

# NTSI 2026

## Practicum Overview



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## Overview

The practicum section of the Turfgrass Science Invitational is designed to test the hands-on and observational skills of the participants in their preparation to demonstrate the skills needed to be successful in the golf course maintenance industry.

Practicums should be carried out in an area large enough to display specimens & and work through tasks, as well as large and small equipment staged with space for students to move to each within the allotted time. Space for demonstration practicums should be chosen based on significant impact to space from repeated use of tools. Nursery greens and practice fields that can handle probing, cutting, and traffic are ideal spaces.

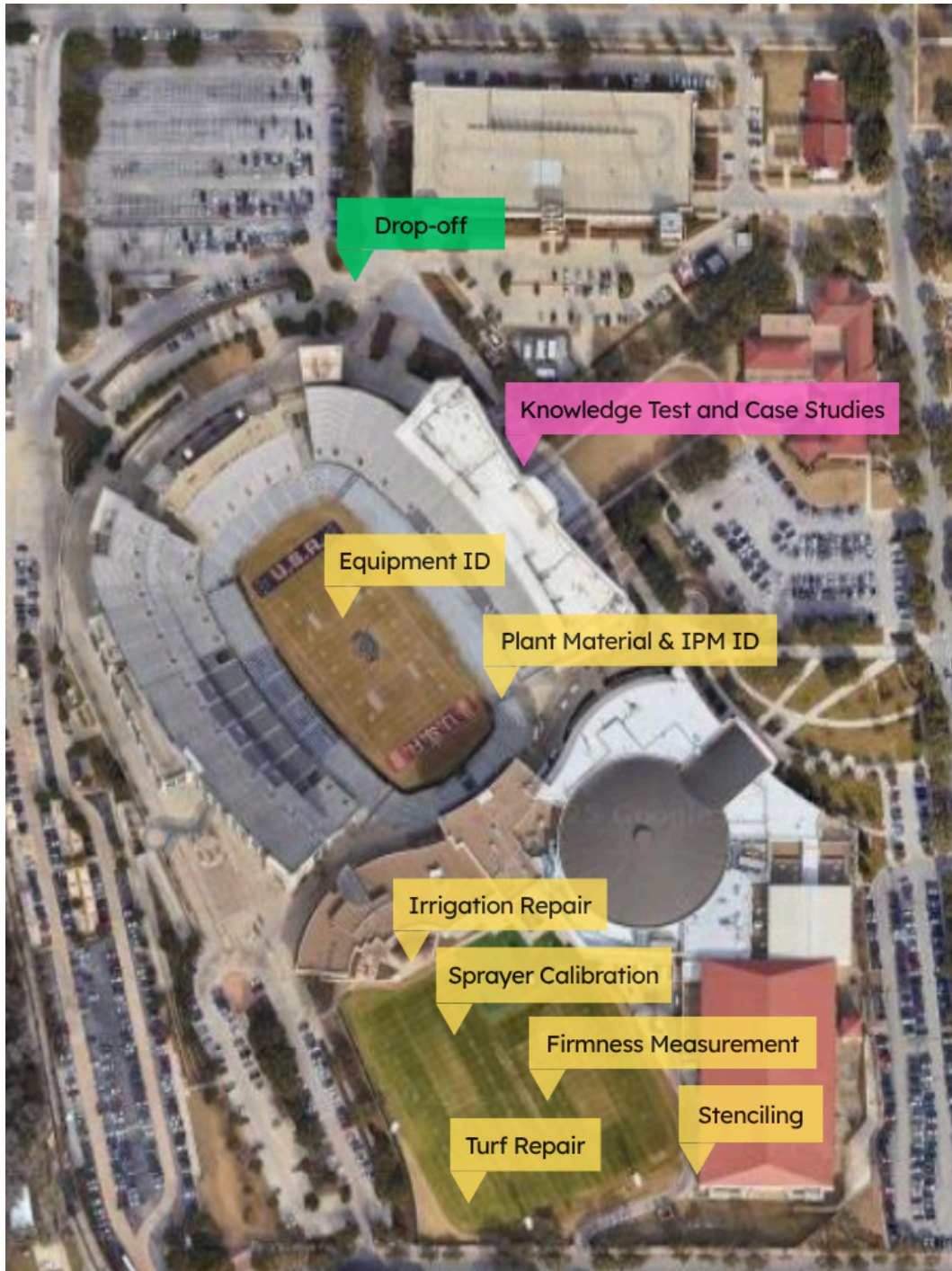
- A. Participants will complete three identification-based practicums:
  - a. Turfgrass Identification
  - b. Equipment Identification
  - c. Integrated Pest Management (IPM) Identification
- B. Participants will rotate through 20 samples within each practicum with specimens, equipment, and items displayed for each student to observe and identify. Students should take 20 seconds at each station. After 20 minutes, students will complete all three identification practicums.
- C. Following the identification practicums, participants will rotate through 5 skill-based practicums that include:
  - a. Stenciling
  - b. Firmness Measurement
  - c. Turf Repair
  - d. Irrigation Repair
  - e. Sprayer Calibration

