Describe the steps of casting techniques. | DOK 1, BOC 5 |
| <ul style="list-style-type: none"> a. Discuss casting materials. b. Discuss decisions on proper casting techniques and injuries that need immobilization. c. Identify indications and contraindications for immobilization. | |

Scenario

Unit 4

- 1) Students can take a field trip to visit a prosthetics and orthodic department to learn how to make custom devices, the training it takes to design such devices, and the materials used to fabricate these devices. Students will also discuss certain biomedical technologies that go into designing products that mimic real human mechanics. Students will realize basic body motions that we take for granted such as how the big toes and the thumbs function.

- 2) Invite a cast technician or a brace specialist to speak to the students about how to apply off-the-shelf and custom braces. Student should role play a clinician applying such devices with proper measurements, providing instructions, and with client care and compassion.
- 3) Students will work on developing a presentation to be given to in-season athletic teams about how protective devices should be worn, how to fit equipment properly, the purpose it serves inactivity, risks of using and not using such devices. Resources for this project includes speaking with coaches, equipment managers, product developers, injured individuals, therapist and etc.
- 4) Students will put together a possible budget for your school for taping supplies. Choose one sport and the number of athletes that will be participating. Use a catalog of the internet to find prices for your budge line items. Decide where the money will come from for your budget.
- 5) Separate the students into pairs for an ankle taping competition. To practice for this competition, student will use select taping videos with access to pause, play, and rewind to practice at their own pace. The teacher will bring in outside athletic trainers from local clinics to serve as judges. They will be judged on speed, technique, comfort, and function.
- 6) Take each joint or body part and demonstrate the common taping procedures used to give support to that area. Have the students pair up and practice these tapings on each other.
- 7) Invite a guest speaker who is a cast technician to show students how to apply casts with fibro glass materials. Students will discuss the variety of optimal positions for long term stabilization that would not compromise circulation or cause skin deterioration. Students will also discuss and analyze prime causes for immobilizing of a limb or joint. Students will discuss how age, injury, and gender etc. may affect such a decision.
- 8) Bring a variety of tape to class and discuss tape uses and the qualities to look for in purchasing tape. Have the class practice on tearing the different types of tape and test function.

Attachments for Scenarios

None

Unit 5: Nutrition in Sports

| Competencies and Suggested Objectives |
|--|
| 1. Define the term sports nutrition and identify the roles and responsibilities of a sports dietician or nutritionist. <small>DOK 1, BOC 1</small> |
| 2. Identify and differentiate the six classes of nutrients needed in balance to promote optimal health and performance. These include: <small>DOK 1, BOC 2</small> <ul style="list-style-type: none">• Carbohydrates• Fats• Proteins• Vitamins• Minerals• Water |
| 3. Determine the best meals and time to consume before exercise, during activity, and after activity. <small>DOK 1, BOC 2</small> |
| 4. Identify what an eating disorder is and understand how eating disorders can challenge ideal activity performance. <small>DOK 1, BOC 2</small> |

Scenario

Unit 5

- 1) Students will analyze and understand the six basic classes of nutrients for optimal health and performance. With this information the students will consider the demands of a specific type of athlete (football, golf, basketball, etc.) and design an ideal meal plan that will provide the athlete with the basic nutrition requirements and that can fuel proper performance.
- 2) Students will keep a nutrition journal for a desired time period writing everything down that he or she consumes for breakfast, lunch, snacks, and dinner. The students will also document their physical activity and their mood for the day. Students will then tally the total calories consumed during the day and the calories burned on an average day, calculate their calorie expenditure according to a calorie expenditure chart and will determine what he or she could have done nutritionally to improve their day's progress.
- 3) Jennifer is a 42-year-old tennis player. She states that recently her energy levels have dropped and she has had a hard time recovering from long tennis matches. She also complains of being "hungry all the time." The constant hunger has been frustrating because she is trying to maintain her current weight and thus attempting to control her total daily intake. She has been "eating well" since she found out two years ago that she has high cholesterol. She counseled with a dietitian at the time of her diagnosis and subsequently made major changes in her diet such as switching to nonfat foods and eliminating dairy.

Have the students help Jennifer with her goals. These include increasing her energy levels, decreasing recovery time, and creating a meal plan that will also be healthy for her husband and three sons.

Attachments for Scenarios

None

Unit 6: Pharmacology and Drugs in Sports

| Competencies and Suggested Objectives | |
|---|-----------------|
| 1. Define the term drug and the various methods by which drugs can be administered. | DOK 1, BOC 1 |
| 2. Analyze pharmokinetics relative to absorption, distribution, metabolism, and excretion. | DOK 2 |
| 3. Differentiate administering and dispensing medication and legal concerns. | DOK 1, BOC 1 |
| 4. Explore the classifications of drugs and common drugs used in sports. | DOK 1 |
| 5. Discuss athletes' use of alcohol, drugs, and tobacco. a. Discuss the drug testing policies and procedures for banned drugs in sports. | DOK 1, BOC 4 |
| 6. Identify the purposes of drug testing in athletes. | DOK 1 |

Scenarios

Unit 6

- 1) Invite a nurse to speak to the students about drug administration, and drug reactions. Students will hear how patients tend to overdose on medications and how the body physiologically reacts to medication overload.
- 2) Students can develop an anti-drug campaign by creating an educational video on how drug use can lead to tragedy, trauma, and death if misused. This can be presented to student athletes, can be used in HOSA competition, or for community education.

Attachments for Scenarios

None

Unit 7: Physical Fitness Conditioning and Assessment

| Competencies and Suggested Objectives |
|--|
| 1. Describe physical fitness and the ways that a physically active person can become physically fit. Include the following: ^{DOK 1, BOC 4} <ul style="list-style-type: none">• Strength• Cardiovascular endurance• Muscle endurance• Flexibility• Body composition• Physical capabilities• Physical limitations |
| 2. Identify a person's fitness level by evaluations for competitive and general fitness. ^{DOK 1} |
| 3. Compare and contrast the fitness levels of men and women, including the focus on age differences. ^{DOK 1} |
| 4. Demonstrate how to measure body weight and calculate body fat percentage by using skin-fold calipers. ^{DOK 2, BOC 4} |
| 5. Identify special considerations that a client may have that can limit his or her participation in activity or competition. Analyze congenital defects and medical conditions and how a sports medicine professional can help a person overcome these limitations to reach his or her goal. ^{DOK 1, BOC 4} |

Scenario

Unit 7

- 1) Have the students identify places where clients can obtain an adequate fitness evaluation. Have them research and write a report about the tools and technology that can make such testing more accurate than techniques in the past.
- 2) Require the students to work in groups to develop a physical fitness assessment form that is unique to the demographic of a tested fitness level. Students should interact with your school's athletic coaches according to an assigned sport to determine what factors are important for a client to have for optimal performance in this sport. Students will then use their physical fitness assessment form to properly assess a client's current fitness level and analyze the data to indicate if the client is considered physically fit for training, competition, or if he or she requires further assessment.
- 3) Assign students to assist athletic coaches in collecting player data that includes evaluating peers' weight, height, body fat percentage, blood pressure, and fitness level. The students will then compile the data for athlete education and to show coaches the overall health status

of the team prior to off-season training. Students can perform a pre-season follow-up to measure how fitness levels have changed because of proper training.

