Unit 4: Turfgrass Management

Content Area: **CTE**
Course(s): **Horticulture III**
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Unit Overview

Turfgrass is a collection of grass plants that form a ground cover. All turfgrasses belong to the grass family Poaceae.

Enduring Understandings

- Lawns are mowed for aesthetic purposes. A neatly mowed lawn is attractive. Mowing, or cutting grass, also reduces problems with some weeds and prevents turfgrasses from forming seed heads.
- Tools and equipment are designed to make work easier. Some have been specifically designed for work associated with the turfgrass industry. Knowing the tools and equipment by name and how to use them properly improves the efficiency and safety of work.
- Turfgrasses, like all other plants, need nutrients to grow. Most of the nutrients are obtained from the soil. For optimal growth, providing additional nutrients is necessary.

Essential Questions

- How are turfgrasses selected based on climate?
- What are the characteristics of grass plants used for turfgrass purposes?
- What are the major parts of turfgrass plants?

Standards/Indicators/Student Learning Objectives (SLOs)

- Describe fertilization practices for turfgrass
- Explain proper mowing procedures
- Discuss water practices for turfgrass
- Describe other maintenance practices for turfgrassExamine site preparation for establishing turfgrass
- Describe how turfgrass is established by seeding
- Describe how turfgrass is established vegetatively
- Explain how turf can be renovated
- Identify turfgrass weeds and describe methods for managing weeds
- Discuss turfgrass diseases and management practices

- Identify turfgrass pests and pest management practices
- Identify turfgrass weeds and describe methods for managing weeds
- Discuss turfgrass diseases and management practices
- Identify turfgrass pests and pest management practices
- Identify hand tools used in the turfgrass industry
- Identify power tools used in the turfgrass industry
- Identify heavy equipment used in the turfgrass industry

9.3.12.AG	Agriculture, Food & Natural Resources
9.3.12.AG.1	Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.
9.3.12.AG.4	Demonstrate stewardship of natural resources in AFNR activities.
9.3.12.AG.6	Analyze the interaction among AFNR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.
9.3.12.AG-BIZ.1	Apply management planning principles in AFNR businesses.
9.3.12.AG-BIZ.4	Develop a business plan for an AFNR business.
9.3.12.AG-BIZ.5	Use sales and marketing principles to accomplish AFNR business objectives.

Lesson Titles

- Establish and Growing Turfgrass
- Identifying, Classifying, and Selecting Turfgrass
- Indentifying Tools and Equipment Associated with Turfgrass
- Managilng Athletic Fields and Golf Course
- Managing Pests and Diseases in Turfgrass
- Managing Turfgrass

Career Readiness, Life Literacies, & Key Skills

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
TECH.9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
TECH.9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

Diverseity, Equity, and Inclusion

LGBTQ and Disabilities Mandate

LGBTQ+ leaders in turf management, it's important to acknowledge that individuals from diverse backgrounds, including the LGBTQ+ community, are making significant contributions to the field.

The turf management industry, like many others, is becoming increasingly inclusive and supportive of LGBTQ+ individuals. As the industry continues to evolve, it's likely that more LGBTQ+ professionals will emerge as leaders in various roles, from superintendents and researchers to educators and industry advocates.

To promote diversity and inclusion in the turf management industry, organizations like the Golf Course Superintendents Association of America (GCSAA) and the Sports Turf Managers Association (STMA) have taken steps to create more inclusive environments. These organizations have implemented policies and initiatives to combat discrimination and promote a welcoming atmosphere for all.

It's crucial to recognize and celebrate the contributions of LGBTQ+ individuals in the turf management industry. By fostering an inclusive and supportive environment, we can encourage more people from diverse backgrounds to pursue careers in this field and contribute to its continued growth and innovation.

Climate Change

Climate change is a major challenge facing landscape architecture and design. Landscape architects are increasingly incorporating climate change considerations into their work to create more resilient and sustainable environments.

Here are some ways landscape design is responding to climate change:

Mitigation Strategies:

- **Carbon Sequestration:** Planting trees and other vegetation that absorb carbon dioxide from the atmosphere.
- **Sustainable Materials:** Using materials with low environmental impact and recycled content.
- **Water Conservation:** Implementing water-saving techniques like rainwater harvesting and efficient irrigation systems.
- **Green Roofs and Walls:** Creating green spaces on rooftops and walls to reduce urban heat island effects and absorb stormwater.

Adaptation Strategies:

- **Resilient Landscapes:** Designing landscapes that can withstand extreme weather events like droughts, floods, and heatwaves.
- **Biodiversity Conservation:** Protecting and restoring ecosystems to maintain biodiversity and ecosystem services.
- **Community Engagement:** Involving communities in the design process to ensure that their needs and priorities are considered.

Additional Resources:

- **American Society of Landscape Architects (ASLA) Climate Change Resources:** https://www.asla.org/climateaction.aspx
- **The Landscape Institute Climate Change Position Statement:**

https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2021/04/12510-LANDSCAPE-2030_v6.pdf

By incorporating climate change considerations into landscape design, we can create more sustainable and resilient communities for the future.

