

**Please note: These minutes are pending Board approval.  
Board of Education  
Newtown, Connecticut**

Minutes of the Board of Education meeting held on December 6, 2022, at 7:00 p.m. in the Council Chambers, 3 Primrose Street.

D. Zukowski, Chair	C. Melillo
J. Vouros, Vice Chair (absent)	A. Uberti
D. Ramsey, Secretary	T. Vadas
D. Cruson (absent)	5 Staff
J. Kuzma (absent)	3 Public
J. Larkin	
A. Plante	
K. Kunzweiler (absent)	
D. Godino	

Ms. Zukowski called the meeting to order at 7:03 p.m.

Item 1 – Pledge of Allegiance

Item 2 – Consent Agenda

MOTION: Mrs. Plante moved that the Board of Education approve the consent agenda which includes the donation to Sandy Hook School and the correspondence report. Mr. Ramsey seconded. Motion passes unanimously.

Item 3 – Public Participation

Item 4 – Reports

Chair Report: Ms. Zukowski reported that there are three ad hoc committees coming up soon. In addition, there are two contract negotiations along with a committee related to the recently adopted teacher's contract to discuss the categorizations of extracurricular activities. Ms. Zukowski asked the Board to let her know if they have time to join and also thanked those who already reached out to her. Ms. Zukowski ended her report by reminding the Board that it was the start of Mr. Melillo's sixth month as Superintendent. She thanked him for exceeding her expectations and his leadership.

Superintendent Report: Mr. Melillo highlighted the winter concerts that are currently happening this week. He encouraged the community to go out and support the Arts in Newtown. Mr. Melillo also reminded the community that the cold and flu season is upon us. There has been a large uptick in Newtown, especially at the high school. He asked everyone to take precautions and avoid contact with people if you are feeling sick.

Committee Reports:

Mr. Ramsey reported on the Social Emotional Health & Wellness meeting on behalf of Mrs. Kuzma. The committee met on Monday with a presentation by Marc Michaud who teaches Project Adventure at Newtown Middle School. The presentation was very informative and the committee benefited greatly from the discussions around what Project Adventure is doing for the students. The committee agreed that it would be a good idea for this course to be presented to the entire Board. The committee also discussed the goals of the committee and agreed to continue with monthly meetings.

Mr. Ramsey reported on the Communications meeting. The committee agreed to continue with monthly meetings. The upcoming newsletter will focus on the budget process and will help the

Newtown communities understand the process and some of the encumbrances we are facing with the economic times that we find ourselves in.

Mrs. Plante reported that December is Kindness Month at Hawley. Children are reading books about kindness and recognizing acts of kindness around the school. Their Kindness Assembly is Friday, December 23<sup>rd</sup> at 9:15 am. It will be at Reed and students from Sandy Hook will travel over to Reed and they will all participate in the assembly. The assembly will consist of songs and a special surprise guest at the end.

#### Student Representative Report:

Mr. Godino reported that the Newtown high School Tools for Living class visited the Prospected Theater in Ridgefield for a service-learning field trip. They learned about the theater's mission to provide employment to those with disabilities. Newtown High School also welcomes many new students into the National Honor Society at this year's inductions. Students put on a fantastic show with their student-directed performance of "Almost Maine". Mr. Godino congratulated everyone on a job well done.

#### Item 5 – Presentations

##### First Read of AP Calculus A/B and AP Calculus B/C:

Mr. Hall presented the curriculum for AP Calculus AB and BC. He focused on the pathways to get to these courses along with each unit in the courses.

Mr. Ramsey thanked Mr. Hall for the presentation. He loved hearing the enthusiasm in Mr. Hall's voice when speaking about these courses. Mr. Ramsey also finds it very noteworthy that Newtown has so many students that can achieve this high-level math. He believes it is a credit to our elementary, intermediate, and middle school programs as well.

Mr. Hall agrees. He noted that they have programs all the way down to kindergarten. In 6<sup>th</sup> and 7<sup>th</sup> grade, they separate the children to form their pathways to high level math. However, there are many different pathways that can occur.

Ms. Zukowski was impressed to find out that some juniors are taking these courses. She asked if Newtown is implementing an AP course that is completely conformant to the College Board requirements.

Dr. Longobucco reminded Ms. Zukowski that the courses meet the requirements, however, not all the courses that were discussed are AP courses.

Ms. Zukowski understood.

Ms. Zukowski asked what courses are offered as seniors for the students who start these courses as sophomores.

Mr. Hall said that they can take AP Statistics, AP Computer Science A, Multivariable Calculus and starting next year, Newtown will offer Differential Equations.

Mr. Melillo noted that he was most impressed with the passion Mr. Hall had for teaching these courses and speaking about them to the Board.

#### Special Education Overview:

Mrs. Mailloux-Petersen, Director of Special Education, Ms. Raquel, Supervisor of Elementary Special Education and Preschool, and Ms. Hall, Supervisor of Intermediate Special Education presented an update on Special Education in Newtown Public Schools.

Mrs. Plante asked what the different pathways are for a student to receive an evaluation. Also, what the typical timeframe is.

Mrs. Mailloux-Petersen answered that the school or a parent can refer a student for an evaluation. Once the Special Education department has it in writing, they will meet within two weeks to review all of the information and data that is given to them. If the decision has been made to move forward, consent from the parents is required. They need to have the evaluation done within forty days to then have a PPT and implement the student's IEP. The parents have an additional five days to review the IEP to determine if they agree or not.

Mr. Ramsey thanked them for their presentation. He asked if there is any interaction between the TAP program and the Special Education department.

Mrs. Mailloux-Petersen answered that she does not oversee the TAP program but there is a Special Education teacher and school psychologist attached to the program for students.

Mr. Ramsey asked if the TAP program has the support of Special Education personnel.

Mrs. Mailloux-Petersen said that they do.

Mr. Ramsey asked how the teachers handle the process of collecting the data and the balance between data collection and being able to teach the class.

Mrs. Mailloux-Petersen answered that data collection is a big part of their job. The supervisors offer a lot of professional development to those who need help with collecting data.

Lastly, Mr. Ramsey asked how the PPT meetings are going.

Mrs. Mailloux-Petersen said that it depends on the situation. Last year, they had over 1700 PPTs with two parents who filed a claim with the state. One claim was dropped and the other one had a very minor correction and was closed. PPTs are about communication, and she feels they are doing a good job.

Mrs. Larkin asked if student's data for parents has to specifically be outlined in their child's IEP to receive it.

Ms. Raquel said that there have been times when parents have requested it and they have recorded it, but it is not necessarily in the IEP. However, going forward with the new IEP framework there will be a schedule of progress monitoring so when the teacher checks on the student's progress it will now be recorded in the IEP.

Mrs. Mailloux-Petersen said that the State of Connecticut required all Districts, as of July 1, to use a new platform for writing student's IEP. Districts were not trained until after July 1 and there are a lot of glitches.

Ms. Raquel added that it is not a requirement to the IEP to reflect the frequency of progress monitoring and how frequently a parent would receive it. What is required of the IEP is the method of the data collection and the criterion for mastery. If a parent would like to see more progress reports, parents can bring the request to the PPT.

Mrs. Larkin asked if it was possible to get more staff to be Wilson trained.

Mrs. Mailloux-Petersen said that she offers the training to the staff. It is a year long commitment and it is voluntary.

Mrs. Larkin asked for ways to help parents understand the IEP process and progress monitoring.

Mrs. Mailloux-Petersen said that the process would start with the school psychologist or teacher reaching out to the parent's about doing an evaluation. Once they are identified, the student has a case manager, and the parents can reach out directly to them if they have questions or concerns.

Mrs. Larkin asked if all the issues in the self-study were addressed from 2019.

Mrs. Mailloux-Petersen said that all issues were addressed. More specifically, more teachers have been trained in Wilson and all staff has been trained in confidentiality. Staffing was an issue and continues to be.

Mrs. Plante asked if the shortage of behavior therapists affected services for the students.

Mrs. Mailloux-Petersen said that it has not been affected and they are using an outside service.

Mr. Ramsey offered his deepest gratitude to the special education staff. He believes the staff truly is superhuman in their care and concern for their students.

Mrs. Mailloux-Petersen agreed that Newtown has the best staff.

Mr. Melillo commented that as a parent of a child with an IEP, he can understand Mrs. Larkin's question about helping parents navigate the process. It can become overwhelming and worrisome.

Mrs. Mailloux-Petersen understands the concern and welcomes any parent with concerns or questions to reach out directly to her or one of the supervisors. It can be a confusing process and it is best to get all the questions answered at the beginning.

Mrs. Larkin praised the special education department for all their hard work.

Ms. Zukowski asked if there was a pipeline that goes from the integrated preschool to the PAL to the Rise to Tools for Living.

Mrs. Mailloux-Petersen said that it is so individualized so not necessarily.