Attachments for Scenarios

None

Unit 8: Therapeutic Rehabilitation and Modalities

| Competencies and Suggested Objectives | |
|--|--------------|
| 1. Discuss the use of therapeutic modalities. | DOK 1, BOC 5 |
| a. Discuss the legal and safety concerns of therapeutic modalities. | |
| b. Identify and describe therapeutic modalities used in a rehabilitation plan. | |
| 2. Identify and discuss the three phases of musculoskeletal healing. | DOK 1, BOC 5 |
| • Inflammatory phase | |
| • Repair phase | |
| • Remodeling phase | |
| 3. Identify the use of thermal therapy. | DOK 1, BOC 5 |
| a. Examine the sources of thermal therapy. | |
| b. Identify the indications and contraindications of cold treatments. | |
| c. Identify the indications and contraindications of hot treatments. | |
| 4. Identify the use of ultrasound therapy. | DOK 1, BOC 5 |
| a. Discuss equipment types, physical principals, indications, and contraindications of ultrasound therapy. | |
| 5. Identify the use of electrotherapy. | DOK 1, BOC 5 |
| a. Discuss equipment types, physical principals, indication, and contraindications of electrotherapy. | |
| 6. Identify the use of massage therapy. | DOK 1, BOC 5 |
| a. Discuss equipment types, physical principals, indication, and contraindications of massage therapy. | |
| 7. Discuss the legal and safety concerns of therapeutic and exercises. | DOK 1, BOC 5 |
| 8. Identify the consequences of sudden inactivity and injury immobilization. | DOK 1, BOC 5 |
| 9. Identify the primary components of a rehabilitation program. | DOK 1, BOC 5 |
| 10. Identify the importance of core stabilization. | DOK 1, BOC 5 |
| 11. Identify open and closed kinetic chain exercises | DOK 1, BOC 5 |
| 12. Identify the techniques and principles of proprioceptive neuromuscular facilitation. | DOK 1, BOC 5 |
| 13. Explore the use of aquatic training. | DOK 1, BOC 5 |
| 14. Apply the evaluation for athlete rehab progression. | DOK 2, BOC 5 |

Scenario

Unit 8

- 1) Students will work in pairs to test a variety of thermotherapy techniques to explore the physiological effects that are placed on patients receiving this type of therapy. This will include but not be limited to: heating pads, ice massage, ice bag, ice immersion, warm bath immersions, and heat lamp use. During the process, students will complete a survey about their individual experiences from a physiological standpoint and a psychological standpoint.

- 2) Assign each student a common sports injury such as an acute Grade 1 ankle sprain. Discuss with the students how they will design a therapeutic regime including modalities to improve a client's healing. They must explain their choices according to the physiological needs of the client.
- 3) To explore the different types of modalities and exercise equipment, have the students take a field trip to a physical therapy clinic or a local college athletic training facility. They will learn the indications and contraindications of electrical modalities and gain hands on experiences on how these treatments feel to a patient.
- 4) Have the students participate in a lab activity that involves an injury scenario and have the students demonstrate different ways to treat this injury through proper rehabilitation phases. The students should develop activities and present these activities to the class explaining how they will help the athlete's progression back to sports.
- 5) Students can visit a local community or school pool to understand how aquatic therapy can benefit an athlete's rehabilitation process by being weightless and creating resistance training.
- 6) Have the students research what short-term and long-term goals would mean in an athlete's rehabilitation process. This will include how each goal will be obtained in short term, pain management, strength, balance, and long-term goals to return to play.
- 7) Identify the athlete's psychosocial barriers during the injury and recovery process. Students can identify how to encourage and provide positive reinforcement to obtain a set of goals for the patient.
- 8) Students will apply challenges to a patient's proprioception in a lab situation such as balancing on one leg, balancing with eyes closed, balancing while catching a ball, etc.

Attachments for Scenarios

None

Unit 9: Injuries to the Head, Spine, Chest, and Abdomen

| Competencies and Suggested Objectives |
|---|
| 1. Review specific anatomy of the head and face (taught in HS2 and A&P) ^{DOK 1} |
| 2. Discuss common injuries of the head, signs and symptoms, basic management to include: DOK 1, BOC 4 <ul style="list-style-type: none"> • Skull fractures • Concussions • Epidural and Subdural Hematoma • Facial Fractures • Lacerations • Dental injuries • Nasal Injuries • Ear injuries • Eye Injuries |
| 3. Identify and practice special tests for identifying common injuries of the face and head. DOK 1, BOC 4 |
| 4. Identify evaluation and treatment options for mild brain or facial injuries. ^{DOK 1, BOC 5} |
| 5. Review the specific anatomy of the spine. ^{DOK 1} |
| 6. Identify and discuss common injuries of the spine, common signs and symptoms of spinal cord injuries, and basic management of spinal cord injuries to include: ^{DOK 1, BOC 4} <ul style="list-style-type: none"> • Vertebral fractures • Spinal Sprains and strains • Vertebral disc dysfunction • Sacroiliac dysfunction • Abnormal spinal curvatures |
| 7. Identify and practice special tests for identifying common injuries of the spine. ^{DOK 1, BOC 5} |
| 8. Identify evaluation and treatment options for mild spinal injuries. ^{DOK 1, BOC 5} |
| 9. Identify ways to improve flexibility and strength of a patient/athlete's spine. ^{DOK 1, BOC 5} |
| 10. Review specific anatomy of the thorax and abdomen. ^{DOK 1} |
| 11. Discuss common injuries of the thorax and abdomen, signs and symptoms, basic management to include: ^{DOK 1, BOC 4} <ul style="list-style-type: none"> • Common strain and sprains • Fractures • Nerve injuries • Heart conditions in sports • Sudden death syndrome in athletes • Organ contusions • Common sports injuries to the reproductive organs Sports hernias |
| 12. Identify and practice special tests for identifying common injuries in the thorax and abdomen. ^{DOK 1, BOC 5} |
| 13. Identify evaluation and treatment options for identifying common injuries in the thorax |

| |
|--|
| and abdomen. ^{DOK 1, BOC 4} |
| 14. Identify and practice ways to improve flexibility and strength of a patients thorax and abdomen. ^{DOK 1, BOC 5} |

Scenario

Unit 9

1. Ask the students to research and collect a variety of concussion exams from the internet. They will evaluate all the exams and pick the best concussion exam that they can find. They will discuss why certain exams or questions are more important to ask a concussed patient without allowing the patient to continue activity. Students will then perform these exams on each other and evaluate their experiences.
2. Have the students research a variety of computer applications that are designed to help coaches, parents, and healthcare professionals evaluate a patient for a concussion. The applications should help them to make a decision about when or if the athlete can return to activity or if they must see a physician.
3. Have the students work in small groups to protect and splint injuries to the head and face to prepare the patient for transport or further medical attention. Students should be provided with equipment that is typically available at the venue and in their first aid kit. When evaluating, look for critical thinking skills and communication between responders.
4. Arrange a field trip to a local neurological therapy clinic to learn how clinicians evaluate and treat patients with brain injuries.
5. Have the students research common internal damage injuries that occur in athletes and the unique signs and symptoms of these internal injuries.
6. Have the students participate in a core building lab activity to understand how important core strength is in athletics and in back pain.
7. Have the students research what blunt cardiac injuries are. Have them discuss how CPR and AED can be unique in sports with the removal of protective equipment.

Attachments for Scenarios

None

Unit 10: Injuries to the Upper and Lower Extremities

| Competencies and Suggested Objectives |
|---|
| 1. Review specific anatomy of the upper extremity such as shoulder complex, elbow joint, and hand and wrist. ^{DOK 1} |
| 2. Discuss common injuries of the upper extremity, signs and symptoms, basic management to include: ^{DOK 1, BOC 4} <ul style="list-style-type: none">• Common Strain and sprains• Fractures• Thoracic outlet syndrome• Nerve injuries• Dislocations and subluxations |
| 3. Identify and practice special tests for identifying common injuries of the upper extremity. ^{DOK 1, BOC 4} |
| 4. Identify evaluation and treatment options for the upper extremity. ^{DOK 1, BOC 4} |
| 5. Identify and practice ways to improve the flexibility and strength of a patient's upper extremity. ^{DOK 1, BOC 4} |
| 6. Review the specific anatomy of the lower extremity such as hip/pelvis, knee, ankle and foot. ^{DOK 1} |
| 7. Discuss common injuries of the lower extremity, signs and symptoms, basic management to include: ^{DOK 1, BOC 4} <ul style="list-style-type: none">• Common strain and sprains• Fractures• Nerve injuries• Dislocations and subluxations |
| 8. Identify and practice special tests for identifying common injuries of lower extremity. ^{DOK 1, BOC 4} |
| 9. Identify evaluation and treatment options for the lower extremity. ^{DOK 1, BOC 5} |
| 10. Identify and practice ways to improve flexibility and strength of a patient's lower extremity. ^{DOK 1, BOC 4} |

Scenario

Unit 10

1. Assign each student a specific muscle of the upper extremity. Have them research the muscle shape and insertion points. With construction paper and other art supplies, the student will make a 3-D image of this muscle, attach it to the skeleton, and demonstrate how this muscle works to the class.