\*Practicums in case of inclement weather

  - f. Field layout
- D. Participants will have 20 minutes at each practicum station to complete the task. Each participant will be observed by a judge who will use the rubric for each practicum to score the participant's ability to quickly, efficiently, and safely complete each task.
- E. Participants will turn in a recording card for identification stations and judges at demonstration stations will submit a score card to combine with the recording card to complete the practicum portion of the contest.



## Practicum Layout



\*Stencil where turf repair is, turf repair slide to right. ID over by red building synthetic drive



## Practicum 1 - Stenciling

(20 minutes)

Playing Surface Set-up (100 points, 200 team points)

*Participants will demonstrate safe, efficient, and accurate completion of a task related to the setup of a logo for application on a game field.*

- Each participant will be allowed 20 minutes to complete this phase.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### -Layout and apply a logo using stencil-

Athletic fields play host to sporting events. In addition to hosting teams with branding, the field must provide a surface that is consistent with the rules of the sport using the field. From paint to chalk, we use materials to define the boundaries as well as the colors and names of the teams. What separates organized competitions from other forms of the sport are fields that are prepared to refereed play. Your challenge will be to test a new stencil that will be used to prepare a football field for play in an official competition.

#### Equipment Required:

- Stencil
- “Painting” material
- Towels
- Measuring tape
- Stakes

#### Grading:

Item	Superior Evidence of Skill (5-4)	Satisfactory Evidence of Skill (3-2)	Unsatisfactory Evidence of Skill (1-0)	Multiplier	Points
Stencil Placement	Stencil is placed exactly according to alignment directive on-site by the manager	Stencil is placed nearly exactly according to alignment directive on-site by the manager	Stencil is not placed near the specified alignment directive on-site by the manager		
Stencil Layout	Stencil is laid out in a timely manner and secured properly to ensure no wrinkles	Stencil is laid out in a fairly timely manner and secured properly to ensure very little wrinkling	Stencil is not laid out in a timely manner and secured improperly or has visible wrinkles		
Dot application	Every dot on the stencil is filled in filled in with paint	Nearly every dot is filled in with paint	Most or less than most dots are filled in with paint	x2	
Line connection	All dots are connected to create professional-looking lines	All dots are connected to create visible lines	Less than most dots are connected and lines are not visible	x2	
Professionalism	All materials are handled safely and efficiently and no disturbance to the turf is visible	All materials are handled safely and minimal disturbance to the turf is visible	Not all materials are handled safely and disturbance to the turf is visible		
				Total	



## Practicum 2 - Measuring Firmness

(20 minutes)

Playing Surface Evaluation (100 points, 200 team points)

*Participants will demonstrate efficient and accurate use of a Clegg Impact Soil Tester to measure firmness on a playing surface.*

- Each participant will be allowed 20 minutes to complete this phase.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### -Measure firmness with a Clegg Impact Soil Tester-

The primary use of an athletic field is to host the playing of sporting events. The most important quality of the field however is that it is a safe surface for use by the athletes. Field conditions may vary depending on weather but the firmness of the field should always be evaluated before a competition. If the field is too firm, it will lead to a higher likelihood of injury to athletes. Too soft, and it may also lead to injuries as well as turfgrass damage beyond a simple repair. Your challenge will be to quantitatively evaluate the firmness of an athletic field and provide a recommendation that dictates management and approval for play.