Turfgrass management and climate change

Show drafts

Climate change is significantly impacting turfgrass management, presenting both challenges and opportunities. Here's a breakdown of how climate change is affecting turfgrass and management strategies:

Challenges:

- **Increased Temperature Stress:** Rising temperatures can lead to heat stress, causing turfgrass to turn brown and go dormant. This can impact the aesthetics and playability of turfgrass areas.
- **Altered Precipitation Patterns:** Changes in rainfall patterns, including more frequent and intense storms or longer droughts, can disrupt the delicate balance of moisture needed for healthy turf.
- **Increased Pest and Disease Pressure:** Warmer temperatures and altered humidity levels can create favorable conditions for pests and diseases, making it harder to control them.
- **Soil Compaction:** Intense rainfall events can lead to increased soil compaction, hindering root growth and water infiltration.

Management Strategies:

- **Selecting Climate-Resilient Turfgrass Varieties:** Choosing turfgrass varieties that are better adapted to local climate conditions, including heat tolerance, drought resistance, and disease resistance.
- **Efficient Irrigation:** Implementing efficient irrigation systems to minimize water usage while ensuring adequate moisture for the turf. This may include using smart controllers, soil moisture sensors, and weather-based irrigation.
- **Proper Mowing Practices:** Maintaining proper mowing heights and sharp mower blades to reduce stress on the turf and promote healthy growth.
- **Soil Health Management:** Improving soil health through practices like aerification, topdressing, and organic matter additions to enhance water infiltration, nutrient retention, and microbial activity.
- **Nutrient Management:** Applying fertilizers strategically to avoid excess nutrient runoff and pollution.
- **Integrated Pest Management (IPM):** Using a combination of cultural, biological, and chemical control methods to manage pests and diseases in a sustainable way.
- **Reduced Chemical Inputs:** Minimizing the use of pesticides and herbicides to protect the environment and human health.

Additional Considerations:

- **Carbon Sequestration:** Turfgrass can act as a carbon sink, absorbing carbon dioxide from the atmosphere. Proper management practices can enhance this carbon sequestration potential.
- **Urban Heat Island Effect:** Turfgrass can help mitigate the urban heat island effect by providing cooling and shade.

By adopting these strategies, turfgrass managers can help ensure the health and sustainability of turfgrass in the face of climate change. It's important to stay informed about the latest research and best practices to adapt to changing conditions.

Asian American Pacific Islander Mandate

Holocaust

Amistad Mandate

Inter-Disciplinary Connections

- 10. English Language Arts
- 10.8.12. Science and Technical Subjects: 9-12
- 10.8.12.SC12. Science and Technical Subjects: 11-12
- 10.8.12.SC12.3. 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.
- RST.11-12.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
- RST.11-12.2. Determine the central ideas, themes, 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.11-12.3. 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.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK

- Philadelphia Flower Show
- NJ State Horticultural Expo
- Student Compete in (CDE)
- Greenhouse Aquaponic
- Greenhouse Hydroponics

- Choose grass types based on climate zone
- conferencing
- inquiry based learning
- Landscape Design Presentation
- acronyms
- cooperative learning
- Guided Practice
- Identify grass types
- Individual Projects
- Install Landscape Design
- Participate in CDE'S - Career Development Events
- Presentations
- Problem Solving

Modifications

ELL Modifications

- Choice of test format (multiple-choice, essay, true-false)
- Continue practicing vocabulary
- Provide study guides prior to tests
- Read directions to the student
- Read test passages aloud (for comprehension assessment)
- Vary test formats

504 and IEP Accommodations & Modifications

- Allow for redos/retakes
- Assign fewer problems at one time (e.g., assign only odds or evens)
- Differentiated center-based small group instruction
- Extra time on assessments
- Highlight key directions
- If a manipulative is used during instruction, allow its use on a test
- Opportunities for cooperative partner work

- Provide reteach pages if necessary
- Provide several ways to solve a problem if possible
- Provide visual aids and anchor charts
- Test in alternative site
- Tiered lessons and assignments
- Use of a graphic organizer
- Use of concrete materials and objects (manipulatives)
- Use of word processor

Gifted and Talented Modifications

- Alternate assignments/enrichment assignments
- Enrichment projects
- Extension activities
- Higher-level cooperative learning activities
- Pairing direct instruction with coaching to promote self-directed learning
- Provide higher-order questioning and discussion opportunities
- Provide texts at a higher reading level
- Tiered assignments
- Tiered centers

At Risk

- Additional time for assignments
- Adjusted assignment timelines
- Agenda book and checklists
- Answers to be dictated
- Assistance in maintaining uncluttered space
- Books on tape
- Concrete examples
- Extra visual and verbal cues and prompts
- Follow a routine/schedule
- Graphic organizers
- Have students restate information
- No penalty for spelling errors or sloppy handwriting
- Peer or scribe note-taking
- Personalized examples
- Preferential seating
- Provision of notes or outlines

- Reduction of distractions
- Review of directions
- Review sessions
- Space for movement or breaks
- Support auditory presentations with visuals
- Teach time management skills
- Use of a study carrel
- Use of mnemonics
- Varied reinforcement procedures
- Work in progress check

Formative Assessment

- Class Discussion
- Group Work
- Guided Practice
- Oral Response
- Performance Assessment
- Teacher Observation

Alternative Assessments

Alternative assessments:
Performance tasks
Project-based assignments
Problem-based assignments
Presentations
Reflective pieces
Concept maps
Case-based scenarios
Portfolios

Summative Assessment

- MPA
- Performance Assessment
- Unit Assessment

Benchmark Assessments

Benchmark Assessments:
Skills-based assessment
Reading response
Writing prompt
Lab practical

Resources & Materials

- Teacher's Supplemental Website
- Unit Specific Power Point Presentation
- United Streaming (Related Videos)

Technology

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.12.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.