2. Students will work with a partner and with the teacher to demonstrate the special test of the upper extremity. Students will learn proper and common evaluation questions to ask a patient. Students should discuss which test is best to diagnose certain musculoskeletal injuries.

3. Students will partner up and develop ways to stretch the upper extremity.
4. Assign each student a specific muscle of the lower extremity. Have them research the muscle shape and insertion points. With construction paper and other art supplies, the student will make a 3-D image of this muscle and attach it to the skeleton. Have them demonstrate how this muscle works to the class.
5. Have the students work in pairs and with the teacher to demonstrate the special test of the lower extremity. Students will learn proper and common evaluation questions to ask a patient. Students should know which test is best to diagnose certain musculoskeletal injuries.
6. Students will partner up and develop ways to stretch the lower extremity.

Attachments for Scenarios

None

Student Competency Profile

Student's Name: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student, and it can serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

| Unit 1: Orientation (Reinforcement and Review) | | |
|--|----|--|
| | 1. | Describe local program and vocational center expectations, policies, and procedures. |
| | 2. | Describe employment opportunities and responsibilities. |
| | 3. | Research, design, and conduct a project that will integrate the knowledge and skills learned in the Sports Medicine course in a real-world, unpredictable environment. |
| | 4. | Apply personal and environmental safety practices. |
| | 5. | Utilize emergency procedures and protocols. |
| | 6. | Explain the importance of maintaining transmission-based isolation precautions. |
| | 7. | Explain standard precaution based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations. |
| Unit 2: The Sports Medicine Team and Health Care Administration | | |
| | 1. | Define sports medicine and discuss its historical background and future emphasis. |
| | 2. | Identify the difference between professional organizations dedicated to athletic training and sports medicine. |
| | 3. | Differentiate the role of the athletic trainer, team physician, support personnel, and coach |
| | 4. | Identify various employment settings for sports medicine personnel |
| | 5. | Identify the responsibilities of a healthcare professional outside of providing medical care |
| | 6. | Identify the steps to administering pre-participation physical examination. |
| | 7. | Identify unique ethical issues in sports medicine. |
| | 8. | Explain the difference between an accident, an injury, and a catastrophic injury. |
| Unit 3: Assessment and Evaluation of Injuries and Emergencies | | |
| | 1. | Describe the components of on-the-field acute care and emergency procedures. |
| | 2. | Explain off-the-field injury evaluation |
| | 3. | Explain the characteristics of sports trauma |
| | 4. | Review the criteria for blood-borne pathogen certification according to the AHA. |

| | | |
|--|-----|--|
| | 5. | Discuss the supplies that should be included in a basic first aid kit or athletic emergency kit. |
| | 6. | Discuss the environmental considerations in medical emergencies. |
| | 7. | Review common medical emergencies. |
| | 8. | Review the most common physical injuries. |
| | 9. | Review the fundamentals of adult basic life support. |
| | 10. | Review the basics of pediatric basic life support. |
| | 11. | Demonstrate cardiopulmonary resuscitation (CPR). |
| | 12. | Explain the procedure of automatic external defibrillation (AED). |
| | 13. | Demonstrate the process of spine boarding a patient. |

Unit 4: Protective Equipment and Techniques

| | | |
|--|-----|---|
| | 1. | Discuss the safety standards and legal concerns of protective equipment. |
| | 2. | Differentiate between the good and bad features of selective protective devices. |
| | 3. | Contrast the advantages and disadvantages of customized versus off-the-shelf devices. |
| | 4. | Rate the protective value of various materials used in sports to make protective padding and orthotic devices |
| | 5. | Identify the steps in making a customized foam with a therma-moldable shell. |
| | 6. | Identify types of protective devices for variety of body parts and the proper application |
| | 7. | Identify the limitations and risks of protective sports equipment. |
| | 8. | Identify the purpose of bandaging, wrapping, and taping, and the supplies needed. |
| | 9. | Demonstrate taping and the basic skills needed for taping in sports. |
| | 10. | Describe the steps of casting techniques. |

Unit 5: Nutrition in Sports

| | | |
|--|----|--|
| | 1. | Define the term sports nutrition and identify the roles and responsibilities of a sports dietician or nutritionist |
| | 2. | Identify and differentiate the six classes of nutrients needed in balance to promote optimal health and performance. |
| | 3. | Determine the best meals and time to consume before exercise, during activity, and after activity. |
| | 4. | Identify what an eating disorder is and understand how eating disorders can challenge ideal activity performance. |

Unit 6: Pharmacology and Drugs in Sports

| | | |
|--|----|---|
| | 1. | Define the term drug and the various methods by which drugs can be administered. |
| | 2. | Analyze pharmokinetics relative to absorption, distribution, metabolism, and excretion. |
| | 3. | Differentiate administering and dispensing medication and legal concerns. |

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| | 4. | Explore the classifications of drugs and common drugs used in sports. |
| | 5. | Discuss athletes' use of alcohol, drugs, and tobacco. |
| | 6. | Identify the purposes of drug testing in athletes |
| Unit 7: Physical Fitness, Conditioning, and Assessment | | |
| | 1. | Describe physical fitness and the ways that a physically active person can become physically fit. |
| | 2. | Identify a person's fitness level by evaluations for competitive and general fitness. |
| | 3. | Compare and contrast the fitness levels of men and women, including the focus on age differences |
| | 4. | Demonstrate how to measure body weight and calculate body fat percentage by using skin-fold calipers. |
| | 5. | Identify special considerations that a client may have that can limit his or her participation in activity or competition. Analyze congenital defects and medical conditions and how a sports medicine professional can help a person overcome these limitations to reach his or her goal. |
| Unit 8: Therapeutic Rehabilitation and Modalities | | |
| | 1. | Discuss the use of therapeutic modalities |
| | 2. | Identify and discuss the three phases of musculoskeletal healing |
| | 3. | Identify the use of thermal therapy |
| | 4. | Identify the use of ultrasound therapy |
| | 5. | Identify the use of electrotherapy |
| | 6. | Identify the use of massage therapy |
| | 7. | Discuss the legal and safety concerns of therapeutic and exercises |
| | 8. | Identify the consequences of sudden inactivity and injury immobilization |
| | 9. | Identify the primary components of a rehabilitation program |
| | 10. | Identify the importance of core stabilization. |
| | 11. | Identify open and closed kinetic chain exercises |
| | 12. | Identify the techniques and principles of proprioceptive neuromuscular facilitation |
| | 13. | Explore the use of aquatic training |
| | 14. | Apply the evaluation for athlete rehab progression |
| Unit 9: Injuries to the Head, Spine, Chest, and Abdomen | | |
| | 1. | Review specific anatomy of the head and face (taught in HS2 and A&P) |
| | 2. | Discuss common injuries of the head, signs and symptoms, basic management. |
| | 3. | Identify and practice special tests for identifying common injuries of the face and head. |
| | 4. | Identify evaluation and treatment options for mild brain or facial injuries. |
| | 5. | Review the specific anatomy of the spine. |