#### Equipment Required:

- Clegg Impact Soil Tester
- Utility marking flag (>50)

#### Grading:

Item	Superior Evidence of Skill (5-4)	Satisfactory Evidence of Skill (3-2)	Unsatisfactory Evidence of Skill (1-0)	Multiplier	Points
Tool selection	Correct tool is chosen for firmness measurement	Multiple tools are chosen to try and collect just firmness readings	Incorrect tool is chosen to collect inappropriate data		
Tool use	Tool is used correctly with visible proof of practice and proficiency	Tool is used correctly with some proof of practice and minimal guidance	Tool is used incorrectly with little to no visible proof of practice and significant guidance is needed		
Data Collection	Collection of firmness values is done quickly and efficiently with collection at each marked area	Collection of firmness values is done fairly quickly and efficiently with collection at each marked area	Collection of firmness values is done slowly and or inefficiently with collection at most each marked area		
Data points	All data points reported are within an acceptable range according to values taken by the manager	Nearly all data points reported are within an acceptable range according to values taken by the manager	Some data points reported are outside of an acceptable range according to values taken by the manager	x2	
Professionalism	All tools are used with no damage or visible disruption to the turf	All tools are used with no damage or very little visible disruption to the turf	Damage to the tool or disruption to the turf is visible		
				Total	



## Practicum 3 - Turf Repair

(20 minutes)

Field Maintenance (100 points, 200 team points)

*Participants will demonstrate safe, efficient, and complete repair of a damaged turf area using tools relevant to plugging a sod surface.*

- Each participant will be allowed 20 minutes to complete this phase.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### -Plug out damaged turf-

Turfgrass is a special member of the plant kingdom, defined by its resilience to traffic and ability to recover after damage. Oftentimes however, we ask our athletic fields to host competitions more frequently than the ideal window of time needed for turfgrass recovery. Additionally, some areas sustain damage that requires repair beyond what the new growth of the turfgrass can manage. In these cases, we remove parts of the field to swap out for healthy turfgrass. Your challenge will be to identify an area in need of maintenance, and both plug that area out and replace the damaged area with new material.

#### Equipment Required:

- Hexagonal plugger
- Cup cutter & Sod knife
- Soil (sand and field substrate)
- Tamp
- Towel

#### Grading:

Item	Superior Evidence of Skill (5-4)	Satisfactory Evidence of Skill (3-2)	Unsatisfactory Evidence of Skill (1-0)	Multiplier	Points
Tool selection	Correct tool is chosen for turf repair	Multiple tools are chosen to try and repair the turf	Incorrect tools are chosen to repair the turf		
Site selection	Site for repair is chosen quickly and correctly according to observed turf quality	Site for repair is chosen correctly according to observed turf quality	Site for repair is chosen slowly and or incorrectly according to observed turf quality		
Tool use	Tool is used correctly with visible proof of practice and proficiency	Tool is used correctly with some proof of practice and minimal guidance	Tool is used incorrectly with little to no visible proof of practice and significant guidance is needed		
Removal & Replacement	Damaged turf is efficiently removed and a new plug is installed with little to no disruption to the surrounding turf	Damaged turf is removed and a new plug is installed with small disruption to the surrounding turf	Damaged turf is inefficiently removed and a new plug is installed with significant disruption to the surrounding turf	x2	
Professionalism	Area is at the quality needed for play on the repair.	Area is close to the quality needed for play on the repair.	Area is not at the quality needed for play on the repair.		
				Total	



## Practicum 4 - Irrigation Repair

(20 minutes)

Field Maintenance (100 points, 200 team points)

*Participants will demonstrate safe, efficient, and accurate construction of a swing joint assembly for application of irrigation water.*

- Each participant will be allowed 10 minutes to complete this phase.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### -Swing Joint Construction-

Swing joints are a critical part of an irrigation system for athletic fields. These components are the intermediary between the primary lines of the system and the irrigation heads. While athletic fields are typically very consistent in grade and material depth, sometimes the joints are built so that they can be adapted to a placement for a variable depth. Additionally, they can incur damage from time to time and must be repaired. Your challenge will be to assemble a “dry” version “unglued” of a complete swing joint to be installed in the system on a practice field.

