

Virginia FFA Guide



Virginia FFA does not discriminate against employees, students, or applicants on the basis of race, color, sex, sexual orientation, disability, age, veteran status, national origin, religion, or political affiliation.

Philosophy for Virginia FFA Career Development Events

Students are important customers of agricultural education and the FFA who recognize quality and value in products and activities. When provided an opportunity to fashion their educational experiences, they generally make wise decisions based on needs, perceptions, image and the opinions of others influence students. They value change based on their perceived personal needs as well as the needs of others. They sometimes value change for the sake of variety. Adults are concerned about the experiences of students and want to help organize experiences that will meet the future needs of students while accomplishing the purposes of agricultural education and the FFA organization. The Virginia FFA Association should assume the leadership role in developing and continuously improving relevant FFA career development events and awards. Although the Virginia FFA Association should be aware of the needs of local chapters and should react to those needs, it should help initiate opportunities that reflect relevant and emerging technology.

Virginia FFA career development events and awards should be developed with significant input from FFA members, teachers, partners, respective industry sponsors, and others involved in agricultural education. Virginia career development events and awards should reflect instruction that currently takes place in the entire agricultural education program, including classroom instruction, laboratory instruction, individualized instruction, and/or supervised agricultural experience. However, it is appropriate for the state organization to develop career development events and awards that stimulate instruction in emerging areas that reflect both current and future community, national, and global work force needs. The authority for insuring the relevance of an FFA activity is ultimately vested in the Virginia FFA Advisory Council. The primary goal of career development events is to develop individual responsibilities, foster teamwork and promote communication and individual achievement.

The activities in each career development event:

- Include problem solving, critical thinking and teamwork skills, where appropriate.
- Encourage appreciation for diversity by reducing barriers to participation among members.
- Develop general leadership and recognize individual and team achievement.
- Promote concentrated focus on future needs of members and society.

The state association should promote individual, chapter, and team career development events and awards. Chapter and team career development events and awards should be based on cooperation and teamwork while recognizing the value of competition and individual achievement. The role of career development events and awards is to motivate students and encourage leadership, personal growth, citizenship, and career development.

Students should be recognized for achievement in career development events and awards. Quality standards should be used as a basis for achievement. The state association should ensure that the recognition is appropriate and meaningful. Recognition for achievement should be reflective of the total effort required by the chapter/team/individual and should take place at all levels of participation.

The Virginia FFA Association shall encourage accessibility and provide opportunities for achievement and recognition for students with diverse backgrounds. High expectations should be consistently communicated to those who are involved in career development events and awards.

Agriculture, Food and Natural Resources (AFNR) Career Cluster Content

Agriculture is a highly technical and ever-changing industry upon which everyone is dependent. In order to maintain agriculture as the nation's number one industry, it is crucial to understand the importance of agrisciences, marketing strategies, safe food production and continuous research. Strong, relevant Agriscience programs are on way to maintain the nation's agricultural edge.

General Rules and Official Policies

Violations of any of the following rules may be grounds for the event superintendent to disqualify the participants.

State FFA Staff and CDE Superintendents will use the published rules and procedures to organize and implement the State FFA Career Development Events. Event activities may not be conducted due to lack of necessary materials, expertise or extreme impact to event budgets.

TEAM ACTIVITIES

The primary goal of team career development events and awards is to develop individual responsibilities, foster teamwork, and promote communications while recognizing the value of ethical competition and the value of individual achievement. A team career development event/award requires two or more members from one chapter working cooperatively. Team career development events and awards are intended to be an outgrowth of instruction.

Team career development events and awards should:

- include problem solving and critical thinking.
- promote an appreciation for diversity by reducing barriers to participation.
- promote new directions and focus on future needs of members and society.
- include cooperative activities.
- encourage broad participation among members and recognize excellence within levels of experience.
- recognize individual and team achievement, develop general leadership, and recognize levels of ability.
- provide local recognition for superior performance at the state and national level.

ELIGIBILITY OF PARTICIPANTS

- 1) Each participant must be a current bona fide dues paying FFA member in good standing with the local chapter, state FFA association, and the National FFA Organization at the time of the career development event (or by May 1 for the Virginia FFA, whichever date comes first.) In the event a participant's name is not on the chapter's official roster for the years in which the dues were payable to the National FFA Organization, a past due membership processing fee of \$35, in addition to the dues must be paid.
- 2) The participant, in a State Senior Career Development Event, must be:
 - a. A high school FFA member, (a graduating senior is considered eligible to compete in state career development events the convention directly after graduation.)
(High school refers to grades 9-12.)
 - b. A middle school team consisting of all 8th grade FFA members.
 - c. While in school, be enrolled in at least one agricultural education course during the school year and/or follow a planned course of study; either course must include a supervised agricultural experience program, the objective of which is preparation for an agricultural career. For this purpose a student needs to be enrolled in at least one agricultural education course during the year they qualified for the event. If the student was previously enrolled in an agriculture class and was an FFA member, they may compete in a contest if they have scheduling issues (ex. Advanced Placement classes) that do not allow them be enrolled in an agriculture class but they must still have an SAE.
- 3) The participant in a State Junior Career Development Event must be:
 - a. at the time of the event must be a 6th, 7th, 8th or 9th grade full dues paying member.
 - b. While in school, be enrolled in at least one agricultural education course during the school year and/or follow a planned course of study; either course must include a supervised agricultural experience program, the objective of which is preparation for an agricultural career. For this purpose a student needs to be enrolled in at least one agricultural education course during the year they qualified for the event.
- 4) The participant in a State Middle School Career Development Event must be:
 - a. At the time of the state competition has qualified as either a 6th, 7th or 8th grade middle school member.
 - b. While in school, be enrolled in at least one agricultural education course during the school year and/or follow a planned course of study; either course must include a supervised agricultural experience program, the objective of which is preparation for an agricultural career. For this purpose a student needs to be enrolled in at least one agricultural education course during the year they qualified for the event.