| | | |
|---|-----|---|
| | 6. | Identify and discuss common injuries of the spine, common signs and symptoms of spinal cord injuries, and basic management of spinal cord injuries. |
| | 7. | Identify and practice special tests for identifying common injuries of the spine. |
| | 8. | Identify evaluation and treatment options for mild spinal injuries. |
| | 9. | Identify ways to improve flexibility and strength of a patient/athlete's spine. |
| | 10. | Review specific anatomy of the thorax and abdomen. |
| | 11. | Discuss common injuries of the thorax and abdomen, signs and symptoms, basic management. |
| | 12. | Identify and practice special tests for identifying common injuries in the thorax and abdomen. |
| | 13. | Identify evaluation and treatment options for identifying common injuries in the thorax and abdomen. |
| | 14. | Identify and practice ways to improve flexibility and strength of a patients thorax and abdomen. |
| Unit 10: Injuries to the Upper and Lower Extremities | | |
| | 1. | Review specific anatomy of the upper extremity such as shoulder complex, elbow joint, and hand and wrist |
| | 2. | Discuss common injuries of the upper extremity, signs and symptoms, basic management |
| | 3. | Identify and practice special tests for identifying common injuries of the upper extremity |
| | 4. | Identify evaluation and treatment options for the upper extremity. |
| | 5. | Identify and practice ways to improve the flexibility and strength of a patient's upper extremity. |
| | 6. | Review the specific anatomy of the lower extremity such as hip/pelvis, knee, ankle and foot. |
| | 7. | Discuss common injuries of the lower extremity, signs and symptoms, basic management. |
| | 8. | Identify and practice special tests for identifying common injuries of lower extremity. |
| | 9. | Identify evaluation and treatment options for the lower extremity. |
| | 10. | Identify and practice ways to improve flexibility and strength of a patient's lower extremity |

Appendix A: Unit References

Suggested resources are listed below.

All Units

Anderson, M. K. & Parr, G. P. (2012). *Foundations of athletic training: Prevention, assessment, and management*. Philadelphia, PA: Lippincott Williams & Wilkins.

France, R. C. (2010). *Introduction to sports medicine and athletic training*. Stamford, CT: Cengage Learning.

Klossner, D. (2011). *2011-2012 NCAA sports medicine handbook*. Indianapolis, IN: The National Collegiate Athletic Association. Retrieved from:
<http://www.ncaapublications.com/productdownloads/MD11.pdf>

Prentice, W. E. & Arnheim, D. D. (2010). *Arnheim's principles of athletic training: A competency-based approach*. New York, NY: McGraw-Hill.

Web Pages

Mississippi High School Activities Association. (2013). Retrieved from:
<http://www.misshsaa.com/GeneralInfo/SportsMedicine.aspx>

WebMD. (2013). Retrieved from: <http://www.webmd.com>.

Unit 2

Gems, G., Borish, L, Pfister, G. (2008). *Sports in American history: From colonization to globalization*. Champaign, IL: Human Kinetics.

Hillman, S. K. (2004). *Introduction to Athletic Training*. Champaign, IL: Human Kinetics.

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National Athletic Trainers' Association: Health Care for Life & Sport. (2013). Retrieved from
<http://www.nata.org>

American Physical Therapy Association: APTA. (2013). Retrieved from <http://www.apta.org>.

Unit 3

Gorse, K. M. (2009). *Emergency Care in Athletic Training*. Philadelphia, PA: F. A. Davis Co.

Web Pages

American Heart Association (2013). Retrieved from <http://www.heart.org>

The American Red Cross (2013). Retrieved from: <http://www.redcross.org>

National Collegiate Athletic Association (2013). Retrieved from:
<http://www.ncaa.org/wps/wcm/connect/public/NCAA/Health+and+Safety/Heat+Illness>

United States Department of Labor, Occupational Safety & Health Administration (2013). Retrieved from: https://www.osha.gov/SLTC/heatstress/heat_illnesses.html

The Mayo Clinic (2013). Retrieved from: <http://www.mayoclinic.com/health/FirstAidIndex/FirstAidIndex>

Sports Medicine International (2013). Retrieved from: <http://sportsmedicineinternational.com/services/plans-spinal>

Unit 4

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Web Page

Essential Equipment (2013). The Nemours Foundation. Retrieved from: http://kidshealth.org/teen/food_fitness/exercise/sport_safety.html

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The Gatorade Sports Science Institute (2013). Retrieved from: <http://www.gssiweb.org>

Nutrition, NCAA Sport Science Institute (2013). Retrieved from: <http://www.ncaa.org/wps/wcm/connect/public/NCAA/SSI/Performance/nutrition>

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Mottram, D. R. (Ed.) (2010). *Drugs in sport*. New York: NY: Routledge

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Freudenrich, C., & Allen, K. P. (2013). *How performance-enhancing drugs work*. How Stuff Works. Retrieved from: <http://www.howstuffworks.com/athletic-drug-test.htm>

Unit 7

ACSM's health-related physical fitness assessment manual. (2014). Baltimore, MD: American College of Sports Medicine.

Baechle, T. R., & Earle, R. W. (Eds.) (2008). *Essentials of strength training and conditioning.* National Strength and Conditioning Association, Champaign, IL: Human Kinetics.

Siedentop, D., & VanDerMars, H. (2011). *Introduction to physical education, fitness & sport.* New York, NY: McGraw-Hill.

Unit 8

Prentice, W. (2001) *Rehabilitation techniques in sports medicine.* (2010). New York, NY: McGraw-Hill.

Prentice, W. E. (Ed.) (2001). *Therapeutic modalities in sports medicine.* New York, NY: McGraw-Hill.

Web Page

Massage can do that? (2013). Associated Bodywork & Massage Professionals. Retrieved from: <http://massagetherapy.com>

Unit 9

Konin, J. G., Wiksten, D, Isear, J. A. & Brader H. (2006) *Special tests for orthopedic examination.* Thorofare, NJ: SLACK Incorporated

Scifers, J. R. (2008). *Special tests for neurologic examination.* Thorofare, NJ: SLACK Incorporated

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Injury Prevention & Control: Traumatic Brain Injury, Centers for Disease Control and Prevention. (2013) Retrieved from: <http://www.cdc.gov/concussion/sports>

The NCAA's history with concussions: A timeline. ThinkProgress (2013). Retrieved from <http://thinkprogress.org/sports/2013/07/23/2339571/ncaa-concussion-timeline/>

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Appendix B: Industry Standards

Board of Certification for the Athletic Trainer (BOC) Standards of Professional Practice

| Industry Crosswalk for Sports Medicine | | | | | | | | | | | |
|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| | Units | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9 | Unit 10 |
| BOC | | | | | | | | | | | |
| BOC 1: Direction | | | X | | | X | X | | | | |
| BOC 2: Prevention | | X | | X | X | X | | | | | |
| BOC 3: Immediate Care | | X | | X | | | | | | | |
| BOC 4: Clinical Evaluation and Diagnosis | | | X | X | | | X | X | | X | X |
| BOC 5: Treatment, Rehabilitation and Reconditioning | | | | X | X | | | | X | X | X |
| BOC 6: Program Discontinuation | | | X | | | | | | | | |
| BOC 7: Organization and Administration | | X | X | | | | | | | | |

I. Practice Standards

Preamble

The Practice Standards (Standards) establish practice expectations for all Athletic Trainers. Compliance with the Standards is mandatory.

The Standards are intended to:

- assist the public in understanding what to expect from an Athletic Trainer
- assist the Athletic Trainer in evaluating the quality of patient care
- assist the Athletic Trainer in understanding the duties and obligations imposed by virtue of holding the ATC® credential

The Standards are NOT intended to:

- prescribe services
- provide step-by-step procedures
- ensure specific patient outcomes

The BOC does not express an opinion on the competence or warrant job performance of credential holders; however, every Athletic Trainer and applicant must agree to comply with the Standards at all times.