#### Equipment Required:

- PVC pipe straight sections
- PVC pipe joints
- Irrigation head
- Wrench
- Plumbers tape

#### Grading:

Item	Superior Evidence of Skill (5-4)	Satisfactory Evidence of Skill (3-2)	Unsatisfactory Evidence of Skill (1-0)	Multiplier	Points
Component Selection	All of the needed components are chosen, leaving components that are not needed for system construction	Most all of the needed components are chosen, and very little components that are not needed for system construction are included	Only some of the needed components are chosen, and components that are not needed for system construction are included		
Assembly	All components needed to build a swing joint with irrigation head are assembled demonstrating extensive familiarity with the system and use	All components needed to build a swing joint with irrigation head are assembled demonstrating some familiarity with the system and use	Not all components needed to build a swing joint with irrigation head are assembled, demonstrating a lack of familiarity with the system and use	x2	
Timing	All components are assembled quickly and efficiently leaving time to troubleshoot	All components are assembled quickly and efficiently but left no time to troubleshoot	Not all components are assembled by the end of the time provided		
Professionalism	All tools and components are free of any damage	All tools and components are nearly free of any damage	Some tools and components are damaged		
				Total	



## Practicum 5 - Calibration

(20 minutes)

Equipment Operation (100 points, 200 team points)

*Participants will demonstrate efficient and accurate calibration and set-up of a boom sprayer for an input application.*

- Each participant will be allowed 20 minutes to complete this phase.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### -Sprayer Calibration-

Using a boom spraying makes the application of flowable inputs both easy and precise. To ensure a safe and accurate application however, the mechanism for application must be calibrated to deliver the exact amount intended per area of interest. From speed to amount/minute, each component of the spray rig must be evaluated. Your challenge will be to calibrate a spray rig according to the rates directed by the label for a specific input needed for application on a football field.

#### Equipment Required:

- Measuring pitcher
- Measuring tape
- 

#### Grading:

Item	Superior Evidence of Skill (5-4)	Satisfactory Evidence of Skill (3-2)	Unsatisfactory Evidence of Skill (1-0)	Multiplier	Points
Nozzle type identification	Correct nozzle is identified with all pertinent information included to communicate type and use	Correct nozzle is identified with some pertinent information included to communicate type and use	Correct nozzle is not identified and pertinent information to communicate type and use are missing		
GPM calculation	Gallons per minute are calculated within .5 gallons of actual application amount during demo	Gallons per minute are calculated within 1.5 gallons of actual application amount during demo	Gallons per minute are calculated outside of 2 gallons of actual application amount during demo	x2	
Problem layout	Application problem based on nozzle type and desired rate is laid out; demonstrating familiarity and mastery of calculation needed	Application problem based on nozzle type and desired rate is laid out; demonstrating some familiarity of calculation needed	Application problem based on nozzle type and desired rate is not laid out; demonstrating a lack of familiarity and mastery of calculation needed		
Problem solution	Problem solution is within 5% of correct application answer	Problem solution is within 6-10% of correct application answer	Problem solution is outside of 10% of correct application answer	x2	
Professionalism	All materials are handled safely and no wear is inflicted	All materials are handled safely and very little wear is inflicted	Not all materials are handled safely and damage is inflicted		
				Total	



## Practicum 6 - Plant Material ID

(20 minutes)

### Identification (50 points, 200 team points)

*Participants will demonstrate efficient and accurate identification of warm season turfgrass, cool season turfgrass, and native plant types based on prepared knowledge.*

- Each participant will be allowed 10 minutes to complete this phase.
  - All specimens will be set out on tables for review.
  - Participants will rotate through each station at their own pace.
  - Participants will be allowed to study the specimen with Magnifying glass and may use forceps to manipulate a small sample of the specimen to inspect specific plant parts.
  - Participants will need to rotate through and identify all specimens by the conclusion of the 20 minutes.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed

### **-Identify various types of plant materials found on a football field-**

For thousands of years, turfgrasses have been used as low growing groundcover with cultural, strategic, and sporting value. Modern turfgrass varieties have a myriad of uses including and not limited to the protection of the playing surface for golf. From construction to maintenance, selecting the best suited and appropriate grass for a specific area on the golf course is both a complicated and essential duty for a builder. Selecting the right turfgrass can save a superintendent countless hours of labor and significant amounts of money on inputs. Your challenge will be to identify warm-season, cool-season, and native turfgrass species.