- 5) To compete in the creed speaking event, the member has qualified as either a 7th, 8th or 9th grader by state convention.
- 6) CDE participants who start an event and do not complete the event without notifying event officials at the time of departure will be disqualified. This can affect the overall team rank and position. In some events this will also disqualify the entire team
- 7) The state supervisor/executive secretary of agricultural education must certify that participants are eligible. If an ineligible student is entered in any career development event, the entire team of which that student is a member may be declared ineligible.
- 8) The first contest that a school wins in the current year will be the contest that the individuals on that team will represent Virginia at the National FFA Convention. To explain, if an FFA chapter puts more than one current winner of an FFA contest on an additional team, then the second place team will be declared the State Winner and will compete at the National FFA Convention. If one person is a duplicate and the National rules allow for a three-person team, then the first place team will represent Virginia. If a student that wins a contest is declared ineligible, or cannot attend the Convention, then the other members of the team will be allowed to compete for individual awards only. (A medical waiver may be granted if a member of a winning team is unable to attend due to a medical condition.)
- 9) Individuals who have been state winners or have represented the state in any official national FFA career development event are not eligible to enter the same FFA event again. However, FFA junior division state winners are eligible for state senior division. Individuals on a state winning team cannot compete in that division again.
- 10) A chapter may enter any number of career development events; however, a chapter may have no more than one team in each division in each event. **If the contest allows a Junior and Senior Team then only the Senior Team is eligible to advance to the National Level. If the event is a joint FFA & 4-H contest, then a school must declare an official team but will be allowed to enter the number of teams permitted by 4-H.**

CHECK-IN

Participants will check-in at the state FFA convention as indicated in the annual State Guidelines. Dates, hours and place of check-in will be sent annually to the agricultural education teacher. All participants will be given an identification number by which they will be designated throughout the event.

ADDITIONAL OPERATIONAL PROCEDURES AND POLICIES

- 1) Emergency Conditions: Under emergency conditions, a state team participating in a Virginia FFA Career Development Event may be made up of less than the required members. Fewer than the required number could compete if an emergency condition such as illness, death in the family or an act of God would occur. Those individuals competing would still be eligible to qualify for individual awards.
- 2) Event committees will strive to divide teams into groups so that no two participants from a team will be in the same group. In any case, no two members will be placed side-by-side.
- 3) **Disqualification:**
 - a. Any communication, verbal or non-verbal between participants during a career development event will be sufficient cause to eliminate the team member involved from the career development event. The only exception to this would be communication between team members during the team activity portion of a given career development event.
 - b. Teams arriving after the career development event has begun may be disqualified or penalized. No member substitutions may be made after the career development event begins.
 - c. Any assistance given to a team member from any source other than the career development event officials or assistants will be sufficient cause to eliminate the team from the career development event.
 - d. Event superintendents may stop any participant if they deem their manner to be hazardous either to themselves or others. Such stoppage shall deem the individuals disqualified for that section of the career development event.
 - e. CDE participants who start an event and do not complete the event without notifying event officials at the time of departure will be disqualified. This can affect the overall team rank and position. In some events this will also disqualify the entire team.

- f. Participants will not be allowed to utilize personal electronic communication devices, other than those approved by the event officials, during the entire course of the event. Participants who access personal electronic communication devices without prior approval of the event officials will be disqualified.
 - g. No participant shall gain access to real materials that will be utilized by the event committee during the competition. Any team, participant, advisor or coach reported and proven to do so will be disqualified from the national event.
- 4) Advisors
 - a. Advisors are not allowed to be in contact with their students at any point or time during the competition.
 - b. Advisors may only be allowed at the contest site if they are assigned to supervise a group or part of the contest
 - 5) Participants are expected to observe the National FFA Code of Ethics and the Proper Use of the FFA Jacket during the career development events. (Please see the latest edition of the Official FFA Manual.)
 - 6) Official FFA dress is highly recommended for all participants where appropriate and is required for the awards presentation and recognition.
 - 7) Participants or advisors will not be allowed in the career development event area as designated in the specific career development event rules. Infractions of this statement may result in team disqualification.
 - 8) Accessibility for all students—all special needs requests should be submitted two weeks prior to the event for scheduling of assistance during event.
 - 9) Written Document Penalties- a penalty of 10% of the total points allotted will be assessed for the written documents received after the postmarked deadline. If the document is still not received seven days after the postmark deadline, the team/individual may be subject to disqualification.
 1. National staff will mark late entries as such.
 2. Event officials will be notified of late entries at the time written documents are provided for judging.
 3. Event superintendent will ensure that penalty is applied.
 - 10) Results of all Virginia State FFA Career Development Events will be announced during sessions at State Convention.

TEAM AND INDIVIDUAL AWARDS

The ranking of teams and individuals in each of the career development events will be on the basis of logical groups within the total range of scores. Awards will be distributed to the winning teams and individuals at award programs following the completion of the career development events.

VIRGINIA FFA ADVISORY COUNCIL

Purpose: To advise the State Staff on issues impacting both FFA Career Development Events and Awards to ensure:

- 1) All activities are consistent with industry needs.
- 2) All activities are available to all members.
- 3) All activities are conducted openly, fairly and in a quality manner.
- 4) Cooperation among various activities occurs, to the degree possible, to promote the interconnectedness of agriculture (i.e. forestry and agricultural mechanics or farm business management and dairy or livestock) and agricultural education (classroom, SAE, FFA).
- 5) New and innovative activities are being put forward for consideration.
- 6) As many students as possible have the opportunity to participate.
- 7) A constant process of local advisor in-service on proper use of these activities as tools for learning is being championed.
- 8) All activities are operated consistently with Advisory Council policy.

- 9) Activities are conducted within available budgets approved by the FFA Advisory Council and, if appropriate, Virginia FFA Foundation Board.

The State FFA Advisory Council shall consist of two instructors of agricultural education from each FFA area in the state, two at-large agricultural education members, past State FFA President, and current President of the Virginia Association of Agricultural Educators; appointed annually by the state advisor. The duties of this council shall be to represent the FFA chapters and advisors in the areas on matters pertaining to the conduct of the entire program; to arbitrate conflicts at the area, federation and chapter level; to review State FFA Degree applications, Star FFA Degree Applications, Proficiency Award Applications, and National Chapter Award applications and make recommendations to the state advisor; to recommend changes, revisions and/or new rules and regulations to the State FFA Board of Directors and the state advisor; and to serve in any capacity in which it may be called upon by the state advisor.

The chair of the advisory committee on awards and career development events will be elected each year.

State Board of Directors

Section A.

Governing Body

1. The governing body of the organization shall be the State Board of Directors, which shall consist of: the state FFA advisor, who shall serve as chairperson; one agricultural education instructor from each of the state FFA areas; one representative from the State FFA Advisory Council, one representative of the State FFA Foundation; and one representative of the State FFA Alumni Association. The state FFA executive secretary shall serve as ex-officio member of the State FFA Board of Directors.