Standard 1: Direction

The Athletic Trainer renders service or treatment under the direction of a physician.

Standard 2: Prevention

The Athletic Trainer understands and uses preventive measures to ensure the highest quality of care for every patient.

Standard 3: Immediate Care

The Athletic Trainer provides standard immediate care procedures used in emergency situations, independent of setting.

Standard 4: Clinical Evaluation and Diagnosis

Prior to treatment, the Athletic Trainer assesses the patient's level of function. The patient's input is considered an integral part of the initial assessment. The Athletic Trainer follows standardized clinical practice in the area of diagnostic reasoning and medical decision making.

Standard 5: Treatment, Rehabilitation and Reconditioning

In development of a treatment program, the Athletic Trainer determines appropriate treatment, rehabilitation and/or reconditioning strategies. Treatment program objectives include long and short-term goals and an appraisal of those which the patient can realistically be expected to achieve from the program. Assessment measures to determine effectiveness of the program are incorporated into the program.

Standard 6: Program Discontinuation

The Athletic Trainer, with collaboration of the physician, recommends discontinuation of the athletic training service when the patient has received optimal benefit of the program. The Athletic Trainer, at the time of discontinuation, notes the final assessment of the patient's status.

Standard 7: Organization and Administration

All services are documented in writing by the Athletic Trainer and are part of the patient's permanent records. The Athletic Trainer accepts responsibility for recording details of the patient's health status.

II. Code of Professional Responsibility

Preamble

The Code of Professional Responsibility (Code) mandates the BOC credential holders and applicants act in a professionally responsible manner in all athletic training services and activities. The BOC requires all Athletic Trainers and applicants to comply with the Code. The BOC may discipline, revoke or take other action with regard to the application or certification of an individual that does not adhere to the Code. The Professional Practice and Discipline Guidelines and Procedures may be accessed via the BOC website, www.bocatc.org.

Code 1: Patient Responsibility

The Athletic Trainer or applicant:

- 1.1 Renders quality patient care regardless of the patient's race, religion, age, sex, nationality, disability, social/economic status or any other characteristic protected by law
- 1.2 Protects the patient from harm, acts always in the patient's best interests and is an advocate for the patient's welfare
- 1.3 Takes appropriate action to protect patients from Athletic Trainers, other healthcare providers or athletic training students who are incompetent, impaired or engaged in illegal or unethical practice
- 1.4 Maintains the confidentiality of patient information in accordance with applicable law
- 1.5 Communicates clearly and truthfully with patients and other persons involved in the patient's program, including, but not limited to, appropriate discussion of assessment results, program plans and progress
- 1.6 Respects and safeguards his or her relationship of trust and confidence with the patient and does not exploit his or her relationship with the patient for personal or financial gain
- 1.7 Exercises reasonable care, skill and judgment in all professional work

Code 2: Competency

The Athletic Trainer or applicant:

- 2.1 Engages in lifelong, professional and continuing educational activities
- 2.2 Participates in continuous quality improvement activities
- 2.3 Complies with the most current BOC recertification policies and requirements

Code 3: Professional Responsibility

The Athletic Trainer or applicant:

- 3.1 Practices in accordance with the most current BOC Practice Standards
- 3.2 Knows and complies with applicable local, state and/or federal rules, requirements, regulations and/or laws related to the practice of athletic training
- 3.3 Collaborates and cooperates with other healthcare providers involved in a patient's care
- 3.4 Respects the expertise and responsibility of all healthcare providers involved in a patient's care
- 3.5 Reports any suspected or known violation of a rule, requirement, regulation or law by him/herself and/or by another Athletic Trainer that is related to the practice of athletic training, public health, patient care or education
- 3.6 Reports any criminal convictions (with the exception of misdemeanor traffic offenses or traffic ordinance violations that do not involve the use of alcohol or drugs) and/or professional suspension, discipline or sanction received by him/herself or by another Athletic Trainer that is related to athletic training, public health, patient care or education

- 3.7 Complies with all BOC exam eligibility requirements and ensures that any information provided to the BOC In connection with any certification application is accurate and truthful
- 3.8 Does not, without proper authority, possess, use, copy, access, distribute or discuss certification exams, score reports, answer sheets, certificates, certificant or applicant files, documents or other materials
- 3.9 Is candid, responsible and truthful in making any statement to the BOC, and in making any statement in connection with athletic training to the public
- 3.10 Complies with all confidentiality and disclosure requirements of the BOC
- 3.11 Does not take any action that leads, or may lead, to the conviction, plea of guilty or plea of nolo contendere (no contest) to any felony or to a misdemeanor related to public health, patient care, athletics or education; this includes, but is not limited to: rape; sexual abuse of a child or patient; actual or threatened use of a weapon of violence; the prohibited sale or distribution of controlled substance, or its possession with the intent to distribute; or the use of the position of an Athletic Trainer To improperly influence the outcome or score of an athletic contest or event or in connection with any gambling activity
- 3.12 Cooperates with BOC investigations into alleged illegal or unethical activities; this includes but is not limited to, providing factual and non-misleading information and responding to requests for information in a timely fashion
- 3.13 Does not endorse or advertise products or services with the use of, or by reference to, the BOC name without proper authorization

Code 4: Research

The Athletic Trainer or applicant who engages in research:

- 4.1 Conducts research according to accepted ethical research and reporting standards established by public law, institutional procedures and/or the health professions
- 4.2 Protects the rights and wellbeing of research subjects
- 4.3 Conducts research activities with the goal of improving practice, education and public policy relative to the health needs of diverse populations, the health workforce, the organization and administration of health systems and healthcare delivery

Code 5: Social Responsibility

The Athletic Trainer or applicant:

- 5.1 Uses Professional skills and knowledge to positively impact the community

Code 6: Business Practices

The Athletic Trainer or applicant:

- 6.1 Refrains from deceptive or fraudulent business practices
- 6.2 Maintains adequate and customary professional liability insurance

http://bocatc.org/images/stories/resources/boc_standards_of_professional_practice_1212af.pdf

Appendix C: 21st Century Skills¹

| 21 st Century Crosswalk for Sports Medicine | | | | | | | | | | | |
|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| | Units | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9 | Unit 10 |
| 21 st Century Standards | | | | | | | | | | | |
| CS1 | | X | X | X | X | X | X | X | X | X | X |
| CS2 | | | X | | | | | | | | |
| CS3 | | | X | | | | | | | | |
| CS4 | | X | X | X | X | X | X | X | X | X | X |
| CS5 | | | X | X | | X | | | | | |
| CS6 | | | | | X | | | | | | |
| CS7 | | | | | X | X | X | X | X | X | X |
| CS8 | | X | X | | X | X | X | X | X | X | X |
| CS9 | | | | | X | X | X | X | X | X | X |
| CS10 | | | | | | | X | X | X | X | X |
| CS11 | | | | | X | X | X | X | X | X | X |
| CS12 | | | | | X | X | X | X | X | X | X |
| CS13 | | | | | | | X | X | X | X | X |
| CS14 | | | | | X | X | X | X | X | X | X |
| CS15 | | | X | | X | X | X | X | X | X | X |
| CS16 | | | X | | X | X | X | X | X | X | X |

CSS1-21st Century Themes

CS1 Global Awareness

1. Using 21st century skills to understand and address global issues
2. Learning from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts
3. Understanding other nations and cultures, including the use of non-English languages

CS2 Financial, Economic, Business, and Entrepreneurial Literacy

1. Knowing how to make appropriate personal economic choices
2. Understanding the role of the economy in society
3. Using entrepreneurial skills to enhance workplace productivity and career options

CS3 Civic Literacy

1. Participating effectively in civic life through knowing how to stay informed and understanding governmental processes
2. Exercising the rights and obligations of citizenship at local, state, national, and global levels
3. Understanding the local and global implications of civic decisions

¹ *21st century skills*. (n.d.). Washington, DC: Partnership for 21st Century Skills.