Ms. Zukowski asked if there is an opportunity for students to take courses they are interested in and can excel. She continued to ask if this is part of the IEP process.

Mrs. Mailloux-Petersen said if the student is able to take that particular course then it is and it is discussed in the IEP.

Ms. Zukowski asked if it was possible for students to be thriving and in general education in the elementary and intermediate grades and then transition into the SAIL program in the middle school.

Mrs. Mailloux-Petersen answered that they can. Unfortunately they are seeing an uptick in the mental health area in students. The middle school level has seen the most reported cases of depression and anxiety.

Ms. Zukowski asked if there was a backlog with the evaluations from 2019-2021. She finds it counterintuitive to only have 106 students identified after a two-year gap.

Ms. Raquel said they are not delayed in their evaluations. Students were identified in the two year gap.

Ms. Zukowski noticed that after 2016, Newtown looks to be doing better than the State average. She thanked them for their hard work.

Reading Program Review/Update:

Mrs. Uberti, Assistant Superintendent, and Mrs. DiBartolo, Director of Teaching & Learning, present an overview and update on the extensive work that has been done in the district in response to the state of Connecticut's impending reading program mandate. The District is required to notify the CSDE of our intention to implement one of the approved reading programs by December 16, 2022.

Mrs. Larkin asked if the District would consider still supplementing phonics and phonemic awareness and keeping Heggerty and Foundations.

Mrs. Uberti said it would be very dependent on the program. Most of the programs are very heavily integrated so it would not make sense to do that because it would be confusing to the students and teachers.

Mrs. DiBartolo continued by saying that one of the programs they looked at was “a la carte”. They asked for the scope and sequence of the program and compared it to the Foundations. They found that in this particular program, Foundations moved at a slower pace and could be problematic.

Mrs. Uberti said that the team went into this process with the mindset that they need to keep Foundations. She believes they are less convinced now because they have seen what some of these programs can offer. Newtown has not had Foundations long enough to evaluate its effectiveness because of the timing of the implementation which was in the Covid year.

Mrs. Plante asked about the process of rolling out the pilot and asked if this will disrupt the student’s learning

Mrs. Uberti answered that they spoke to the representatives about those concerns. Some of the programs have “Pilot Teams” and one even said they would work with us to look at our i-Ready data following the January testing session to help us select units that would be beneficial to our students. Mrs. Uberti’s fear is that they would pilot two programs and find that neither program is right. She would not want to implement the program without the support of the teachers.

Mrs. Plante continued by asking how it would impact the students that have been using Teacher’s College K-2 and then switching at Grade 3.

Mrs. Uberti said the district just went through something similar with the new math program. One option is to do a slower rollout but the team came to an agreement that it is appropriate to do a K-4 implementation as long as it is fiscally possible.

Mr. Ramsey asked about the Science of Reading and how the brain learns to read. He asked if we have made significant progress in the last five years.

Mrs. DiBartolo said that she believes they are moving up. She has spoken with teachers and in cross-grade level building meetings and teachers have recognized that what they are doing is not working. Given that information, she believes that they will see that climb. We are in a really great place to enhance our reading instruction.

Mrs. Larkin is in support of implementing a new reading program. Looking forward, after meeting the mandate, Mrs. Larkin requested implementing the program to grades 5-6.

Mrs. Larkin asked how adopting a structured literacy program would impact existing IEPs that are currently written for level literacy.

Mrs. Uberti said it would be ideal if they had the 2023-2024 school year to look into rolling out to grade 5-6. Mrs. Uberti said she has a wonderful relationship with Special Education department. The District tries to include Special Education in everything with General Education. They have a meeting coming up regarding the new reading mandate.

Mrs. DiBartolo said IEPs will not change drastically in terms of the encoding and decoding. The only thing that she believes will change is that the reading comprehension could be written differently.

Ms. Zukowski asked when they would know which two resources they are thinking of going with. Mrs. Uberti said that their hope is to have that decision made in December, before the break.

Item 6 – Old Business

## Update on Strategic Plan Process:

Mr. Melillo reported that the Strategic Plan Committee is working within the guidelines of the Board to engage stakeholders and conduct the needs assessments of the District. The committee has already reviewed the results of SWOT analysis, which are the strengths, weaknesses, opportunities and threats. At the last meeting, they came together as a team and decided that is important to solicit all of our voices and engage various stakeholders in the process. The committee decided which stakeholders they wanted to bring to the table. Stakeholders would include but not limited to students, families, community members, Board members, and staff.

Mrs. Plante asked if they were on track with where they expected to be.

Mr. Melillo said that yes, they are on track. They have a very good team. It is comprised of Board members, parents, community members, and educators. And everyone seems to be on the same page.

Ms. Zukowski asked if Mr. Melillo could outline the SWOT analysis at the next Board meeting.

Mr. Melillo said that he could share the results with the Board.

## Second Read and Possible Action on Greenery 1 &amp; 2 Curriculum:

MOTION: Mrs. Plante moved that the Board of Education approve the Greenery 1 & 2 Curriculum. Mrs. Larkin seconded. Motion passes unanimously.

Item 7 – New Business

## Discussion of 2023 Board of Education Schedule of Meetings:

Ms. Zukowski said that she was concerned about the number of meetings that were held in the Reed Library because it is not as conducive to reaching our public. Unfortunately, there is not anything that can be done about that. She asked the Board to review the dates over the next couple of weeks.

## Discussion of 2023 Standing Committees:

Ms. Zukowski suggested that all the Board members look at the 2023 standing committees. There will be a broader discussion on December 20<sup>th</sup>. Ms. Zukowski also suggested thinking about the frequency with which the meetings are held.

Mrs. Larkin reminded the Board that the subcommittees were designed to have three members. In case a member could not attend, the committee would still have two remaining members and have a quorum.

MOTION: Mrs. Plante moved that the Board of Education approve the minutes of November 15, 2022. Mr. Ramsey seconded.

Mr. Ramsey moved that the Board of Education amend the minutes of the November 15, 2022 Board of Education meeting to include comments made by Mr. Ramsey regarding the Fine Arts presentation issued by Michelle Hiscovich. Comments included praise for the Covid 19 Response under difficult circumstances, the depth and authenticity of the Fine Arts Mission Statement, praise for the HEMMA program, and the positive impact of the Arts for the entire school. Mrs. Larkin seconded. Motion passes unanimously.

Vote on the main motion. Motion passes unanimously.

Item 8 – Public Participation

Dr. Vivian Koppelman, 12 Appleblossom Lane, spoke about how impressed she was with the discussions she heard at tonight's meeting. She spoke about the national assessment of the educational progress which says that the fourth and eighth grade readers have poor results. Dr. Koppelman believes tutors would be effective to help the students. There is a long road ahead to recover from the pandemic and some students have a higher mountain to climb.

MOTION: Mrs. Plante moved to adjourn. Mrs. Larkin seconded. Motion passes unanimously.

Item 9 - Adjournment

The meeting adjourned at 10:35 pm.

Respectfully Submitted,

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Donald Ramsey  
Secretary

12 Dickinson Drive  
Sandy Hook, CT 06482  
(203) 426-7657

**Sandy Hook School**

# Memo

**To:** Mr. Melillo  
**From:** Erin Ardino  
**cc:**  
**Date:** December 2, 2022  
**Re:** Donation from Curtis L Dupuis

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Sandy Hook School received the attached \$100 donation Curtis L Dupuis. This donation is to be used towards additional classroom purchases.

We are asking for approval of this donation. Once approved, we will deposit the check into the SHS Activity Account to be spent appropriately.

If you have any questions, please contact our office.

Thank you!



TO: Chris Melillo, Superintendent  
FROM: Suzanne D'Eramo, Director of Human Resources  
RE: Superintendent's Report – Staffing Update for **NOVEMBER 2022**  
DATE: December 1, 2022

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**NOVEMBER 2022**

**CERTIFIED RETIREMENTS:**

Carol Danenberg – Lead Teacher HOM (effective 1/27/23)

**CERTIFIED RESIGNATIONS:**

None

**CERTIFIED NEW HIRES:**

None

**CERTIFIED OPEN POSITIONS:**

Lead Teacher - HOM

**ADDITIONAL DISTRICT HIRING NOTES:**

Here is a recap of all certified/non-certified staff who began working in November:

Paraeducators = 2

Custodians = 2

NELC = 1

Coach = 1

Of the 6 newly hired employees, 2 indicated a diverse ethnicity or race other than white. This equates to a total of 33% broken down as follows:

Black = 1

Hispanic = 1



## AP Calculus A/B (College Board AP)

7 Curriculum Developers | Last Updated: Monday, Jun 27, 2022 by Cavataro, Charlotte

### Unit Calendar by Year

Unit	Au	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Ju																											
Lessons	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	26	27	28	29	30	31	32	33	34	35	36	37	38
Limits	0																																					
Differentiation	0																																					
Applications of Differentiation	0																																					
Integration	0																																					
Applications of Integration	0																																					
Differential Equations	0																																					

6 Units found

Previous Year

# Unit Planner: Limits

## AP Calculus A/B

Printed: November 14, 2022, 12:49PM

Newtown High  
School /  
2022-2023 /  
Grade 12 /

Mathematics / Last Updated: Sunday, June 26, 2022 by Charlotte Cavataro  
AP Calculus A/B  
(College Board  
AP) / Week 1 -  
Week 5

### Limits

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

#### Concepts

- Properties
- Limit Existence Theorem
- One-Sided Limits
- Infinity
- Limit existence

#### Lens: Estimation

G

#### Generalizations / Enduring Understandings

Strand 1: Evaluate

Concepts:

- Properties
- Limit Existence Theorem
- One-Sided Limits
- Infinity

Generalization:

Limits of a function evaluated graphically or algebraically use the properties and the limit existence theorem.