### **Equipment Required:**

- Magnifying glass
- Forceps
- Recording card

### **Grading:**

Item	% of Practicum	Multiplier	Points
Identification of Warm Season Grass	40	x2	
Identification of Cool Season Grass	40	x2	
Identification of Native Plant Species	20		
Total			



## Practicum 7 - Equipment ID

(20 minutes)

### Identification (50 points, 200 team points)

*Participants will demonstrate efficient and accurate identification of equipment used to maintain athletic fields based on prepared knowledge.*

- Each participant will be allowed 10 minutes to complete this phase.
  - All equipment will be set out for review.
  - Participants will rotate through each station at their own pace.
  - Participants will be allowed to study the equipment but will not be allowed to turn the equipment on, climb on, or operate any piece of equipment.
  - Participants will need to rotate through and identify all equipment by the conclusion of the 20 minutes.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### **-Identify the Equipment Needed to Maintain a Football Field-**

The field conditions we enjoy today depend on highly specialized equipment. The equipment needed to maintain the grass on a modern football field are extremely sharp, finely tuned, and constantly evolving. Additionally, highly specialized tools, vehicles, and instruments help Field Managers sustainably manage playing surfaces for the best athlete experience. Your challenge will be to identify every tool that is used to maintain a football field for elite play.

### **Equipment Required:**

- Recording card

### **Grading:**

Item	% of Practicum	Points
Reel mower Walk behind aerator Sand pro/ skin drag 1 ton roller Paint rig Air2g2 Turbine blower Moisture Meter (i'll source the USGA one) Sheer strength tester Back blower Stick edger Sod cutter Verticutter/ unirake Turf blankets and dirt tarp (decipher between two) Bu-10 grow light Walk behind rotary spreader Walk behind drop spreader Tamp Specific shovel used to help clear out old clay for building mounds/home plate Hose & nozzle	100	
Total		



## Practicum 8 - IPM ID

(20 minutes)

### Identification (50 points, 200 team points)

*Participants will demonstrate efficient and accurate identification of insects, disease, and weeds found on and around an athletic field using prepared knowledge.*

- Each participant will be allowed 20 minutes to complete this phase.
  - All specimens will be set out for review.
  - Participants will rotate through each station at their own pace.
  - Participants will be allowed to study the specimens but will not be allowed to open the specimen container unless a sample is set out specifically for Participants to manipulate.
    - Manipulable samples will be noted with a sign.
  - Participants will need to rotate through and identify all specimens by the conclusion of the 20 minutes.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### **-Identify the various types of pests found on a football field-**

Field Managers and their staff work diligently to provide the safest and highest quality playing conditions possible; however, proper field management today also requires not only maintaining turf, but also conserving natural resources and protecting the environment. The goal for any manager is to reduce while still providing the best playing surface possible. Your challenge will be to identify the pests that a field manager may encounter and treat for through cultural and chemical strategies.

### **Equipment Required:**

- Magnifying glass
- Forceps
- Recording card

### **Grading:**

Item	% of Practicum	Multiplier	Points
Identification of Insects	35		
Identification of Diseases	35		
Identification of Weeds	30		
Total			



## Practicum 9 - [alternative to plugging]

(20 minutes)

Field Preparation (100 points, 200 team points)

*Participants will demonstrate efficient and accurate layout of a field for a football practice.*

- Each participant will be allowed 20 minutes to complete this phase.
- All tools and resources required for the practicum will be at the site.
- The use of cell phones for this practicum will not be allowed.

### -Layout a field for a football practice-

Football is played on a field that is a consistent size according to the rules of the game from the organization that runs each level of competition. To ensure fairness for all competitors, the fields are laid out to exact specifications. Sometimes however, coaches will request that field managers set up custom field sizes for practice situations. These fields vary in size, but maintain proper right angles for fair play. Your challenge will be to set up a field for a practice drill according to the specifications provided by the football coach.