CS4 Health Literacy

1. Obtaining, interpreting, and understanding basic health information and services and using such information and services in ways that enhance health
2. Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance, and stress reduction
3. Using available information to make appropriate health-related decisions
4. Establishing and monitoring personal and family health goals
5. Understanding national and international public health and safety issues

CS5 Environmental Literacy

1. Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water, and ecosystems.
2. Demonstrate knowledge and understanding of society's impact on the natural world (e.g., population growth, population development, resource consumption rate, etc.).
3. Investigate and analyze environmental issues, and make accurate conclusions about effective solutions.
4. Take individual and collective action toward addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues).

CSS2-Learning and Innovation Skills

CS6 Creativity and Innovation

1. Think Creatively
2. Work Creatively with Others
3. Implement Innovations

CS7 Critical Thinking and Problem Solving

1. Reason Effectively
2. Use Systems Thinking
3. Make Judgments and Decisions
4. Solve Problems

CS8 Communication and Collaboration

1. Communicate Clearly
2. Collaborate with Others

CSS3-Information, Media and Technology Skills

CS9 Information Literacy

1. Access and Evaluate Information
2. Use and Manage Information

CS10 Media Literacy

1. Analyze Media
2. Create Media Products

CS11 ICT Literacy

1. Apply Technology Effectively

CSS4-Life and Career Skills

CS12 Flexibility and Adaptability

1. Adapt to change
2. Be Flexible

CS13 Initiative and Self-Direction

1. Manage Goals and Time
2. Work Independently
3. Be Self-directed Learners

CS14 Social and Cross-Cultural Skills

1. Interact Effectively with others
2. Work Effectively in Diverse Teams

CS15 Productivity and Accountability

1. Manage Projects
2. Produce Results

CS16 Leadership and Responsibility

1. Guide and Lead Others
2. Be Responsible to Others

Appendix D: Common Core Standards

| Common Core Crosswalk for English/Language Arts (11-12) | | | | | | | | | | | |
|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| | Units | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9 | Unit 10 |
| Common Core Standards | | | | | | | | | | | |
| RL.11.1. | | | | | | | | | | | |
| RL.11.2. | | | | | | | | | | | |
| RL.11.3. | | | | | | | | | | | |
| RL.11.4. | | | | | | | | | | | |
| RL.11.5. | | | | | | | | | | | |
| RL.11.6. | | | | | | | | | | | |
| RL.11.7. | | | | | | | | | | | |
| RL.11.8. | | | | | | | | | | | |
| RL.11.9. | | | | | | | | | | | |
| RL.11.10. | | | | | | | | | | | |
| RI.11.1. | | X | | X | | | | | | | |
| RI.11.2. | | X | | X | | | | | | | |
| RI.11.3. | | X | X | X | | | | | | | |
| RI.11.4. | | X | | X | | | | | | | |
| RI.11.5. | | | | | | | | | | | |
| RI.11.6. | | | | | | | | | | | |
| RI.11.7. | | X | | X | | X | X | X | | X | X |
| RI.11.8. | | | | | | | | | | | |
| RI.11.9. | | | | | | | | | | | |
| RI.11.10. | | | | | | | | | | | |
| W.11.1. | | X | | X | | | | X | | | |
| W.11.2. | | X | X | X | X | X | X | X | X | X | X |
| W.11.3. | | | | | | | | | | | |
| W.11.4. | | X | X | X | X | X | X | X | X | X | X |
| W.11.5. | | X | X | X | X | X | X | X | X | X | X |
| W.11.6. | | X | | X | X | | X | X | X | | X |
| W.11.7. | | X | | X | | X | X | X | | X | X |
| W.11.8. | | X | | X | | X | X | X | | X | X |
| W.11.9. | | | | | | | | | | | |
| W.11.10. | | X | | X | | | | X | | | |
| SL.11.1. | | X | | X | | X | X | X | | X | X |
| SL.11.2. | | X | | X | X | X | X | X | X | X | X |
| SL.11.3. | | | | X | | X | X | X | | X | X |
| SL.11.4. | | X | X | X | X | X | X | X | X | X | X |
| SL.11.5. | | X | | X | X | X | X | X | X | X | X |
| SL.11.6. | | X | | X | X | X | X | X | X | X | X |
| L.11.1. | | X | X | X | X | X | X | X | X | X | X |
| L.11.2. | | X | X | X | X | X | X | X | X | X | X |
| L.11.3. | | X | | X | | X | X | X | | X | X |
| L.11.4. | | X | X | X | X | | | X | X | | |
| L.11.5. | | | | | | | | | | | |
| L.11.6. | | X | X | X | X | X | X | X | X | X | X |
| RH.11.1. | | X | X | X | X | | | X | X | | |
| RH.11.2. | | X | X | X | X | | | X | X | | |
| RH.11.3. | | | X | X | X | | | X | X | | |
| RH.11.4. | | X | X | | X | | | | X | | |
| RH.11.5. | | | | | | | | | | | |
| RH.11.6. | | | | | | | | | | | |
| RH.11.7. | | X | | X | | X | X | X | | X | X |
| RH.11.8. | | | | X | | X | X | X | | X | X |
| RH.11.9. | | X | | X | | | X | X | | | X |
| RH.11.10. | | X | | X | | X | X | X | | X | X |
| RST.11.1. | | | | X | | X | X | X | | X | X |
| RST.11.2. | | X | | X | | | X | X | | | X |
| RST.11.3. | | X | | X | | X | X | X | | X | X |

| | | | | | | | | | | | |
|-------------|--|---|---|---|---|---|---|---|---|---|---|
| RST.11.4. | | X | | X | | | | X | | | |
| RST.11.5. | | X | X | X | X | X | X | X | X | X | X |
| RST.11.6. | | | | | | | | | | | |
| RST.11.7. | | X | X | X | X | X | X | X | X | X | X |
| RST.11.8. | | X | X | X | X | X | X | X | X | X | X |
| RST.11.9. | | X | | X | X | | X | X | X | | X |
| RST.11.10. | | X | | X | | X | X | X | | X | X |
| WHST.11.1. | | X | | X | | X | X | X | | X | X |
| WHST.11.2. | | | | | | | | | | | |
| WHST.11.3. | | X | | X | | | | X | | | |
| WHST.11.4. | | X | | X | | X | X | X | | X | X |
| WHST.11.5. | | X | | X | X | X | X | X | X | X | X |
| WHST.11.6. | | X | X | | X | | | | X | | |
| WHST.11.7. | | | | | | | | | | | |
| WHST.11.8. | | | | | | | | | | | |
| WHST.11.9. | | X | | X | | X | X | X | | X | X |
| WHST.11.10. | | | | X | | X | X | X | | X | X |

Reading Standards for Literature (11-12)

College and Career Readiness Anchor Standards for *Reading Literature*

Key Ideas and Details

RL.11.1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

RL.11.2. Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.

RL.11.3. Analyze the impact of the author’s choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters are introduced and developed).

Craft and Structure

RL.11.4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)

RL.11.5. Analyze how an author’s choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.

RL.11.6. Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).

Integration of Knowledge and Ideas

RL.11.7. Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text. (Include at least one play by Shakespeare and one play by an American dramatist.)

RL.11.8. (Not applicable to literature)

RL.11.9. Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.

Range of Reading and Level of Text Complexity

RL.11.10. By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.

By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 11–CCR text complexity band independently and proficiently.

Reading Standards for Informational Text (11-12)

College and Career Readiness Anchor Standards for *Informational Text*

Key Ideas and Details

RI.11.1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

RI.11.2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.

RI.11.3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

Craft and Structure

RI.11.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).

RI.11.5. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.

RI.11.6. Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.

Integration of Knowledge and Ideas

RI.11.7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

RI.11.8. Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., *The Federalist*, presidential addresses).

RI.11.9. Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including *The Declaration of Independence*, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.