One-sided limits, limits at infinity, and limits as  $x$  approaches a constant derives the definition of a limit.

Strand 2: Continuity

Concepts:

- Defined
- Limit existence

Generalization:

#### Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual:

- What are the properties of limits? (S1)
- What is the limit existence theorem? (S1)
- What is a one-sided limit? (S1)
- What is the proper notation for a limit? (S1)
- What is the definition of continuity? (S2)
- What does it mean for a function to be continuous? (S2)
- How can limits at a discontinuity be evaluated? (S1)
- When do limits fail to exist? (S1)

Conceptual:

- How can properties of limits be used to evaluate complex limits? (S1)
- How can limits be used to develop the definition of derivatives? (S1)

<p>For continuity to exist at a point, the functions defined value equals the limit at that point.</p>	<ul style="list-style-type: none"> <li>• How can a function be undefined but still have a limit? (S1/S2)</li> </ul> <p><u>Provocative:</u></p> <ul style="list-style-type: none"> <li>• How can limits be effectively used in real-world applications? (S1/S2)</li> <li>• Why are one-sided limits equal to infinity, but the limit existence theorem does not allow the limit to exist? (S1/S2)</li> </ul>
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Standard(s)  
*Connecticut Core Standards / Content Standards*

**Critical Content & Skills**  
*What students must **KNOW and be able to DO***  
 Students must be able to:  
 Evaluate limits from a graph or from an expression  
 Define continuity from a graph or an expression

**Core Learning Activities**  
 Evaluate limits from a graph or from an expression

- Given a limit, evaluate algebraically.
- Evaluate a limit given a graph.
- Define where limits do not exist based on a graph.
- Evaluate one-sided limits from a graph or algebraically.
- Use properties of limits to evaluate.

Define continuity from a graph or an expression

- Determine if continuity exists at key points of a piecewise function.
- Find the value of a variable that will make a function continuous at a given point.
- Determine if continuity exists algebraically.

**Assessments**  
**Summative Assessment**  
**Summative: Written Test**  
 Sample Assessment  
[Review for Quiz on Limits \(Sections 1.6-1.8\).pdf](#)  
[Review for Quiz on Limits.pdf](#)

**Resources**  
*Professional & Student*  
 Department developed materials on google drive.

**Student Learning Expectation & 21st Century Skills**  
[Information Literacy](#)  
[Critical Thinking](#)  
[Spoken Communication](#)  
[Written Performance](#)

**Interdisciplinary Connections**  
 Physics-Rate of Change

# Unit Planner: Differentiation

## AP Calculus A/B

Monday, November 14, 2022, 12:42PM

Newtown High

School /

2022-2023 /

Grade 12 /

Mathematics /

Last Updated: Monday, June 27, 2022 by Megan Guarino

AP Calculus A/B

(College Board

AP) / Week 6 -

Week 13

Differentiation

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template \(Optional\)](#)

Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Differentiation

- Difference Quotient
- Limit
- Derivative
- Average Rate
- Instantaneous Rate
- Rules of differentiation
- Continuity
- Differentiability

Lens: Properties

G

Generalizations / Enduring Understandings

Strand 1: Derivatives

- Difference Quotient
- Limit
- Derivative
- Average Rate
- Instantaneous Rate
- Rules of differentiation

Generalization:

The average rate of change of a function is a difference quotient.

The instantaneous rate of change or derivative is the limit of difference quotient.

Mathematical rules and procedures exist to calculate the derivatives of different types of functions.

Strand 2: Differentiability

Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual

What are the derivative rules? (S1)

How is the derivative of a function found? (S1)

What is the definition of a derivative? (S1)

What is the difference between average rate of change and instantaneous rate of change? (S1)

What is an implicit function? (S1)

Conceptual

How is the rate of change determined? (S1)

How is the instantaneous rate of change determined? (S1)

Why are implicit functions needed? (S1)

Why are higher order derivatives needed? (S1)

How is differentiability determined? (S2)

How is continuity and differentiability related? (S2)

- Continuity
- Differentiability

Generalization:

Differentiability implies continuity.

How is rate of change using the tangent line estimated? (S1)  
 How is the chain rule to differentiate a composite function used? (S1)  
 How is the second derivative found? (S1)  
 How is the chain rule used to take the derivative of an implicit function? (S1)  
 How is the derivative of an inverse function found? (S1)

Provocative

What is the best approach to finding the derivative of a function? (S1)

## Standard(s)

*Connecticut Core Standards / Content Standards*

### Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must be able to:

- Find the derivatives of various functions using the limit of a difference quotient.
- Apply appropriate mathematical rules or procedures to differentiate.
- Determine if a function is continuous and differentiable.

### Core Learning Activities

Find the derivatives of various functions using the limit of a difference quotient.

- Calculate average rate of change of various functions using difference quotients.
- Find the derivative of a function using the limit of a difference quotient and estimate the rate of change at a given point.

Apply appropriate mathematical rules or procedures to differentiate.

- Evaluate the slope at a particular point to write the tangent line.
- Apply the power rule to differentiate a function.
- Apply the constant property to differentiate a function.
- Apply the sum or difference property to differentiate a function.
- Apply the constant multiple property to differentiate a function.
- Apply the quotient rule to differentiate a function.
- Apply appropriate rules and properties to differentiate trigonometric, exponential, and logarithmic functions.
- Connect and understand the relationship of the function to its derivative as it relates to degree and shape.
- Find the derivative of a function using derivative rules and calculate the rate of change at a given point.
- Find the derivative of a composite function and evaluate the function at a given point to write the equation of a tangent line.
- Find the derivative of an implicit function and evaluate the function at a given point to write the equation of a tangent line.
- Find the derivative of an inverse function and evaluate the function at a given point to find the equation of a tangent line.
- Find the derivative of an inverse trigonometric function and evaluate the function at a given point to find the equation of tangent line.
- Apply properties and rules of differentiation to find the derivative of higher order derivatives.
- Connect and understand the relationship of the function to its derivative as it relates to degree and shape.

Determine if a function is continuous and differentiable.

- Use limits to determine continuity.

- Understand that differentiability implies continuity.
- Understand discontinuities ie. asymptotes, hole, jump.

[Unit 2 - Notes & Assignemts.pdf](#)

**Assessments**

**Review**

**Summative: Other written assessments**

[Calculus Ch -2 PT .pdf](#)

**Resources**

*Professional & Student*

Department developed materials on google drive.

<https://apstudents.collegeboard.org/ap/pdf/ap-calculus-ab-bc-course-and-exam-description.pdf>

**Student Learning Expectation & 21st Century Skills**

[Information Literacy](#)

[Critical Thinking](#)

[Spoken Communication](#)

[Written Performance](#)

**Interdisciplinary Connections**

Physics - Derivative as rate of change

# Unit Planner: Applications of Differentiation

## AP Calculus A/B

Version: November 14, 2022 12:19PM

Newtown High

School /

2022-2023 /

Grade 12 /

Mathematics /

Last Updated: Monday, June 27, 2022 by Megan Guarino

AP Calculus A/B

(College Board

AP) / Week 14 -

Week 21

Applications of Differentiation

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template \(Optional\)](#)

Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concepts: Analytical

- First Derivative Test
- Second Derivative Test
- Mean Value Theorem
- Extreme Value Theorem
- Optimization
- Related Rates
- Particle Motion
- L'Hopital's Rule

Lens: Connection

G

Generalizations / Enduring Understandings

Strand 1: Key Characteristics of a Function

- First Derivative Test
- Second Derivative Test
- Mean Value Theorem
- Extreme Value Theorem

Generalization:

The First and Second Derivative tests determine the key characteristics of a function.

Mean Value Theorem and Extreme Value Theorem are essential theorems of differential calculus.