2. The terms of office of members, other than the ex-officio member, shall be prescribed in the bylaws.

3. The State FFA Board of Directors shall meet at least once each year at such time and place as may be prescribed by the board and shall present an annual report.

4. The duties of the State FFA Board of Directors shall include: interpret rules governing the activities of the state association, including the State FFA Convention; to have full power to prescribe new regulations that the board finds necessary in connection with the operation of the organization, including the State Convention; to interpret rules and regulations applicable to the convention; and to review recommendations from the State FFA Advisory Council and State FFA Executive Committee and take any action deemed appropriate.

Section B.

Governing Committee

The chairperson and two members of the State FFA Board of Directors shall be designated by the board to serve as the Governing Committee and shall have the power to deal with items of business of the state organization. All official actions of the Governing Committee shall be reported to the State FFA Board of Directors.

Meeting Schedule

- 1) Annual fall meeting to report on the completion of activities at convention and provide input into the winter meeting agenda.
- 2) The annual spring meeting will allow for most of the committee's work to be conducted as a whole group and in sub-groups focused on specific issues or specific types of activities (e.g. team career development events, individual awards, chapter awards).

Local advisors should submit concerns suggestions to the state FFA Specialist/chair of the advisory board and their area representative at least two weeks in advance of the meeting.

Rules Committee on State Career Development Events

The advisory committee will meet only when needed and will make all final decisions on interpretation of the rules and regulations of the State FFA Career Development Events or awards programs.

Official judges' decisions are final. The announced results are the official results.

Conflict of Interest

If there is a violation of a student whose advisor is a member of the advisory board, the advisor may not vote on the violation. A teacher from that area maybe used to fill in for the advisor whose student has possible committed the violation.



State FFA Senior Forestry

I. PURPOSE

To stimulate student interest and to promote forestry instruction in the agricultural education curriculum and to provide recognition for those who have demonstrated skills and competencies as a result of forestry instruction.

II. OBJECTIVES

- Ability to understand and use forestry terms.
- Ability to promote an understanding of the economic impact of the forest environment and the forest industry to the American economy.
- Ability to recognize sustainability (multiple use) opportunities in the forests.
- Ability to recognize environmental and social factors affecting the management of forests.
- Ability to identify major species of trees of economic importance to the United States and internationally.
- Ability to identify hand tools, equipment, and their uses in forestry management.
- Ability to recognize and understand approved silviculture practices in the United States.
- Ability to identify forest disorders
- Ability to take a forest inventory.
- Ability to utilize marketing management strategies.
- Ability to recognize safety practices in forest management.

III. Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards

With the recommendation of the National FFA Board of Directors, all national FFA programs have incorporated these standards to guide the direction and content of program materials and activities. Refer to Appendix A in this document for a complete list of the measurable activities that participants will carry out in this event. For details about the incorporation of AFNR standards, refer to the Introduction chapter of the National CDE handbook.

IV. EVENT RULES

- The team will consist of four individuals and all four scores will count toward the team score. The team score is comprised of the combined scores of each individual and the team activity in which all team members will participate.
- Participants must come to the event prepared to work in adverse weather conditions. The event will be conducted regardless of weather. Participants should have rain gear, warm clothes and proper footwear. Each participant must provide the following safety equipment, and it must be worn while in the woods or the participant will be disqualified:
 - Long Pants
 - Closed-Toe Shoes
- Students will need to provide their own clipboard, two number two pencils, Biltmore stick, and four-function calculator.
- Participants must follow instructions from event staff for handling materials during the event. Any infraction of this rule will be sufficient to eliminate the team from the event.

- Observers will not be permitted in the event area while the event is in progress.
- Participants will be assigned to group leaders who will escort them to various event-staging sites. Each participant is to stay with his/her assigned group leader throughout the event or until told to change leaders by the event superintendent.
- All participants will be given an identification number by which they will be designated throughout the event.
- Written Materials: All written materials will be furnished for the event, including log charts, scorecards, et cetera. No written materials such as tests, problems and worksheets shall be removed from the event site.
- Any participant in possession of an electronic device such as a cell phone in the event area is subject to disqualification.

V. EVENT FORMAT

A. Equipment

Each participant must provide the following

- a. Biltmore Stick,
- b. 4-Function calculator,
- c. Clipboard without writing
- d. Pencils

B. Procedure

Procedures for the events are as follows: Not all events will be used each year but only those sections listed below can be on the contest. Each event area will carry an equal point value.

Individual Activities

Event I: Forest General Knowledge Exam (100 points)

1. Fifty (50) multiple-choice questions will be selected from areas of the forestry industry reflected in the event objectives. This phase of the event will test the participant's knowledge and understanding of basic principles of forestry. The test will be a True/False, multiple-choice exam based on the Forestry Guide for Agricultural Education in Virginia produced by Commonwealth of Virginia Department of Education Richmond, Virginia Catalog #0.02.10
2. Time: Each participant will be allowed 30 minutes to complete this phase of the event.
3. Scoring: Each answer has a value of 2 points for a total maximum score of 100 points.

Event II: Forestry Issues Interview (100 points)

1. Participants will communicate their knowledge and opinion about national or regional forestry issues through a personal interview with a judge. A list of general issue topics for participants to study will be provided prior to convention. The specific topic will be provided at the event.
2. Time: Each participant will have ten minutes to complete the interview/speech. The speech should be 2-4 minutes in length and the judge will ask questions about the selected topic once the speech is complete.

- Participants will not be permitted to bring written or prepared notes with them.
- Scoring: Scoring criteria are presented on the issues interview score card, which will be recorded by a judge.

Scoring:

Introduction	5
Personality/Confidence	10
Poise/Body Posture	10
Response to questions	15
Knowledge of the issue	20
Conveyance of thought and meaning	40
Total	100

Topic

Speech topic will be released every spring to participating teams.

Event III: Tree Identification (100 points)

- Twenty-five (25) live specimens, pressed samples, fresh leaf samples and/or standing trees, from the list below will be displayed for participants to identify by common names. A number will designate each specimen.
- Time:** Each participant will be allowed 20 minutes to complete this phase.
- Scoring:** Five points will be given for each specimen that is correctly identified for a maximum of 100 points.