Range of Reading and Level of Text Complexity

RI.11.10. By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.

By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.

College and Career Readiness Anchor Standards for *Writing*

Text Types and Purposes

W.11.1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.

b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both

in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.

c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

e. Provide a concluding statement or section that follows from and supports the argument presented.

W.11.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

W.11.3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

- a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.
- b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters
- c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution).
- d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.
- e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

Production and Distribution of Writing

- W.11.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
- W.11.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 11–12 on page 54.)
- W.11.6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Research to Build and Present Knowledge

- W.11.7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- W.11.8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
- W.11.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

a. Apply grades 11–12 Reading standards to literature (e.g., “Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics”).

b. Apply grades 11–12 Reading standards to literary nonfiction (e.g., “Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., *The Federalist*, presidential addresses]”).

Range of Writing

W.11.10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

College and Career Readiness Anchor Standards for *Speaking and Listening*

Comprehension and Collaboration

SL.11.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.

a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.

c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.

d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.

SL.11.2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and

solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

SL.11.3. Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.

Presentation of Knowledge and Ideas

SL.11.4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.

SL.11.5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

SL.11.6. Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 on page 54 for specific expectations.)

College and Career Readiness Anchor Standards for *Language*

Conventions of Standard English

L.11.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

a. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.

b. Resolve issues of complex or contested usage, consulting references (e.g., Merriam-Webster’s Dictionary of English Usage, Garner’s Modern American Usage) as needed.

L.11.2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

a. Observe hyphenation conventions.

b. Spell correctly.

Knowledge of Language

L.11.3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

- a. Vary syntax for effect, consulting references (e.g., Tufte’s *Artful Sentences*) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.

Vocabulary Acquisition and Use

L.11.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies.

- a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word’s position or function in a sentence) as a clue to the meaning of a word or phrase.
- b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable).
- c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage.
- d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

L.11.5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

- a. Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text.
- b. Analyze nuances in the meaning of words with similar denotations.

L.11.6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Reading Standards for Literacy in History/Social Studies (11-12)

Key Ideas and Details

RH.11.1 Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.

RH.11.2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas

RH.11.3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain

Craft and Structure

RH.11.4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines faction in Federalist No. 10).

RH.11.5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.

RH.11.6. Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.

Integration of Knowledge and Ideas

RH.11.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

RH.11.8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.

RH.11.9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.

Range of Reading and Level of Text Complexity

RH.11.10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–CCR text complexity band independently and proficiently.

Reading Standards for Literacy in Science and Technical Subjects (11-12)

Key Ideas and Details

RST.11.1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

RST.11.2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

RST.11.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Craft and Structure

RST.11.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.

RST.11.5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

RST.11.6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

Integration of Knowledge and Ideas

RST.11.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

RST.11.8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

RST.11.9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Range of Reading and Level of Text Complexity

RST.11.10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects (11-12)

Text Types and Purposes

WHST.11.1. Write arguments focused on discipline-specific content.

- a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
- b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values, and possible biases.
- c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
- d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- e. Provide a concluding statement or section that follows from or supports the argument presented.

WHST.11.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

- a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.

- c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
- e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).

WHST.11.3. (Not applicable as a separate requirement)

Production and Distribution of Writing

WHST.11.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

WHST.11.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

WHST.11.6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Research to Build and Present Knowledge

WHST.11.7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

WHST.11.8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

WHST.11.9. Draw evidence from informational texts to support analysis, reflection, and research.

Range of Writing

WHST.11.10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Common Core Crosswalk for Mathematics (11-12)

| | Units | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9 | Unit 10 |
|------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Common Core Standards | | | | | | | | | | | |
| N-RN.1. | | | X | | | | | | | | |
| N-RN.2. | | | | | | | | | | | |
| N-RN.3. | | | | | | | | | | | |
| N-Q.1. | | | X | | | | | | | | |
| N-Q.2. | | | | X | | | | | | | |
| N-Q.3. | | | | X | | | | | | | |
| N-CN.1. | | | | | | | | | | | |
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| N-VM.1. | | | | | | | | | | | |
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| N-VM.4. | | | | X | | | | | | | |
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| N-VM.10. | | | | | | | | | | | |
| N-VM.11. | | | | | | | | | | | |
| N-VM.12. | | | | | | | | | | | |
| A-SSE.1. | | | X | X | | | | | | | |
| A-SSE.2. | | | X | X | | | | | | | |
| A-SSE.3. | | | X | X | | | | | | | |
| A-SSE.4. | | | | X | | | | | | | |
| A-APR.1. | | | | X | | | | | | | |
| A-APR.2. | | | | | | | | | | | |
| A-APR.3. | | | | | | | | | | | |
| A-APR.4. | | | | X | | | | | | | |
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| A-APR.7. | | | | | | | | | | | |
| A-CED.1. | | | X | X | | | | | | | |
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| A-CED.3. | | | | | | | | | | | |
| A-CED.4. | | | | | | | | | | | |
| A-REI.1. | | | X | X | | | | | | | |
| A-REI.2. | | | | X | | | | | | | |
| A-REI.3. | | | X | X | | | | | | | |
| A-REI.4. | | | | | | | | | | | |
| A-REI.5. | | | X | X | | | | | | | |
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| F-IF.1. | | | X | X | | | | | | | |
| F-IF.2. | | | | | | | | | | | |
| F-BF.3. | | | | | | | | | | | |

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| F-BF.4. | | | X | X | | | | | | | | | |
| F-LE.1. | | | | X | | | | | | | | | |
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| G-CO.6. | | | | | | X | | | | | | | |
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| G-CO.13. | | | | | | | | | | | | | |
| G-SRT.1. | | | | | X | X | | | | | | | |
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| G-SRT.3. | | | | | X | X | | | | | | | |
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| G-SRT.11. | | | | | | | | | | | | | |
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| G-GPE.1. | | | | | | | | | | | | | |
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| G-GMD.1. | | | X | X | | | | | | | | | |
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| G-GMD.3. | | | | | | | | | | | | | |
| G-GMD.4. | | | | | | | | | | | | | |
| G-MG.1. | | | X | X | X | | | | | | | | |
| G-MG.2. | | | X | X | X | | | | | | | | |
| G-MG.3. | | | | | | | | | | | | | |
| S-ID.1. | | | X | X | | | | | | | | | |
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| S-ID.4. | | | X | X | | | | | | | | | |
| S-ID.5. | | | | | | | | | | | | | |
| S-ID.6. | | | X | X | X | | | | | | | | |
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| S-MD.1. | | | | | | | | | | | |
| S-MD.2. | | | X | X | | | | | | | |
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| S-MD.4. | | | | | | | | | | | |
| S-MD.5. | | | | | | | | | | | |
| S-MD.6. | | | X | X | | | | | | | |
| S-MD.7. | | | X | X | X | | | | | | |

Mathematics (High School)

Number and Quantity

The Real Number System

N-RN.1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.

N-RN.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

N-RN.3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Quantities

N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N-Q.2. Define appropriate quantities for the purpose of descriptive modeling.

N-Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

The Complex Number System

N-CN.1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.

N-CN.2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

N-CN.3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

N-CN.4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.

N-CN.5. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(-1 + \sqrt{3}i)^3 = 8$ because $(-1 + \sqrt{3}i)$ has modulus 2 and argument 120° .

N-CN.6. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

N-CN.7. Solve quadratic equations with real coefficients that have complex solutions.

N-CN.8. (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.

N-CN.9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

Vector and Matrix Quantities

N-VM.1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., \mathbf{v} , $|\mathbf{v}|$, $\|\mathbf{v}\|$, v).

N-VM.2. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

N-VM.3. (+) Solve problems involving velocity and other quantities that can be represented by vectors.

N-VM.4. (+) Add and subtract vectors

N-VM.4.a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.

N-VM.4.b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.