Strand 2: Applications of Differentiation

- Optimization

Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual

What is the Mean Value Theorem? (S1)

What is Extreme Value Theorem? (S1)

How is the first derivative test used? (S1)

How is the second derivative test used? (S1)

What are extrema? (S1)

Conceptual

What does it mean for a function to be increasing or decreasing? (S1)

What does it mean for a function to have a positive or negative concavity in a certain interval? (S1)

How do the minimum and maximum relate to optimization problems? (S2)

How is concavity determined? (S1)



<ul style="list-style-type: none"> <li>• Related Rates</li> <li>• Particle Motion</li> <li>• L'Hopital's Rule</li> </ul> <p>Generalization: Optimization, related rates, and particle motion are real world applications of differentiation. L'Hopital's rule is an application of differentiation applied to limits</p>	<p>How are intervals of increasing or decreasing determined? (S1) How can the rate of one variable be used to find the rates of others? (S2) How is L'Hospital's Rule used? (S3) When is L'Hospital's Rule used? (S3) How are functions rewritten to limit the number of variables in order to apply related rates? (S2)</p> <p><b>Provocative</b> Where can optimization, related rates or particle motion be used in the real world? (S2) What role does Calculus play as a tool in science, business, and other areas of study? (S1/S2) What is the most efficient way to solve a related rates problem? (S2)</p>
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**Standard(s)**

*Connecticut Core Standards / Content Standards*

**Critical Content & Skills**

*What students must **KNOW and be able to DO***  
Students must be able to:

- Justify conclusions about the behavior of a function based on the behavior of its derivatives.
- Solve real world problems
- Use L'Hospital's Rule to evaluate limits.

**Core Learning Activities**

Justify conclusions about the behavior of a function based on the behavior of its derivatives.

- Use the Mean Value Theorem to sketch graphs.
- Use Rolle's Theorem to determine a maximum or minimum value.
- Use Extreme Value Theorem to find the absolute minimum or absolute maximum values.
- Use the first derivative test to describe the function's behavior in an interval and determine a critical value.
- Use the second derivative test to determine concavity and classify points of inflection.
- Create an accurate graph without the use of technology.

Solve real world problems

- Solve optimization problems
- Solve Related Rates problems
- Solve Particle Motion problems

Use L'Hospital's Rule to evaluate limits.

- Limits of indeterminate forms may be evaluated

[Unit 5 - Notes & Assignments.pdf](#)

[Unit 6 - Notes & Assignments.pdf](#)

**Assessments**

**Review**

**Summative: Other written assessments**

[5. Review for Quiz on Applications of Derivatives Part II.pdf](#)

[5. Review for Quest on Applications of Derivatives.pdf](#)

**Resources**

*Professional & Student*

Department developed materials on google drive.

<https://apstudents.collegeboard.org/ap/pdf/ap-calculus-ab-bc-course-and-exam-description.pdf>

<p>Student Learning Expectation &amp; 21st Century Skills</p> <p><u>Information Literacy</u></p> <p><u>Critical Thinking</u></p> <p><u>Spoken Communication</u></p> <p><u>Written Performance</u></p>	<p>Interdisciplinary Connections</p> <p>Farming, construction, architecture, business-Area, perimeter, volume</p>

# Unit Planner: Integration

## AP Calculus A/B

Monday, November 14, 2022, 12:44PM

Newtown High

School /

2022-2023 /

Grade 12 /

Mathematics / Last Updated: Monday, June 27, 2022 by Paige Hyman

AP Calculus A/B

(College Board

AP) / Week 22 -

Week 25

### Integration

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Integration

- Riemann Sum
- definite integrals
- area under a curve
- indefinite integration
- rules of integration
- Fundamental Theorem of Calculus

Lens: Change

G

#### Generalizations / Enduring Understandings

Strand 1: Definite Integration

Concepts:

- Riemann Sum
- definite integrals
- area under a curve

Generalization:

A definite integral represents the area under a curve over a given interval.

Riemann sums use geometric and numerical methods to approximate definite integrals.

Strand 2: Indefinite Integration

Concepts:

- indefinite integration

#### Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual:

What is a definite integral? (S1)

What does the area of the region between the graph of a rate of change function and the x-axis represent? (S1)

What is the difference between areas above and areas below the x-axis? (S1)

What is a Riemann sum? (S1)

What is the Fundamental Theorem of Calculus? (S2)

What is the difference between differentiation and integration? (S2)

What is the difference between indefinite and definite integrals? (S2)

What patterns indicate the need for integration using substitution? (S2)

What does it mean for a sum to diverge? (S2)

<ul style="list-style-type: none"> <li>• rules of integration</li> <li>• Fundamental Theorem of Calculus</li> </ul> <p>Generalization: Indefinite Integration is the inverse of differentiation. Mathematical rules and procedures exist to evaluate the integral of different types of functions. The Fundamental Theorem of Calculus connects differentiation and integration.</p>	<p><u>Conceptual:</u> Given information about a rate of change, how can we determine the net change over a given interval of time? (S1) How can definite integrals be approximated using geometric and numerical methods? (S2) When is it appropriate to use geometry to evaluate an integral? (S2) Given information on velocity, how can the Fundamental Theorem of Calculus be used to determine position? (S2) How is integrating to find areas related to differentiating to find slopes?(S2) How can rearranging function into equivalent forms allow us to find anti-derivatives efficiently? (S2)</p> <p><u>Provocative:</u> How is it possible for the area of an unbounded region to be finite? (S2)</p>
<p>Standard(s) <i>Connecticut Core Standards / Content Standards</i> <u>Calculus Standards</u></p>	
<p>Critical Content &amp; Skills <i>What students must <b>KNOW and be able to DO</b></i> Students will be able to</p> <ul style="list-style-type: none"> <li>• Apply the Properties of Integrals</li> <li>• Apply Riemann Sums</li> <li>• Apply the Fundamental Theorem of Calculus</li> </ul>	
<p>Core Learning Activities Apply Riemann Sums</p> <ul style="list-style-type: none"> <li>• Approximate areas under a curve using the sum of areas of basic geometric shapes.</li> <li>• Interpret the limiting case of the Riemann sum as a definite integral.</li> <li>• Represent the limiting case of the Riemann sum as a definite integral.</li> </ul> <p>Apply the Fundamental Theorem of Calculus</p> <ul style="list-style-type: none"> <li>• Connect the area under the graph of a functions derivative with the net change in the function.</li> <li>• Solve Problems related to the motion of a particle along a line.</li> </ul> <p>Apply the Properties of Integrals</p> <ul style="list-style-type: none"> <li>• Apply basic integration rules to find the integral of a function.</li> <li>• Use the inverse process of differentiation to find the antiderivative of functions.</li> </ul>	
<p>Assessments <u>Exam Sample Questions</u></p>	<p>Resources <i>Professional &amp; Student</i> AP Classroom Department developed materials online resources</p>
<p>Student Learning Expectation &amp; 21st Century Skills</p>	<p>Interdisciplinary Connections</p>

Information Literacy  
Critical Thinking  
Spoken Communication  
Written Performance

Economics - If compounding more often increases the amount in an account with a given rate of return and term, why doesn't compounding continuously result in an infinite account balance, all other things being equal?  
Physics - Particle Motion

# Unit Planner: Applications of Integration

## AP Calculus A/B

Monday, November 14, 2022 12:44PM

Newtown High

School /

2022-2023 /

Grade 12 /

Mathematics / Last Updated: Monday, June 27, 2022 by Charlotte Cavataro

AP Calculus A/B

(College Board

AP) / Week 30 -

Week 33

### Applications of Integration

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Applications of Integration

- integral defined function
- The Second Fundamental Theorem of Calculus
- average value of a function
- area between two curves
- volume of solids

Lens: transformation

G

#### Generalizations / Enduring Understandings

Strand 1: Real World Applications

Concepts:

- integral defined function
- The Second Fundamental Theorem of Calculus
- average value of a function

Generalization:

The Second Fundamental Theorem of Calculus gives an equation for the derivative of an integral defined function. The average value of a function is solved by definite integrals.