Specimen

Ash, White	Hickory*	Pine, Eastern White
Beech	Holly	Pine, Loblolly
Birch, Black	Hornbeam, American	Pine, Longleaf
Birch, White	Locust, Black (Yellow Locust)	Pine, Pitch
Cedar, Eastern Red	Locust, Honey	Pine, Shortleaf
Cherry, Black (Wild Cherry)	Maple, Red	Pine, Virginia
Cottonwood	Mulberry, Red	Poplar, Yellow (Tulip Tree)
Dogwood	Oak, Black	Redbud
Douglas Fir	Oak, Chestnut	Sassafras
Elm (American)	Oak, Northern Red	Spruce
Elm, Slippery	Oak, Post	Sycamore
Gum, Black	Oak, Scarlet	Walnut, Black
Gum, Sweet (Red Gum)	Oak, Southern Red	Willow, Black
Hackberry	Oak, White	
Hemlock	Persimmon	

*No distinction is made among the various species of Hickory

Event IV: Estimation of Board-Foot Volume of Standing Timber (100 points)

- Using the provided tree measurement tools, each participant will measure ten pre-numbered trees on a plot for board foot volume. The participant must record the DBH (Diameter Breast Height) to the nearest two-inch (even-inch) class and the merchantable height of each tree height rounded down to the nearest ½ log. Volume tables will be provided at the event.
- The following minimum diameters and log length will be:

Minimum Saw Timber

DBH	10 inches
Top Diameter	8 inches DIB
Height	16 feet

3. Merchantable height stops are estimated to the upper point on a tree where it becomes 8 inches in diameter or where a major fork in a tree stem occurs or where a limb has a diameter equal to ½ of the diameter of the tree at that point.
4. Time: Each participant will be allowed 20 minutes to complete this phase.
5. Scoring:
 - a. 25 points (five points per DBH) will be given for the correct DBH
 - b. 25 points for the correct height (within a half log of the official)
 - c. 50 points will be given for the correct volume per acre
 - d. 50 points for difference in value if estimate is within 5% of the official estimate; 40 points if within 10%; 30 points if within 15%, 20 points if within 20%, and 10 points if within 15%.

Event V: Timber Stand Improvement (100 points)

Virginia Guidelines are used

1. The contest manager marks 25 trees in an intermediate-age stand.
2. Constants are informed of management objectives immediately before the event. Information includes the purpose of the thinning or cutting and a list of preferred species and markets or thinning methods available.
3. Unnumbered example trees may be marked “take” or “leave” by a contest official to assist in making decisions on adjacent numbered trees. Adjacent trees must be considered by contestants whether they are marked or not.
4. Constants provide the following information for each tree.
 - Species (must be from the Virginia list)
 - Recommendation
 - Cut
 - Leave
 - Reason for leaving, removing or killing (contestants may only give one reason for their recommendation; however, more than one reason may be correct. In this case, judges are to give full credit for either answer.) The reasons are based on the following.
 - Reasons for leaving to grow.
 1. Crop tree
 2. Not a crop tree, but best tree available: reevaluate at next thinning.
 - Reasons for removing or killing
 1. Poor form, shape, size or crown: damaged, diseased, or infested with insects.
 2. Less desirable because of species or markets
 3. Cut only to improve spacing
 4. Mature
5. **Time:** Participants will be given 20 minutes to make their decisions.
6. **Scoring:** Four points will be allowed for each correct decision up to a maximum total of 100 points, depending on the number of trees. Generally scoring will be, 1 point for correct tree ID, 2 points for keep/cull, and 1 point for the reason to keep or cull the tree. (The possible score for this phase of the event will vary.)

Event VI: Equipment Identification (100 points)

Twenty-five pieces of equipment from the following list will be displayed for participants to identify by technical names.

Each piece of equipment will be designated by number.

Time: Each participant will be allowed 20 minutes to complete this phase.

Scoring: Four points will be given for each piece of equipment identified correctly for a total of 100 points. All answers must be correct. No partial credit will be given.

Specimen

Altimeter	Fire-Swatter	Soil Sampler
Back-pack Fire Pump	Flow/Current Meter	Soil Test Kit
Bark Gauge	GPS Receiver	Staff Compass
Bulldozer	Hand Compass	Stereoscope
Canthook	Hand Lens/Field Microscope	Survey Instrument (some type)
Chainsaw	Hip Chain	Tally Book
Chainsaw Chaps	Hypo-Hatchet	Tally Meter
Clinometer	Increment Borer	Tree Caliper
Data Recorder	Log Rule	Tree Harvester
Denosimeter	Logger's Tape	Tree Marking Gun
Diameter Tape	pH Meter	Tree Planting Hoe or Bar
Dot Grid	Planimeter	Tree Skidder
Drip Torch	Plant Press	Tree Stick
Endloader	Plastic Flagging	Water Sampler
Feller Buncher	Pulaski Forester Axe	Water Test Kit
Fiberglass Measuring Tape	Relaskop	Wedge Prism
Fire Rake	Safety Glasses	Wheeler Caliper
Fire Weather Kit	Safety Hard Hat	

Event VII: Map Interpretation (100 points)

- Participants will be furnished a United States geological survey topographic map with specific points marked for the participant to identify. The participant shall know legal description, recognize topographic map symbols, and understand the meaning of map symbols and size and location of 40 acres or more in a section.
- Ten points on the map will be clearly marked with a number or arrow pointing to the section, symbol, or area on the map to be identified.
- Examples:
 - What is the legal description of the area boxed?
 - What is the item located at this point?
 - What is the acreage of the area enclosed?
 - In what section is the city of Marshall located?
- Legal descriptions will be written or described according to the following:
 - NW Northwest
 - T Township
 - SE Southeast
 - R Range
 - S Section (640 acres)
 - 1/4 Quarter of a section (160 acres)
- Scoring:** Ten questions or problems will be completed. Ten points will awarded for each correct answer. No partial credit will be given.

Event VIII: Compass

- The participant will use a hand compass and pacing to the nearest full foot to simulate the determination of the property lines on a tract of timber. The compass course will have ten marked points. The student will start at any point and record the compass reading and distance to the next point. Azimuth readings shall be recorded.

2. **Scoring:** A total of 100 points are possible: Ten points for each correct numbered site, Five points for correct azimuth and five points for correct distance. Partial credit will be given with a deduction of one point for each two degrees or two feet the participant is off the correct answer.

Event IX: Tree/Forest Disorders (100 points)

1. Symptoms of at least 10 and not more than 25 disorders from the following list will be displayed for participants to identify by common names. The symptoms will be presented in one or more of the following forms:

- a. Actual Sample
- b. Picture(s)/Slides
- c. Written description
- d. Written case history

2. **Scoring:** Five points will be given for each disorder that is correctly identified for a total up to 100 points. No partial credit will be given.