N-VM.4.c. Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w , with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.

N-VM.5. (+) Multiply a vector by a scalar.

N-VM.5.a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.

N-VM.5.b. Compute the magnitude of a scalar multiple cv using $\|cv\| = |c|v\|$. Compute the direction of cv knowing that when $|c|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).

N-VM.6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

N-VM.7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

N-VM.8. (+) Add, subtract, and multiply matrices of appropriate dimensions.

N-VM.9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties

N-VM.10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.

N-VM.11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.

N-VM.12. (+) Work with 2×2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

Algebra

Seeing Structure in Expressions

A-SSE.1. Interpret expressions that represent a quantity in terms of its context.

A-SSE.1.a. Interpret parts of an expression, such as terms, factors, and coefficients.

A-SSE.1.b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P .

A-SSE.2. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A-SSE.3.a. Factor a quadratic expression to reveal the zeros of the function it defines.

A-SSE.3.b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

A-SSE.3.c. Use the properties of exponents to transform expressions for exponential functions.

A-SSE.4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.

Arithmetic with Polynomials and Rational Expressions

A-APR.1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials

A-APR.2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.

A-APR.3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

A-APR.4. Prove polynomial identities and use them to describe numerical relationships.

A-APR.5. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n , where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

A-APR.6. Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.

A-APR.7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Creating Equations

A-CED.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A-CED.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R .

Reasoning with Equations and Inequalities

A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A-REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A-REI.4. Solve quadratic equations in one variable.

A-REI.4.a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.

A-REI.4.b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .

A-REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A-REI.7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.

A-REI.8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.

A-REI.9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).

A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

A-REI.11. Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

A-REI.12. Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Functions

Interpreting Functions

F-IF.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.

F-IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F-IF.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.

F-IF.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F-IF.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F-IF.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F-IF.7.a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

F-IF.7.b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F-IF.7.c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

F-IF.7.d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

F-IF.7.e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F-IF.8.a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

F-IF.8.b. Use the properties of exponents to interpret expressions for exponential functions.

F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

Building Functions

F-BF.1. Write a function that describes a relationship between two quantities.

F-BF.1.a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

F-BF.1.b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

F-BF.1.c. (+) Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.

F-BF.2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

F-BF.3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F-BF.4. Find inverse functions.

F-BF.4.a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.

F-BF.4.b. (+) Verify by composition that one function is the inverse of another.

F-BF.4.c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.

F-BF.4.d. (+) Produce an invertible function from a non-invertible function by restricting the domain.

F-BF.5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

Linear, Quadratic, and Exponential Models

F-LE.1. Distinguish between situations that can be modeled with linear functions and with exponential functions.

F-LE.1.a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

F-LE.1.b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

F-LE.1.c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another

F-LE.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F-LE.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

F-LE.4. For exponential models, express as a logarithm the solution to $ab^ct = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.

F-LE.5. Interpret the parameters in a linear or exponential function in terms of a context.

Trigonometric Functions

F-TF.1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

F-TF.2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

F-TF.3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x , where x is any real number.

F-TF.4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

F-TF.5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

F-TF.6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.

F-TF.7. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

F-TF.8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.

F-TF.9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

Geometry

Congruence

G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G-CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G-CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G-CO.9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G-CO.10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

G-CO.11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

G-CO.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Similarity, Right Triangles, and Trigonometry

G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor:

G-SRT.1.a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

G-SRT.1.b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G-SRT.4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G-SRT.7. Explain and use the relationship between the sine and cosine of complementary angles.

G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

G-SRT.9. (+) Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

G-SRT.10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.

G-SRT.11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Circles

G-C.1. Prove that all circles are similar.

G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G-C.4. (+) Construct a tangent line from a point outside a given circle to the circle.

G-C.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Expressing Geometric Properties with Equations

G-GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G-GPE.2. Derive the equation of a parabola given a focus and directrix.

G-GPE.3. (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

G-GPE.4. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.

G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

G-GPE.6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Geometric Measurement and Dimension

G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.

G-GMD.2. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

G-GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

G-GMD.4. Identify the shapes of two-dimensional cross-sections of three dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Modeling with Geometry

G-MG.1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Statistics and Probability

Interpreting Categorical and Quantitative Data

S-ID.1. Represent data with plots on the real number line (dot plots, histograms, and box plots).

S-ID.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

S-ID.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S-ID.4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate.

Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

S-ID.5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

S-ID.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S-ID.6.a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.

S-ID.6.b. Informally assess the fit of a function by plotting and analyzing residuals.

S-ID.6.c. Fit a linear function for a scatter plot that suggests a linear association.

S-ID.7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S-ID.8. Compute (using technology) and interpret the correlation coefficient of a linear fit.

S-ID.9. Distinguish between correlation and causation.

Making Inferences and Justifying Conclusions

S-IC.1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S-IC.2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?

S-IC.3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S-IC.4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

S-IC.5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

S-IC.6. Evaluate reports based on data.

Conditional Probability and the Rules of Probability

S-CP.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).

S-CP.2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S-CP.3. Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

S-CP.4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.

S-CP.5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.

S-CP.6. Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A, and interpret the answer in terms of the model.

S-CP.7. Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.

S-CP.8. (+) Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B|A) = P(B)P(A|B)$, and interpret the answer in terms of the model.

S-CP.9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

Using Probability to Make Decisions

S-MD.1. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.

S-MD.2. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.

S-MD.3. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.

S-MD.4. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?

S-MD.5. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

S-MD.5.a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.

S-MD.5.b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.

S-MD.6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

S-MD.7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Appendix E: National Educational Technology Standards for Students (NETS-S)

| NETS Crosswalk for Sports Medicine | | | | | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| | Course | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9 | Unit 10 |
| NETS Standards | | | | | | | | | | | |
| T1 | | | | X | | | X | X | | X | X |
| T2 | | | X | X | X | X | X | X | X | X | X |
| T3 | | | X | X | X | X | X | X | X | X | X |
| T4 | | | X | X | X | | X | X | X | X | X |
| T5 | | | | | X | | | | X | X | X |
| T6 | | | X | X | X | X | X | X | X | X | X |

- T1** Creativity and Innovation
- T2** Communication and Collaboration
- T3** Research and Information Fluency
- T4** Critical Thinking, Problem Solving, and Decision Making
- T5** Digital Citizenship
- T6** Technology Operations and Concepts

- T1** Creativity and Innovation
Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students do the following:
- a. Apply existing knowledge to generate new ideas, products, or processes.
 - b. Create original works as a means of personal or group expression.
 - c. Use models and simulations to explore complex systems and issues.
 - d. Identify trends and forecast possibilities.

- T2** Communication and Collaboration
Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students do the following:
- a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
 - b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
 - c. Develop cultural understanding and global awareness by engaging with learners of other cultures.
 - d. Contribute to project teams to produce original works or solve problems.

- T3** Research and Information Fluency
Students apply digital tools to gather, evaluate, and use information. Students do the following:

- a. Plan strategies to guide inquiry.
- b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
- d. Process data and report results.

T4 Critical Thinking, Problem Solving, and Decision Making

Students use critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Students do the following:

- a. Identify and define authentic problems and significant questions for investigation.
- b. Plan and manage activities to develop a solution or complete a project.
- c. Collect and analyze data to identify solutions and/or make informed decisions.
- d. Use multiple processes and diverse perspectives to explore alternative solutions.

T5 Digital Citizenship

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students do the following:

- a. Advocate and practice safe, legal, and responsible use of information and technology.
- b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
- c. Demonstrate personal responsibility for lifelong learning.
- d. Exhibit leadership for digital citizenship.

T6 Technology Operations and Concepts

Students demonstrate a sound understanding of technology concepts, systems, and operations. Students do the following:

- a. Understand and use technology systems.
- b. Select and use applications effectively and productively.
- c. Troubleshoot systems and applications.
- d. Transfer current knowledge to learning of new technologies.