Strand 2: Area and Volume Applications

Concepts:

- area between two curves
- volume of solids

Generalization:

#### Guiding Questions

***Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]***

Factual:

What is the average value of a function? (S1)  
How do position, velocity, and acceleration relate? (S1)  
What are the methods to calculate volume of solids? (S2)

Conceptual:

How can differentiation and antidifferentiation help to move between position, velocity, and acceleration functions? (S1)  
When should each method to calculate volume of solids be used? (S2)

Provocative:

Is the same solution achieved when finding the volume of a three dimensional figure using different methods? (S2)  
How can integration be used to explain that the formulas for areas of two dimensional geometric figures relate to the volume of their three dimensional counterparts? (S2)

<p>Definite integrals solve for areas between two curves and volumes of solids.</p>	<p>If the width of a rectangle is infinitesimally small is it still two dimensional? (S2)</p>
<p>Standard(s)  <i>Connecticut Core Standards / Content Standards</i>  <u>Calculus Standards</u></p>	
<p>Critical Content &amp; Skills  <i>What students must <b>KNOW and be able to DO</b></i>  Students will be able to:</p> <ul style="list-style-type: none"> <li>• Apply the Second Fundamental Theorem of Calculus in Real World problems</li> <li>• Use integrals to solve for area under a curve and volume of solids</li> </ul>	
<p>Core Learning Activities  Apply the Second Fundamental Theorem of Calculus in Real World problems</p> <ul style="list-style-type: none"> <li>• determine the average value of a function using definite integrals</li> <li>• determine values for positions and rates of change using definite integrals in problems involving rectilinear motions</li> <li>• calculate areas in the plane using the definite integral</li> </ul> <p>Use integrals to solve for area under a curve and volume of solids</p> <ul style="list-style-type: none"> <li>• calculate volumes of solids with known cross sections using definite integrals</li> <li>• calculate volumes of solids of revolution using definite integrals</li> <li>• determine the length of a curve in the plane defined by a function, using a definite integral</li> </ul>	
<p>Assessments  <u>Sample Exam Questions</u></p>	<p>Resources  <i>Professional &amp; Student</i>  AP Classroom  Department developed materials  online resources</p>
<p>Student Learning Expectation &amp; 21st Century Skills  <u>Information Literacy</u>  <u>Critical Thinking</u>  <u>Spoken Communication</u>  <u>Written Performance</u></p>	<p>Interdisciplinary Connections  Physics- particle motion</p>

# Unit Planner: Differential Equations

## AP Calculus A/B

Monday, August 14, 2023 12:45:00

Newtown High

School /

2022-2023 /

Grade 12 /

Mathematics / Last Updated: Monday, June 27, 2022 by Charlotte Cavatara

AP Calculus A/B

(College Board

AP) / Week 26 -

Week 29

### Differential Equations

Cavatara, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Different Equations

- differential equations
- slope fields
- general solution
- particular solution
- exponential growth and decay
- gravity

Lens: Analysis

G

#### Generalizations / Enduring Understandings

Strand 1: Differential Equations

Concepts:

- differential equations
- slope fields
- general solution
- particular solution

Generalization:

A differential equation is the derivative of a family of functions.

A slope fields represents all possible general solutions to a differential equation.

The particular solution to a differential equation is a unique solution based on a given initial condition.

Strand 2: Applications of Differential Equations

Concepts:

#### Guiding Questions

***Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]***

Factual:

What is the difference between a general solution and a particular solution? (S1)

What is a slope field? (S1)

What is the difference between exponential growth and decay? (S1)

What is the gravitational constant? (S2)

Conceptual:

How can you identify the behavior of a particular solution using a slope field? (S1)

How is the particular solution graphed on a slope field? (S1)

How do the general solutions of a differential equation vary? (S1)

How are differential equations used to model exponential growth and decay? (S2)

How are differential equations used to model acceleration due to gravity? (S2)



<ul style="list-style-type: none"> <li>• exponential growth and decay</li> <li>• gravity</li> </ul> <p>Generalization: Exponential growth and decay and acceleration due to gravity can be modeled using differential equations.</p>	<p><u>Provocative:</u> Can a model be derived for the number of computers, <math>C</math>, infected by a virus, given a model for how fast the computers are being infected, <math>dC/dt</math>, at a particular time? (S1)</p>
<p>Standard(s) <i>Connecticut Core Standards / Content Standards</i> <u>Calculus Standards</u></p>	
<p>Critical Content &amp; Skills <i>What students must <b>KNOW and be able to DO</b></i> Students will be able to:</p> <ul style="list-style-type: none"> <li>• Solve differential equations</li> <li>• Apply differential equations</li> </ul>	
<p>Core Learning Activities Solve differential equations</p> <ul style="list-style-type: none"> <li>• Interpret verbal statements of problems as differential equations involving a derivative expression</li> <li>• Verify solutions to a differential equation</li> <li>• Estimate solutions to differential equations</li> <li>• Determine general solutions to differential equations</li> <li>• Determine particular solutions to differential equations</li> </ul> <p>Apply differential equations</p> <ul style="list-style-type: none"> <li>• Interpret the meaning of a differential equation and its variables in context</li> <li>• Determine general and particular solutions for problems involving differential equations in context</li> </ul>	
<p>Assessments <u>Exam Sample Question</u></p>	<p>Resources <i>Professional &amp; Student</i> AP Classroom Department developed materials online resources</p>
<p>Student Learning Expectation &amp; 21st Century Skills <u>Information Literacy</u> <u>Critical Thinking</u> <u>Spoken Communication</u> <u>Written Performance</u></p>	<p>Interdisciplinary Connections Physics - Particle motion Economics - Exponential growth and decay</p>



## AP Calculus B/C (College Board AP)

7 Curriculum Developers | Last Updated: Tuesday, Jun 28, 2022 by Guarino, Megan

### Unit Calendar by Year

Unit	Au	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Ju																											
Lessons	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	26	27	28	29	30	31	32	33	34	35	36	37	38
Differentiation	0																																					
Applications of Differentiation	0																																					
Integration	0																																					
Applications of Integration	0																																					
Differential Equations	0																																					
Parametric, Polar, and Vector-...	0																																					
Infinite Sequences and Series	0																																					

◀ 7 Units found ▶

Previous Year

# Unit Planner: Differentiation

## AP Calculus B/C

Thursday, October 19, 2023 11:11:11

Newtown High  
School /  
2022-2023 /  
Grade 12 /

Mathematics / Last Updated: Tuesday, June 28, 2022 by Paige Hyman  
AP Calculus B/C  
(College Board  
AP) / Week 1 -  
Week 4

### Differentiation

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### [Unit Web Template \(Optional\)](#)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Differentiation

- Difference Quotient
- Limit
- Derivative
- Average Rate
- Instantaneous Rate
- Rules of differentiation
- Continuity
- Differentiability

Lens: Properties

G

#### Generalizations / Enduring Understandings

Strand 1: Derivatives

- Difference Quotient
- Limit
- Derivative
- Average Rate
- Instantaneous Rate
- Rules of differentiation

Generalization:

The average rate of change of a function is a difference quotient.

The instantaneous rate of change or derivative is the limit of difference quotient.

Mathematical rules and procedures exist to calculate the derivatives of different types of functions.

Strand 2: Differentiability

#### Guiding Questions

***Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]***

Factual

What are the derivative rules? (S1)

How is the derivative of a function found? (S1)

What is the definition of a derivative? (S1)

What is the difference between average rate of change and instantaneous rate of change? (S1)

What is an implicit function? (S1)

Conceptual

How is the rate of change determined? (S1)

How is the instantaneous rate of change determined? (S1)

Why are implicit functions needed? (S1)

Why are higher order derivatives needed? (S1)

How is differentiability determined? (S2)

How is continuity and differentiability related? (S2)

- Continuity
- Differentiability

Generalization:

Differentiability implies continuity.

How is rate of change using the tangent line estimated? (S1)  
 How is the chain rule to differentiate a composite function used? (S1)  
 How is the second derivative found? (S1)  
 How is the chain rule used to take the derivative of an implicit function? (S1)  
 How is the derivative of an inverse function found? (S1)

Provocative

What is the best approach to finding the derivative of a function? (S1)

## Standard(s)

*Connecticut Core Standards / Content Standards*

## Critical Content & Skills

*What students must **KNOW and be able to DO***

Students must be able to:

- Find the derivatives of various functions using the limit of a difference quotient.
- Apply appropriate mathematical rules or procedures to differentiate.
- Determine if a function is continuous and differentiable.

## Core Learning Activities

Find the derivatives of various functions using the limit of a difference quotient.

- Calculate average rate of change of various functions using difference quotients.
- Find the derivative of a function using the limit of a difference quotient and estimate the rate of change at a given point.

Apply appropriate mathematical rules or procedures to differentiate.

- Evaluate the slope at a particular point to write the tangent line.
- Apply the power rule to differentiate a function.
- Apply the constant property to differentiate a function.
- Apply the sum or difference property to differentiate a function.
- Apply the constant multiple property to differentiate a function.
- Apply the quotient rule to differentiate a function.
- Apply appropriate rules and properties to differentiate trigonometric, exponential, and logarithmic functions.
- Connect and understand the relationship of the function to its derivative as it relates to degree and shape.
- Find the derivative of a function using derivative rules and calculate the rate of change at a given point.
- Find the derivative of a composite function and evaluate the function at a given point to write the equation of a tangent line.
- Find the derivative of an implicit function and evaluate the function at a given point to write the equation of a tangent line.
- Find the derivative of an inverse function and evaluate the function at a given point to find the equation of a tangent line.
- Find the derivative of an inverse trigonometric function and evaluate the function at a given point to find the equation of tangent line.
- Apply properties and rules of differentiation to find the derivative of higher order derivatives.
- Connect and understand the relationship of the function to its derivative as it relates to degree and shape.