Tree Disorders

Air pollution	Lightning damage
Aphid	Mechanical Damage
Beetles	Mistletoe
Butt or Heart Rot	Nematode
Canker	Rust
Chemical Damage	Sawfly
Cicada	Scale
Climatic injury: snow, wind, frost, drought, hail	Spruce budworm
Damping off	Sunscald
Douglas fir tussock moth	Tent caterpillar
Emerald Ash Borer	Wetwood or slime flux
Fire damage	Wildlife/Livestock damage
Gypsy moth	Wood borer
Hemlock Woolly Adelgid	
Landscape Equipment Damage	

Event X: Forest Products (100 points)

1. Twenty-five wood products/samples will be displayed for participants to evaluate and identify its tree species source from the approved tree specimen list. The wood products/samples will come from the list of trees that are eligible for the Virginia State Contest and will be presented in one or more of the following forms. (For Oak, students will only have to specify red or white –they will not have to identify the species.)

- a. Actual Sample
- b. Picture(s)/Slides
- c. Written description

2. **Scoring:** Four points will be given for each wood product or sample that is correctly identified for a total of 100 points.

VI. SCORING

Each individual can earn up to 100 points per event with a maximum of 10 events per year. The team total will be a combination of all four individual scores with a total of 400 points per event with a maximum of 10 events per year.

	Individual	Team
General Knowledge Exam	100	400
Forestry Issues Interview	100	400
Tree Identification	100	400
Board-Foot Volume	100	400
Timber Stand Improvement	100	400
Equipment ID	100	400
Map Interpretation	100	400

Compass	100	400
Tree/Forest Disorders	100	400
Forest Products	100	400
Total	1000	4,000

VII. TIEBREAKERS

- Tiebreakers for teams will be the first, second, and third high individuals.
- Tiebreakers for individual scores will be:
 - Knowledge Exam
 - Timber Cruising
 - Tree Identification
 - Issues Interview

VIII. AWARDS

Awards will be presented at the contest at the same time results are presented. Awards are presented to teams as well as individuals based upon their rankings.

FORESTRY

CAREER DEVELOPMENT EVENT

What is it?

Participate in this CDE to grow your skills in forestry management. At the competition, members complete a written exam, identify trees and forestry equipment, and are interviewed regarding forestry-related issues. They also demonstrate their skills in forest disorders, forest management, inventory and approved silviculture practices.

Career Opportunities

Career Clusters

- Agricultural and Forestry Production
- Management and Financial Specialties
- Marketing, Merchandising and Sales
- Science and Engineering
- Education and Communication

Career opportunities found in the career cluster areas:

- **Agricultural and Forestry Production** - forest ranger, log grader, lumber mill operator, timber manager, forester, forest fire fighter
- **Management and Financial Specialties** - log exporter, Christmas tree farm manager
- **Marketing, Merchandising and Sales** - forest products merchandiser
- **Science and Engineering** - forestry scientist, resource economist, silviculturist, dendrologist
- **Education and Communication** - postsecondary teacher, forest fire control tower communications

Educational Requirements

High School Diploma - lumber mill operator, forest fire fighter, forest fire control tower communications

Bachelor Degree - forest ranger, log grader, timber manager, forest products merchandiser, forester, Christmas tree farm manager, silviculturist, dendrologist

Graduate Degree - forestry scientist, resource economist, postsecondary teacher

SAE Opportunities

Chopping, selling, and delivering firewood, raising Christmas trees and selling them, employment at the U.S. Forest Service

Proficiency Award Areas

Forest Management and Products
Agriculture Sales and/or Services

Curriculum Resources

- The U.S. Department of Interior Geological Survey Topographic Map Information and Symbols Key, Map Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80223.
- David A. Anderson, I.I. Holland and Gary L. Rolfe. *Forests and Forestry*, current edition. Danville, IL: The Interstate Printers Publishers, Inc.
- W.M. Harlow, E.S. Harrar, and F.M. White. *Textbook of Dendrology*, current edition. New York, NY: McGraw-Hill Book Company
- B. McManar Collins and Fred M. White. *Elementary Forestry*. Reston, VA: Reston Publishing Company, Inc.
- *Silvics of Forests of United States*, Handbook #271, U.S. Forest Service, P.O. Box 2417, 12th and Independence Avenue, SW, Washington, DC 20013
- Owners Manual - Homelite - Division of Textron, P.O. Box 7047, Charlotte, NC 28217.
- *Forestry Handbook*, current edition, Edited by Karl Wenger for the Society of American Foresters, 5400 Grosvenor Lane, Bethesda, MD 20814.
- Timber Harvesting, current edition, American Pulpwood Association, The Interstate Printers & Publishers, Inc., Danville, IL.
- Chain Saw Manual, current edition, American Pulpwood Association, The Interstate Printers & Publishers, Inc.; Danville, IL
- William G. Camp & Thomas R. Daughtery. *Managing Our Natural Resources*, current edition,. Albany, N.Y.: Delmar Publishers, Inc.
- Virginia Department of Forestry. <http://www.dof.virginia.gov/mgt/trees/index.shtml>
- *Forestry Guide for Agriculture Education in Virginia*, CTE Resource Center, current edition.

Senior Forestry

Event I: Tree Identification

Name _____

School _____

Tree No.	Species	Correct
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
TOTAL	Points _____ x 4 =	

- Ash, White
- Beech
- Birch, Black
- Birch, White
- Cedar, Eastern Red
- Cherry, Black (Wild Cherry)
- Cottonwood
- Dogwood
- Douglas Fir
- Elm (American)
- Elm, Slippery
- Gum, Black
- Gum, Sweet (Red Gum)
- Hackberry
- Hemlock
- Hickory
- Holly
- Hornbeam, American
- Locust, Black
- Locust, Honey
- Maple, Red
- Mulberry, Red
- Oak, Black
- Oak, Chestnut
- Oak, Northern Red
- Oak, Post
- Oak, Scarlet
- Oak, Southern Red
- Oak, White
- Persimmon
- Pine, Eastern White
- Pine, Loblolly
- Pine, Longleaf
- Pine, Pitch
- Pine, Shortleaf
- Pine, Virginia
- Poplar, Yellow (Tulip Tree)
- Redbud
- Sassafras
- Spruce
- Sycamore
- Walnut, Black
- Willow, Black

Senior Forestry

Event IV: Equipment Identification

Name _____

School _____

Tree No.	Species	Correct
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
TOTAL	Points _____ x 4 =	