#### Equipment Required:

- Measuring tape
- Stakes

#### Grading:

Item	Superior Evidence of Skill (5-4)	Satisfactory Evidence of Skill (3-2)	Unsatisfactory Evidence of Skill (1-0)	Multiplier	Points
Orientation of Field	Field is oriented exactly to the directive of the field manager	Field is oriented very closely to the directive of the field manager	Field is not oriented to the directive of the field manager		
Specifications	Field is laid out using specifications provided by field manager and both length and width are within 6 inches of specified values	Field is laid out using specifications provided by field manager and both length and width are within 1ft of specified values	Field is laid out using specifications provided by field manager and both length and width are outside of 1ft of specified values	x2	
Squariness	All field corners are squared using pythagorean theorem	Most field corners are squared using pythagorean theorem	All field corners are not square and visible distortion is present	x2	
Timing	Field is laid out with time left over to check for specifications and squareness	Field is laid out with little time left over to check for specifications and squareness	Field is partially laid out or laid out with no time left over to check for specifications and squareness		
Professionalism	Field is laid out with no disruption to surface	Field is laid out with minimal disruption to surface	Field is laid out with some disruption to surface		
Total					



## References

### Practicum 1

<https://www.youtube.com/watch?v=YR4TWnhQFYs>

<https://sportsfieldmanagementonline.com/2020/07/29/five-keys-to-field-stencils/11794/>

<https://sportsfieldmanagementonline.com/2009/05/26/logo-and-other-field-painting-tips-from-a-top-pro/5096/>

### Practicum 2

[https://www.sportsfieldmanagement.org/wp-content/uploads/2017/11/Field\\_Hardness-FINAL-2.pdf](https://www.sportsfieldmanagement.org/wp-content/uploads/2017/11/Field_Hardness-FINAL-2.pdf)

<https://www.youtube.com/watch?v=8Q9GK9cl7B8>

### Practicum 3

[https://www.youtube.com/watch?v=yUEzOpZdg\\_4](https://www.youtube.com/watch?v=yUEzOpZdg_4)

### Practicum 4

<https://www.youtube.com/watch?v=em1ev83pW7k&t=238s>

<https://www.hunterirrigation.com/support/sj-swing-joint-installation>

### Practicum 5

<https://www.sportsfieldmanagement.org/wp-content/uploads/2017/11/Boom-Sprayer-Calibration-FINAL.pdf>

<https://www.youtube.com/watch?v=poesaVUL1xw>

### Practicum 6

<https://extension.psu.edu/the-cool-season-turfgrasses-identification>

<https://aggieturf.tamu.edu/texas-turfgrasses/>



### Practicum 7

[https://www.standardgolf.com/equipment/greens/maintenance-turf/?srsId=AfmBOor\\_kZm50DMSrBSv-hTGqVaVsxBO\\_5Qikf87Sr6Fp9nIJHFk0wVZ\\_](https://www.standardgolf.com/equipment/greens/maintenance-turf/?srsId=AfmBOor_kZm50DMSrBSv-hTGqVaVsxBO_5Qikf87Sr6Fp9nIJHFk0wVZ_)

<https://1stproducts.com/blog/how-to-build-the-ultimate-turf-management-equipment-setup/>

<https://sturf.lib.msu.edu/article/2011dec32a.pdf>

### Practicum 8

<https://turf.cals.cornell.edu/pests-and-weeds/insect-management/>

<https://extension.entm.purdue.edu/publications/E-61.pdf>

<https://turfpathology.ces.ncsu.edu/turfgrass-diseases/>

<https://buckeyeturf.osu.edu/TurfWeedID>

<https://www.tnturfgrassweeds.org/factsheets>

### Practicum 9

[https://www.sportsfieldmanagement.org/knowledge\\_center/sports-field-dimensions/](https://www.sportsfieldmanagement.org/knowledge_center/sports-field-dimensions/)

[https://www.youtube.com/watch?v=WSiH1J\\_y1f4](https://www.youtube.com/watch?v=WSiH1J_y1f4)