Determine if a function is continuous and differentiable.

- Use limits to determine continuity.

- Understand that differentiability implies continuity.
- Understand discontinuities ie. asymptotes, hole, jump.

### Assessments

[3. Review-Implicit Differentiation.pdf](#)

### Resources

*Professional & Student*

Department developed materials on google drive.

<https://apstudents.collegeboard.org/ap/pdf/ap-calculus-ab-bc-course-and-exam-description.pdf>

### Student Learning Expectation & 21st Century Skills

[Information Literacy](#)

[Critical Thinking](#)

[Spoken Communication](#)

[Written Performance](#)

### Interdisciplinary Connections

Physics-Second derivative is acceleration.

Business-Supply and demand curves.

# Unit Planner: Applications of Differentiation

## AP Calculus B/C

Thursday, November 10, 2022 3:48 PM

Newtown High  
School /  
2022-2023 /  
Grade 12 /

Mathematics / Last Updated: [Tuesday, June 28, 2022](#) by Paige Hyman  
AP Calculus B/C  
(College Board  
AP) / Week 5 -  
Week 11

### Applications of Differentiation

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template \(Optional\)](#)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concepts: Analytical

- First Derivative Test
- Second Derivative Test
- Mean Value Theorem
- Extreme Value Theorem
- Optimization
- Related Rates
- Particle Motion
- L'Hopital's Rule

Lens: Connection

G

#### Generalizations / Enduring Understandings

Strand 1: Key Characteristics of a Function

- First Derivative Test
- Second Derivative Test
- Mean Value Theorem
- Extreme Value Theorem

Generalization:

The First and Second Derivative tests determine the key characteristics of a function.

Mean Value Theorem and Extreme Value Theorem are essential theorems of differential calculus.

Strand 2: Applications of Differentiation

- Optimization

#### Guiding Questions

***Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]***

Factual

What is the Mean Value Theorem? (S1)

What is Extreme Value Theorem? (S1)

How is the first derivative test used? (S1)

How is the second derivative test used? (S1)

What are extrema? (S1)

Conceptual

What does it mean for a function to be increasing or decreasing? (S1)

What does it mean for a function to have a positive or negative concavity in a certain interval?(S1)

How do the minimum and maximum relate to optimization problems? (S2)

How is concavity determined? (S1)

<ul style="list-style-type: none"> <li>• Related Rates</li> <li>• Particle Motion</li> <li>• L'Hopital's Rule</li> </ul> <p>Generalization: Optimization, related rates, and particle motion are real world applications of differentiation. L'Hopital's rule is an application of differentiation applied to limits.</p>	<p>How are intervals of increasing or decreasing determined? (S1) How can the rate of one variable be used to find the rates of others? (S2) How is L'Hospital's Rule used? (S3) When is L'Hospital's Rule used? (S3) How are functions rewritten to limit the number of variables in order to apply related rates? (S2)</p> <p>Provocative Where can optimization, related rates or particle motion be used in the real world? (S2) What role does Calculus play as a tool in science, business, and other areas of study? (S1/S2) What is the most efficient way to solve a related rates problem? (S2)</p>
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**Standard(s)**

*Connecticut Core Standards / Content Standards*

**Critical Content & Skills**

*What students must **KNOW and be able to DO***

Students must be able to:

- Justify conclusions about the behavior of a function based on the behavior of its derivatives.
- Solve real world problems
- Use L'Hospital's Rule to evaluate limits.

**Core Learning Activities**

Justify conclusions about the behavior of a function based on the behavior of its derivatives.

- Use the Mean Value Theorem to sketch graphs.
- Use Rolle's Theorem to determine a maximum or minimum value.
- Use Extreme Value Theorem to find the absolute minimum or absolute maximum values.
- Use the first derivative test to describe the function's behavior in an interval and determine a critical value.
- Use the second derivative test to determine concavity and classify points of inflection.
- Create an accurate graph without the use of technology.

Solve real world problems

- Solve optimization problems
- Solve Related Rates problems
- Solve Particle Motion problems

Use L'Hospital's Rule to evaluate limits.

- Limits of indeterminate forms may be evaluated.

**Assessments**

**Review**

**Summative: Other written assessments**

[5. Review for Quiz on Applications of Derivatives Part II.pdf](#)

[5. Review for Quest on Applications of Derivatives.pdf](#)

**Resources**

*Professional & Student*

Department developed materials on google drive.

<https://apstudents.collegeboard.org/ap/pdf/ap-calculus-ab-bc-course-and-exam-description.pdf>

**Student Learning Expectation & 21st Century Skills**

Information Literacy

Critical Thinking

Spoken Communication

Written Performance

**Interdisciplinary Connections**

Farming, construction, architecture, business-Area, perimeter, volume



# Unit Planner: Integration

## AP Calculus B/C

Thursday, November 10, 2022, 3:47 PM

Newtown High  
School /  
2022-2023 /  
Grade 12 /

Mathematics / Last Updated: Tuesday, June 28, 2022 by Paige Hyman  
AP Calculus B/C  
(College Board  
AP) / Week 12 -  
Week 15

### Integration

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### [Unit Web Template \(Optional\)](#)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Integration

- Reimann Sum
- definite integrals
- area under a curve
- indefinite integration
- rules of integration
- Fundamental Theorem of Calculus

Lens: Change

G

#### Generalizations / Enduring Understandings

Strand 1: Definite Integration

Concepts:

- Reimann Sum
- definite integrals
- area under a curve

Generalization:

A definite integral represents the area under a curve over a given interval.

Reimann sums use geometric and numerical methods to approximate definite integrals.

Strand 2: Indefinite Integration

Concepts:

#### Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual:

What is a definite integral? (S1)

What does the area of the region between the graph of a rate of change function and the x-axis represent? (S1)

What is the difference between areas above and areas below the x-axis? (S1)

What is a Riemann sum? (S1)

What is the Fundamental Theorem of Calculus? (S2)

What is the difference between differentiation and integration? (S2)

What is the difference between indefinite and definite integrals? (S2)

What patterns indicate the need for integration using substitution? (S2)

What does it mean for a sum to diverge? (S2)

<ul style="list-style-type: none"> <li>• indefinite integration</li> <li>• rules of integration</li> <li>• Fundamental Theorem of Calculus</li> </ul> <p>Generalization: Indefinite Integration is the inverse of differentiation. Mathematical rules and procedures exist to evaluate the integral of different types of functions. The Fundamental Theorem of Calculus connects differentiation and integration.</p>	<p><u>Conceptual:</u> Given information about a rate of change, how can we determine the net change over a given interval of time? (S1) How can definite integrals be approximated using geometric and numerical methods? (S2) When is it appropriate to use geometry to evaluate an integral? (S2) Given information on velocity, how can the Fundamental Theorem of Calculus be used to determine position? (S2) How is integrating to find areas related to differentiating to find slopes?(S2) How can rearranging function into equivalent forms allow us to find anti-derivatives efficiently? (S2)</p> <p><u>Provocative:</u> How is it possible for the area of an unbounded region to be finite? (S2)</p>
<p>Standard(s) <i>Connecticut Core Standards / Content Standards</i> <u>Calculus Standards</u></p>	
<p>Critical Content &amp; Skills <i>What students must <b>KNOW and be able to DO</b></i> Students will be able to</p> <ul style="list-style-type: none"> <li>• Apply the Properties of Integrals</li> <li>• Apply Riemann Sums</li> <li>• Apply the Fundamental Theorem of Calculus</li> </ul>	
<p>Core Learning Activities Apply Riemann Sums</p> <ul style="list-style-type: none"> <li>• Approximate areas under a curve using the sum of areas of basic geometric shapes.</li> <li>• Interpret the limiting case of the Riemann sum as a definite integral.</li> <li>• Represent the limiting case of the Riemann sum as a definite integral.</li> </ul> <p>Apply the Fundamental Theorem of Calculus</p> <ul style="list-style-type: none"> <li>• Connect the area under the graph of a functions derivative with the net change in the function.</li> <li>• Solve Problems related to the motion of a particle along a line.</li> </ul> <p>Apply the Properties of Integrals</p> <ul style="list-style-type: none"> <li>• Apply basic integration rules to find the integral of a function.</li> <li>• Use the inverse process of differentiation to find the antiderivative of functions.</li> </ul>	
<p>Assessments <u>Exam Sample Questions</u></p>	<p>Resources <i>Professional &amp; Student</i> AP Classroom Department developed materials online resources</p>
<p>Student Learning Expectation &amp; 21st Century Skills</p>	<p>Interdisciplinary Connections</p>

Information Literacy  
Critical Thinking  
Spoken Communication  
Written Performance

Economics - If compounding more often increases the amount in an account with a given rate of return and term, why doesn't compounding continuously result in an infinite account balance, all other things being equal?  
Physics - Particle Motion

# Unit Planner: Applications of Integration

## AP Calculus B/C

Thursday, November 10, 2022, 3:43PM

Newtown High  
School /  
2022-2023 /  
Grade 12 /

Mathematics / Last Updated: Tuesday, June 28, 2022 by Paige Hyman  
AP Calculus B/C  
(College Board  
AP) / Week 16 -  
Week 19

### Applications of Integration

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template \(Optional\)](#)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Applications of Integration

- integral defined function
- The Second Fundamental Theorem of Calculus
- average value of a function
- area between two curves
- volume of solids

Lens: transformation

G

#### Generalizations / Enduring Understandings

Strand 1: Real World Applications

Concepts:

- integral defined function
- The Second Fundamental Theorem of Calculus
- average value of a function

Generalization:

The Second Fundamental Theorem of Calculus gives an equation for the derivative of an integral defined function. The average value of a function is solved by definite integrals.