- Altimeter
- Back-pack Fire Pump
- Bark Gauge
- Bulldozer
- Canthook
- Chainsaw
- Chainsaw Chaps
- Clinometer
- Data Recorder
- Densimeter
- Diameter Tape
- Dot Grid
- Drip Torch
- Endloader
- Feller Buncher
- Fiberglass Measuring Tape
- Fire Rake
- Fire Weather Kit
- Fire-Swatter
- Flow/Current Meter
- GPS Receiver
- Hand Compass
- Hand Lens/FieldMicroscope
- Hip Chain
- Hypo-Hatchet
- Increment Borer
- Log Rule
- Logger's Tape
- pH Meter
- Planimeter
- Plant Press
- Plastic Flagging
- Pulaski Forester Axe
- Relaskop
- Safety Glasses
- Safety Hard Hat
- Soil Sampler
- Soil Test Kit
- Staff Compass
- Stereoscope
- Survey Instrument
- Tally Book
- Tally Meter
- Tree Caliper
- Tree Harvester
- Tree Marking Gun
- Tree Planting Hoe or Bar
- Tree Skidder
- Tree Stick
- Water Sampler
- Water Test Kit
- Wedge Prism
- Wheeler Caliper

Senior Forestry Event III: Issue Interview

Name _____

School _____

	Possible Points	Score	Comments
Introduction	5 pts		
Personality/ Confidence	10 pts		
Poise/Posture	10 pts		
Response to Questions	15 pts		
Knowledge	20 pts		
Conveyance of Thought & Meaning	40 pts		
Total:	100 pts		

Senior Forestry Event IV: Estimation of Board-Foot Volume

Name _____ School _____

Tree No.	DBH	No. of 16' Logs	Volume Board Feet
1.			
2.			
3.			
4.			
5.			
TOTAL			

TREE SCALE IN BOARD FEET

DIAMETER BREST HIGH (INCHES)	NUMBER OF 16-FOOT LOGS								
	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
8	20	27	33	38					
10	38	50	61	69	77				
12	56	77	96	110	124	132	143		
14	82	110	138	160	182	196	211		
16	108	146	183	214	246	269	292		
18	140	190	240	282	325	356	388		
20	176	240	305	360	414	455	496	528	561
22	216	297	378	446	514	568	621	666	710
24	260	359	458	543	628	690	753	814	875
26	305	422	540	641	742	820	899	972	1046
28	357	496	635	756	877	969	1061	1152	1242
30	413	575	737	878	1020	1128	1235	1346	1458
32	474	661	848	1014	1181	1310	1440	1562	1685
34	538	752	966	1158	1349	1498	1647	1790	1932
36	602	844	1087	1304	1521	1690	1860	2024	2189
38	674	947	1220	1470	1720	1910	2101	2294	2488
40	750	1058	1365	1644	1923	2142	2362	2568	2775

Senior Forestry

Event V: Timber Stand Improvement

Name _____ School _____

Tree No.	Species	Remove or Kill	Leave	Reason
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
TOTAL	Points _____ X 4 =			

Indicate "Remove or Kill" or "Leave" by entering an X in the appropriate column.

Under "Reason" indicate by entering the letter corresponding to appropriate reason:

Reasons for leaving to grow:
 a. Crop tree
 b. Not a crop tree, but best tree available re-evaluate at next thinning

Reasons for removing or killing:
 c. Poor form, shape, size or crown; damaged; insect or disease-infected
 d. Less desirable due to species or markets
 e. Cut only to improve spacing
 f. Mature

Senior Forestry Event VI: Map Interpretation

Name _____ School _____

Parcel	Description	Score
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Total Score

Senior Forestry Event VII: Compass Practicum

Name _____ School _____

Station	Compass Reading	Distance	Score
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Total Score

Scoring Key	
Site:	10 pts total <ul style="list-style-type: none"> • 5 pts – Azimuth • 5 pts – Distance
Deductions:	-1 pt for each 2 degrees or 2 feet off

Senior Forestry Event VIII: Tree Forest Disorders

Name _____

School _____

Tree No.	Species	Correct
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
TOTAL	Points _____ x 4 =	

- Air pollution
- Aphid
- Beetles
- Butt or Heart Rot
- Canker
- Chemical Damage
- Cicada
- Climatic injury: snow, wind, frost, drought, hail
- Damping off
- Douglas fir tussock moth
- Emerald ash borer
- Fire damage
- Gypsy moth
- Hemlock wooly adelgid
- Landscape Equipment Damage
- Lightning damage
- Mechanical Damage
- Mistletoe
- Nematode
- Rust
- Sawfly
- Scale
- Spruce budworm
- Sunscald
- Tent caterpillar
- Wetwood or slime flux
- Wildlife/Livestock damage
- Wood borer

Senior Forestry Event IX: Forest Products

Name _____ School _____

Tree No.	Species	Correct
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
TOTAL	Points _____ x 4 =	

Ash, White
 Beech
 Cedar, Eastern Red
 Cherry, Black (Wild Cherry)
 Dogwood
 Elm (American)
 Elm, Slippery
 Gum, Black
 Gum, Sweet (Red Gum)
 Hackberry
 Hickory
 Holly
 Hornbeam, American
 Locust, Black
 Locust, Honey
 Maple, Red
 Mulberry, Red
 Oak, Red
 Oak, White
 Persimmon
 Pine, Eastern White
 Pine, Loblolly
 Pine, Shortleaf
 Pine, Virginia
 Poplar, Yellow (Tulip Tree)
 Redbud
 Sassafras
 Sycamore
 Walnut, Black
 Willow, Black

Senior Forestry Event X: General Knowledge Exam

Name _____

School _____

Question #	Answer	Score
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

Question #	Answer	Score
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		

TOTAL Points _____ X 2 =

Appendix A. AFNR Content Cluster Standards

	Performance Measurement Levels	Event Activities Addressing Measurements	Related Academic Standards
ABS.01.01. Performance Indicator: Apply principles of capitalism in the business environment.			Social Studies: 7b and 7g
	ABS.01.01.01.c. Execute supply-and-demand principles in AFNR businesses.	business management problem/general knowledge exam/team activity/TSI	
ESS.02.01. Performance Indicator: Interpret laws affecting environmental service systems.			Science: F4 Language Arts: 1 and 8 Social Studies: 10c
	PST.01.02.01.b. Classify lubricants by SAE viscosity and API service classifications.	chainsaw practicum/general knowledge exam	
ESS.03.01. Performance Indicator: Apply meteorology principles to environmental service systems.			Science: D2 and F4 Language Arts: 8 Social Studies: 3c
	PST.03.01.01.a. Identify components and systems of internal combustion engines.	chainsaw practicum/general knowledge exam	
	PST.03.01.02.b. Analyze and troubleshoot internal combustion engines.	chainsaw practicum/general knowledge exam	
ESS.03.04. Performance Indicator: Apply best management techniques associated with the properties, classifications and functions of wetlands.			Science: C4 and F3 Social Studies: 3c
	CS.08.03.01.a. Describe the conditions that cause the need for tool maintenance.	chainsaw practicum/general knowledge exam	
ESS.06.02. Performance Indicator: Maintain tools, equipment and machinery in safe working order for tasks in environmental service systems.			
	CS.07.01.01.b. Use appropriate personal protective equipment for a given task.	chainsaw practicum/team event	

NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of natural resource systems.		Math: 5a Science: C4 and F3 Social Studies: 3h
NRS.04.03.01.a. Identify harmful and beneficial insects and signs of insect damage to natu-	disorders/general knowledge exam	
ESS.02.01.01.b. Identify the purposes of laws associated with environmental service sys-	general knowledge exam	
NRS.01.02. Performance Indicator: Classify natural re-		Science: F3
NRS.03.01.02.b. Describe processing of forest products.	general knowledge exam	
NRS.02.01. Performance Indicator: Develop a safety plan for work with natural resources.		Science: F3 and F5 Language Arts: 8
NRS.04.01.01.b. Describe techniques used to suppress wild-fires and manage prescribed	general knowledge exam	
NRS.02.02. Performance Indicator: Demonstrate cartographic skills to aid in developing, implementing and evaluating natural resource management plans.		Math: 4B Science: A3 and F2 Social Studies: 3b
NRS.04.03.01.c. Describe techniques used to manage pests of natural resources.	general knowledge exam	
NRS.02.03. Performance Indicator: Measure and survey natural resource status to obtain planning data.		Math: 5C Science: A3 and F2 Social Studies: 3h
PS.01.01.01.a. Explain systems used to classify plants.	general knowledge exam	
NRS.02.04. Performance Indicator: Demonstrate natural resource enhancement techniques.		Science: F3 Social Studies: 3g
PS.01.02.02.a. Identify the components, the types and the	general knowledge exam	
NRS.02.05. Performance Indicator: Interpret laws related to natural resource management and protection.		Science: F3 Language Arts: 7
PS.01.02.03.a. Identify the components and the functions	general knowledge exam	

NRS.02.06. Performance Indicator: Apply ecological concepts and principles to natural resource systems.		Science: D2 and F3 Social Studies: 3b, 3f and 3h
PS.01.02.04.a. Discuss leaf morphology and the functions of leaves.	general knowledge exam	
PS.01.02.06.b. Identify the major types of fruit.	general knowledge exam	
PS.01.03.01.a. Explain the basic process of photosynthesis and its importance to life on Earth.	general knowledge exam	
NRS.03.01. Performance Indicator: Produce, harvest, process and use natural resource products.		Science: F3
PS.01.03.01.c. Explain the light-dependent and light-independent reactions that occur during photosynthesis and apply the knowledge to plant management.	general knowledge exam	
PS.02.01.01.b. Describe plant responses to light color, intensity and duration.	general knowledge exam	
NRS.04.01. Performance Indicator: Manage fires in natural resource systems.		Science: F5
PS.02.01.02.b. Determine the optimal air, temperature and water conditions for plant growth.	general knowledge exam	
NRS.04.02. Performance Indicator: Diagnose plant and wildlife diseases and follow protocol to prevent their spread.		Science: F1 and F3 Social Studies: 9d
PS.03.01.01.a. Explain pollination, cross-pollination and self-pollination of flowering plants.	general knowledge exam	
NRS.04.03. Performance Indicator: Manage insect infestations of natural resources.		Science: C4 and F3
PS.03.01.02.a. Demonstrate sowing techniques and provide favorable conditions for seed germination.	general knowledge exam	
CS.06.03.01.a. Demonstrate the importance of safety, health and environmental practices in the workplace.	general knowledge exam/ chainsaw practicum	
PS.01.01. Performance Indicator: Classify agricultural plants according to taxonomy systems.		Science: C3
CS.07.02.01.a. Inform others how to avoid placing oneself in hazardous work situations.	general knowledge exam/ chainsaw practicum	

PS.01.02. Performance Indicator: Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.		Science: B6, C3 and C5
PST.02.02.01.a. Identify power unit and equipment controls and instruments, along with their functions.	general knowledge exam/ chainsaw practicum/tool ID	
ESS.03.01.01.b. Differentiate the types of weather systems and weather patterns.	general knowledge exam/ issues interview	
ESS.03.04.01.a. Describe the functions of wetlands and differentiate types of wetlands.	general knowledge exam/ issues interview	
NRS.02.05.01.b. Identify the purposes of laws associated with natural resource systems.	general knowledge exam/ issues interview	
PS.01.03. Performance Indicator: Apply knowledge of plant physiology and energy conversion to plant systems.		Science: B6 and C5
NRS.02.06.02.a. Describe properties of watersheds and identify the boundaries of local watersheds.	general knowledge exam/ issues interview	
NRS.02.06.07.b. Discuss factors that influence the establishment and spread of invasive species.	general knowledge exam/ issues interview	
PS.02.01. Performance Indicator: Determine the influence of environmental factors on plant growth.		Science: C6
ESS.03.01.02.a. Explain how meteorological conditions influence air quality.	general knowledge exam/ issues interview/tree disorders	
NRS.02.03.01.a. Describe the value of resource inventories and population studies.	general knowledge exam/ team event	
PS.03.01. Performance Indicator: Demonstrate plant propagation techniques.		Science: C2
CS.07.04.01.c. Apply general workplace safety precautions/procedures.	general knowledge exam/ team event	
CS.02.03.01.a. Explore various career interests/options.	issues interview	
PS.03.05. Performance Indicator: Harvest, handle and store crops.		Science: F5
CS.03.01.01.b. Select the appropriate form of technical and business writing or communication for a specific situation.	issues interview	