Strand 2: Area and Volume Applications

Concepts:

- area between two curves
- volume of solids

Generalization:

#### Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual:

What is the average value of a function? (S1)  
How do position, velocity, and acceleration relate? (S1)  
What are the methods to calculate volume of solids? (S2)

Conceptual:

How can differentiation and antidifferentiation help to move between position, velocity, and acceleration functions? (S1)  
When should each method to calculate volume of solids be used? (S2)

Provocative:

Is the same solution achieved when finding the volume of a three dimensional figure using different methods? (S2)  
How can integration be used to explain that the formulas for areas of two dimensional geometric figures relate to the volume of their three dimensional counterparts? (S2)

<p>Definite integrals solve for areas between two curves and volumes of solids.</p>	<p>If the width of a rectangle is infinitesimally small is it still two dimensional? (S2)</p>
<p>Standard(s)  <i>Connecticut Core Standards / Content Standards</i>  <u>Calculus Standards</u></p>	
<p>Critical Content &amp; Skills  <i>What students must <b>KNOW and be able to DO</b></i>  Students will be able to:</p> <ul style="list-style-type: none"> <li>• Apply the Second Fundamental Theorem of Calculus in Real World problems</li> <li>• Use integrals to solve for area under a curve and volume of solids</li> </ul>	
<p>Core Learning Activities  Apply the Second Fundamental Theorem of Calculus in Real World problems</p> <ul style="list-style-type: none"> <li>• determine the average value of a function using definite integrals</li> <li>• determine values for positions and rates of change using definite integrals in problems involving rectilinear motions</li> <li>• calculate areas in the plane using the definite integral</li> </ul> <p>Use integrals to solve for area under a curve and volume of solids</p> <ul style="list-style-type: none"> <li>• calculate volumes of solids with known cross sections using definite integrals</li> <li>• calculate volumes of solids of revolution using definite integrals</li> <li>• determine the length of a curve in the plane defined by a function, using a definite integral</li> </ul>	
<p>Assessments  <u>Sample Exam Questions</u></p>	<p>Resources  <i>Professional &amp; Student</i>  AP Classroom  Department developed materials  online resources</p>
<p>Student Learning Expectation &amp; 21st Century Skills  <u>Information Literacy</u>  <u>Critical Thinking</u>  <u>Spoken Communication</u>  <u>Written Performance</u></p>	<p>Interdisciplinary Connections  Physics- particle motion</p>

# Unit Planner: Differential Equations

## AP Calculus B/C

Thursday, November 10, 2022, 3:49PM

Newtown High  
School /  
2022-2023 /  
Grade 12 /

Mathematics / Last Updated: Tuesday, June 28, 2022 by Paige Hyman  
AP Calculus B/C  
(College Board  
AP) / Week 20 -  
Week 23

### Differential Equations

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Different Equations

- differential equations
- slope fields
- general solution
- particular solution
- exponential growth and decay
- gravity

Lens: Analysis

G

#### Generalizations / Enduring Understandings

Strand 1: Differential Equations

Concepts:

- differential equations
- slope fields
- general solution
- particular solution

Generalization:

A differential equation is the derivative of a family of functions.

A slope fields represents all possible general solutions to a differential equation.

The particular solution to a differential equation is a unique solution based on a given initial condition.

Strand 2: Applications of Differential Equations

Concepts:

#### Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual:

What is the difference between a general solution and a particular solution? (S1)

What is a slope field? (S1)

What is the difference between exponential growth and decay? (S1)

What is the gravitational constant? (S2)

Conceptual:

How can you identify the behavior of a particular solution using a slope field? (S1)

How is the particular solution graphed on a slope field? (S1)  
How do the general solutions of a differential equation vary? (S1)

How are differential equations used to model exponential growth and decay? (S2)

How are differential equations used to model acceleration due to gravity? (S2)

<ul style="list-style-type: none"> <li>• exponential growth and decay</li> <li>• gravity</li> </ul> <p>Generalization: Exponential growth and decay and acceleration due to gravity can be modeled using differential equations.</p>	<p><b>Provocative:</b> Can a model be derived for the number of computers, <math>C</math>, infected by a virus, given a model for how fast the computers are being infected, <math>dC/dt</math>, at a particular time? (S1)</p>
<p>Standard(s) <i>Connecticut Core Standards / Content Standards</i> <u>Calculus Standards</u></p>	
<p>Critical Content &amp; Skills <i>What students must <b>KNOW and be able to DO</b></i> Students will be able to:</p> <ul style="list-style-type: none"> <li>• Solve differential equations</li> <li>• Apply differential equations</li> </ul>	
<p>Core Learning Activities Solve differential equations</p> <ul style="list-style-type: none"> <li>• Interpret verbal statements of problems as differential equations involving a derivative expression</li> <li>• Verify solutions to a differential equation</li> <li>• Estimate solutions to differential equations</li> <li>• Determine general solutions to differential equations</li> <li>• Determine particular solutions to differential equations</li> </ul> <p>Apply differential equations</p> <ul style="list-style-type: none"> <li>• Interpret the meaning of a differential equation and its variables in context</li> <li>• Determine general and particular solutions for problems involving differential equations in context</li> </ul>	
<p>Assessments <u>Exam Sample Question</u></p>	<p>Resources <i>Professional &amp; Student</i> AP Classroom Department developed materials online resources</p>
<p>Student Learning Expectation &amp; 21st Century Skills <u>Information Literacy</u> <u>Critical Thinking</u> <u>Spoken Communication</u> <u>Written Performance</u></p>	<p>Interdisciplinary Connections Physics - Particle motion Economics - Exponential growth and decay</p>

# Unit Planner: Parametric, Polar, and Vector-Valued Functions AP Calculus B/C

Thursday, November 10, 2022, 8:50PM

Newtown High

School /

2022-2023 /

Grade 12 /

Mathematics / Last Updated: Tuesday, June 28, 2022 by Megan Guarino

AP Calculus B/C

(College Board

AP) / Week 24 -

Week 27

Parametric, Polar, and Vector-Valued Functions

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Keristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

## Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template \(Optional\)](#)

Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Parametric, Polar, and Vector-Valued Functions

- real-valued function
- parametric equation
- vector-valued functions
- arc length
- polar coordinates
- polar equation
- area between polar curves

Lens: function

G

Generalizations / Enduring Understandings

Strand 1: Parametric Equations and Vector Valued

Functions

Concepts:

- real-valued function
- parametric equation
- vector-valued functions
- arc length

Generalization:

Methods for calculating derivatives and integrals of real valued functions are extended to parametric and vector valued functions.

The arc length of a parametrically defined curve is calculated using a definite integral.

Strand 2: Polar Coordinates

Guiding Questions

***Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]***

Factual:

What is a parametric equation? (S1)  
 What is a tangent line? (S1)  
 What is a vector-valued function? (S1)  
 What are polar coordinates? (S2)

Conceptual:

How can functions be rewritten as parametric functions? (S1)  
 How can motion defined parametrically be translated to vector notation? (S1)  
 How we model motion not constrained to a linear path? (S2)  
 How does the chain rule help us to analyze graphs defined using parametric equation or polar functions? (S1)  
 How is the concept of calculating areas in rectangular coordinates extended to polar coordinates? (S2)



<p>Concepts:</p> <ul style="list-style-type: none"> <li>• polar coordinates</li> <li>• polar equation</li> <li>• area between polar curves</li> </ul> <p>Generalization: Methods for calculating derivatives and integrals of real valued functions is extended to functions in polar coordinates. The area between two polar curves is calculated using definite integrals.</p>	<p><u>Provocative:</u> Can polar, parametric, and vector valued functions allow us to extend our knowledge to other applications? (S1/S2)</p>
--	---

**Standard(s)**

*Connecticut Core Standards / Content Standards*

**Critical Content & Skills**

*What students must **KNOW and be able to DO***

Students will be able to:

- Apply methods for calculating derivatives of real-valued functions to parametric functions and polar curves
- Use definite integrals to determine regions defined by parametric functions and polar curves
- Determine values for positions and rates of change in problems involving planar motion

**Core Learning Activities**

Apply methods for calculating derivatives of real-valued functions to parametric functions and polar curves

- Calculate derivatives of parametric functions
- Calculate derivatives of vector-valued functions
- Calculate derivatives of functions written in polar coordinates

Use definite integrals to determine regions defined by parametric functions and polar curves

- Determine the length of a curve in the plane defined by parametric functions
- Calculate areas of regions defined by polar curves using definite integrals
- Determine a particular solution given a rate vector and initial conditions

Determine values for positions and rates of change in problems involving planar motion

- Derivatives can be used to determine velocity, speed, and acceleration for a particle moving along a curve in the plane defined using parametric or vector-valued functions.