PST.01.02. Performance Indicator: Apply physical science		Science: B4
NRS.01.01.01.c. Research and debate one or more current issues related to the conservation or preservation of natural re-	issues interview/general knowledge exam	
PST.02.02. Performance Indicator: Operate, service and diag-		Science: E2
NRS.02.02.01.a. Demonstrate how to use maps to identify directions and features, calculate actual distance and determine the elevations of	mapping practicum/general knowledge exam/compass practicum	
PST.03.01. Performance Indicator: Troubleshoot and repair internal combustion engines.		Science: A1 and A4 Language Arts: 3
NRS.02.01.01.b. Demonstrate safety practices when working	team event	
ESS.06.02.01.a. Demonstrate proper use and maintenance of	team event/chainsaw practicum	
CS.02.03. Performance Indicator: Professional Growth: Develop awareness and apply skills necessary for achieving ca-		Language Arts: 12 Social Studies: 4a
NRS.02.04.02.c. Formulate a timber stand improvement plan	team event/TSI	
CS.03.01. Performance Indicator: Communication: Demonstrate oral, written and verbal skills.		Language Arts: 4, 5 and 12
CS.08.01.02.b. Demonstrate appropriate operation, storage and maintenance techniques	timber cruising/team event	
CS.06.03 Performance Indicator: Provide health, safety and environmental operating guidelines.		Science: F4 and F5 Language Arts: 4
NRS.01.02.01.c. Conduct a field inventory of trees and other woody plants, and record	Timber cruising/TSI/team event	
CS.07.01. Performance Indicator: Apply safety/health prac-		Science: F1 and F5
NRS.02.06.08.b. Describe the impact of pollution on natural	Tree disorders/general knowledge exam	

CS.07.02. Performance Indicator: Demonstrate recognized first aid knowledge and procedures to show how they are		Science: F5
NRS.04.02.01.c. Explain management techniques used to reduce infection and spread of plant diseases in natural resources.	Tree disorders/general knowledge exam	
CS.07.04. Performance Indicator: Assess workplace safety.		Science: F5
PS.03.05.01.b. Assess the stage of growth to determine crop maturity or salability and demonstrate proper harvesting techniques.	TSI	
CS.08.01. Performance Indicator: Evaluate and select the ap-		
NRS.03.01.01.b. Determine when to harvest forest products.	TSI	
NRS.01.01.02.c. Conduct a field study of an ecosystem, and record and document observations of species interactions.	TSI/team event	
CS.08.03. Performance Indicator: Maintain tools for efficient		
CS.08.01.01.c. Use tools and equipment appropriately to	TSI/timber cruising/team event/compass practicum	

Appendix B: Related Academic Standards

National academic standards for mathematics, science, English language arts and social studies related to this event are reported below. The statements are based on information in reports of the respective associations/organizations in the academic areas. Some adjustment of numbering was done to facilitate the process of alignment with the standards that have been developed in the pathways of the Agriculture, Food and Natural Resources (AFNR) Career Cluster.

The approach was to determine the presence of alignment between the content standards, expectations or thematic strands of the four academic areas and the performance indicators of the AFNR Standards. Supporting statements have been included to clarify content of the respective content standards, expectations or thematic strands. The statements were initially developed independently by the respective organizations and, therefore, are not parallel in wording and presentation. Occasionally minor editing was done to adjust the background or stem of a statement but not the statement itself.

Mathematics

- 4. Standard and Expectations: Measurement
 - 4B. Apply appropriate techniques, tools and formulas to determine measurements.
- 5. Standard and Expectations: Data Analysis and Probability
 - 5A. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.
 - 5C. Develop and evaluate inferences and predictions that are based on data.

Science

- A. Content Standard: Science as an Inquiry
 - A1. Identify questions and concepts that guide scientific investigation.
 - A3. Use technology and mathematics to improve investigations and communications.
 - A4. Formulate and revise scientific explanations and models using logic and evidence.
- B. Content Standard: Physical Science
 - B4. Motions and forces.
 - B6. Interactions of energy and matter.
- C. Content Standard: Life Science
 - C2. Molecular basis of heredity.
 - C3. Biological evolution.
 - C4. Interdependence of organisms.
 - C5. Matter, energy and organization in living systems.
 - C6. Behavior of organisms.
- D. Content Standard: Earth and Space Science
 - D2. Geochemical cycles.
- E. Content Standard: Science and Technology
 - E2. Understanding about science and technology.

F. Content Standard: Science in Personal and Social Perspectives

- F1. Personal and community health.
- F2. Population growth.
- F3. Natural resources.
- F4. Environmental quality.
- F5. Natural and human-induced hazards.

English Language Arts

1. Students read a wide range of print and non-print texts to build an understanding of texts, of themselves and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.
3. Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).
4. Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that support their purpose and audience.
8. Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.
12. Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information).

Social Studies**3. Thematic Strand: People, Places and Environments**

- 3b. create, interpret, use and synthesize information from various representations of the earth, such as maps, globes and photographs;
- 3c. use appropriate resources, data sources and geographic tools such as aerial photographs, satellite images, geographic information systems (GIS), map projects, and cartography to generate, manipulate and interpret information such as atlases, data bases, grid systems, charts, graphs and maps.
- 3f. use knowledge of physical system changes such as seasons, climate and weather, and the water cycle to explain geographic phenomena;
- 3g. describe and compare how people create places that reflect culture, human needs, government policy and current values and ideals as they design and

- build specialized buildings, neighborhoods, shopping centers, urban centers, industrial parks and the like;
- 3h. examine, interpret and analyze physical and cultural patterns and their interactions, such as land use, settlement patterns, cultural transmission of customs and ideas and ecosystem changes;
- 3k. propose, compare and evaluate alternative policies for the use of land and other resources in communities, regions, nations and the world.
4. Thematic Strand: Individual Development and Identity
- 4a. articulate personal connections to time, place and social/cultural systems;
6. Thematic Strand: Power, Authority and Governance
- 6c. analyze and explain ideas and mechanisms to meet needs and wants of citizens, regulate territory, manage conflict, establish order and security and balance competing conceptions of a just society;
7. Thematic Strand: Production, Distribution and Consumption
- 7b. analyze the role that supply and demand, prices, incentives and profits play in determining what is produced and distributed in a competitive market system;
- 7g. compare basic economic systems according to how rules and procedures deal with demand, supply, prices, the role of government, banks, labor and labor unions, savings and investments and capital;
9. Thematic Strand: Global Connections
- 9d. analyze the causes, consequences and possible solutions to persistent, contemporary and emerging global issues, such as health, security, resource allocation, economic development and environmental quality;
10. Thematic Strand: Civic Ideals and Practices
- 10c. locate, access, analyze, organize, synthesize, evaluate and apply information about selected public issues—identifying, describing and evaluating multiple points of view;