<p>Assessments</p>	<p>Resources <i>Professional &amp; Student</i> AP Classroom Department developed materials</p>
--------------------	--

	online resources
Student Learning Expectation & 21st Century Skills <u>Information Literacy</u> <u>Critical Thinking</u> <u>Spoken Communication</u> <u>Written Performance</u>	Interdisciplinary Connections

# Unit Planner: Infinite Sequences and Series

## AP Calculus B/C

Thursday, November 20, 2022 3:54PM

Newtown High

School /

2022-2023 /

Grade 12 /

Mathematics / Last Updated: Tuesday, June 28, 2022 by Megan Guarino

AP Calculus B/C

(College Board

AP) / Week 28 -

Week 32

Infinite Sequences and Series

Cavataro, Charlotte; Dnes, Danielle; Guarino, Megan; Hall, Eugene; Hyman, Paige; Raccio, Kristen; Tierney, Shawn

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

[Unit Web Template \(Optional\)](#)

Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Concept: Infinite Sequences and Series

- sequence
- series
- convergence tests
- Tangent Line approximation
- Taylor polynomial
- Maclaurin series
- Power Series

Lens: series

G

Generalizations / Enduring Understandings

**Strand 1: Sequences and Series**

Concepts:

- sequence
- series
- convergence tests

Generalizations:

A series is the sum of the terms of an infinite sequence.  
Convergence tests show whether an infinite series converges or diverges.

**Strand 2: Taylor, Maclaurin, and Power Series**

Concepts:

- Tangent Line approximation
- Taylor polynomial

Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

Factual:

What is the  $n$ th term test for divergence? (S1)

What is a series? (S1)

What is the difference between absolute or conditional convergence? (S1)

What is the Taylor polynomial approximation of functions? (S2)

What is a power series? (S2)

What is a Taylor series? (S2)

What is a Maclaurin series? (S2)

Conceptual:

How is the  $n$ th term test used to test for divergence of a series? (S1)

How is the integral test used to determine whether a series converges or diverges? (S1)

- Maclaurin series
- Power Series

Generalization:

A tangent line approximation is a first degree Taylor polynomial used to approximate the value of a function at a given point

Higher degree Taylor polynomials provide more accurate approximations of the corresponding function.

A Maclaurin series is a Taylor polynomial centered at  $x=0$ .

A power series is a Taylor polynomial with an infinite number of terms.

How does a harmonic series differ from a geometric series? (S1)

How are the comparison test, limit comparison test, alternating series test, and ratio test used to determine whether a series converges or diverges? (S1)

When is a series absolutely convergent, conditionally convergent, or divergent? (S1)

If an alternating series converges by the alternating series test, how is the alternating series error bound used to bound how far a partial sum is from the value of the infinite series? (S2)

How can the Lagrange error bound be used to determine a maximum interval for the error of a Taylor polynomial approximation to a function? (S2)

Provocative:

Can the sum of infinitely many discrete terms be a finite value or represent continuous functions? (S1)

Standard(s)

Connecticut Core Standards / Content Standards

Calculus standards

Critical Content & Skills

What students must **KNOW and be able to DO**

Students will be able to:

- determine whether a series converges or diverges
- approximate the sum of a series
- use series to represent associated functions on an appropriate interval
- determine the error bound associated with a Taylor polynomial approximation
- determine the radius of convergence and interval of convergence for a power series

Core Learning Activities

Determine whether a series converges or diverges

- define convergent and divergent series
- use geometric series
- apply the  $n$ th term test for divergence
- apply the integral test for convergence
- use Harmonic series
- use  $p$ -series
- apply comparison tests for convergence
- apply alternating series test for convergence
- apply ratio test for convergence
- determine absolute or conditional convergence

Approximate the sum of a series

- alternating series error bound

Use series to represent associated functions on an appropriate interval

- represent a function at a point as a Taylor polynomial
- approximate function values using a Taylor Polynomial

- represent a function as a Taylor series
- represent a function as a Maclaurin series
- represent a function as a power series
- Interpret Taylor series or Maclaurin series

Determine the error bound associated with a Taylor polynomial approximation

- Lagrange error bound
- alternating series error bound

Determine the radius of convergence and interval of convergence for a power series

#### Assessments

[Sample exam questions](#)

#### Resources

*Professional & Student*

AP Classroom

Department developed materials

online resources

#### Student Learning Expectation & 21st Century Skills

[Information Literacy](#)

[Critical Thinking](#)

[Spoken Communication](#)

[Written Performance](#)

#### Interdisciplinary Connections

Taylor series have wide reaching applications across mathematics, physics, engineering and other sciences. The concept of approximating a function, or data, using a series of functions is a fundamental tool of modern science.



# ***Newtown Public Schools Special Education***

**Deborah Petersen - *Director of Pupil Personnel/Special Education,  
NCP ages 18-22***

**Sonia Raquel - *Supervisor of Elementary Special Education, PK-4***

**Maureen Hall - *Supervisor of Intermediate Special Education, Gr. 5-8***

**Dr. Paula Grayson- *Supervisor of Secondary Special Education,  
Gr. 9-12***

# NPS Special Education Programs

- **Integrated Preschool Program**- 2022-23 HOM, 2023-24 SHS
- **PAL** (*P*rogram for *A*daptive *L*earning)- MG
- **SEAL** (*S*ocial *E*motional *A*djustment *L*earning)- 2022-23 SHS, 2023-24 HAW
- **RISE** (*R*eaching *I*ndependence through *S*tructured *E*ducation) - NMS
- **Tools For Living**- NHS
- **SAIL** (*S*upportive *A*lternative *I*ndividualized *L*earning)- NMS and NHS
- **NCP** (*N*ewtown *C*ommunity *P*artnership)- Community/Vocational sites

# 2019 Special Education Self Study Action Steps

Action Steps for the Self Study can be found on the Newtown Public Schools Special Education Department web page. All recommendations from Self Study were put in place before the 2019-2020 School Year. Presentation on **November 19, 2019** BOE meeting. **(handout)**

## Areas:

1- Specialized Reading Programs and Certified Staff

2- Confidentiality

3- Professional Development/Training

4- Staffing

5-The Planning and Placement Team (PPT) and Individualized Education Program (IEP)

6- Leadership and Accountability



# 2021-2022 Evaluations, Referrals

Initial Evaluations: 137

# Students Identified: 106



# 2018-2019 Referrals/Evaluations

Initial Evaluations:	133
# Students Identified:	95

# 2017-2018 Referrals/Evaluations

Initial Evaluations: 142

# Students Identified: 88

# 2016-2017 Referrals/Evaluations

Initial Evaluations:	141
# Students Identified:	90

# ***Newtown Public Schools currently has **677** students who require Specialized Instruction (December 5, 2022)***

---

*How is success measured:*

- *Each of the 677 students have their own Individualized Education Plan with specific goals/objectives written to help them master specific skills (i.e. toileting, reading, counting, speaking, walking, writing, etc..)*
- **The look of success:** *participating in circle time in a general education classroom with minimal prompts and/or independently, reading one grade level below compared to previous year being two grades below grade level, speaking in a full sentence to make a request, using assistive technology to fully participate in an AP high school class, etc....*
- *Walking into the school building and participating in one class, staying in school for a full day and attending one class in the general education classroom, etc..*

## *Continued:*



The *average* student with an IEP has 5 goals and 15 objectives which equates to:

- **10,155** different ways student success is measured on a daily basis by the districts special education teachers and related services providers.
- Data on goals/objectives vary from student to student
  - Daily
  - Weekly
  - Monthly
  - Quarterly

# Performance Index Report

- The Performance Index is the average performance of students in a subject area (i.e., ELA, Mathematics or Science) on the state summative assessments.
- The Performance Index ranges from 0-100 and is reported for all students and for students in each individual student group.
- Connecticut's ultimate target for a Performance Index is 75.
- Starting with 2018-19, Connecticut began implementation of new science assessments aligned to the Next Generation Science Standards. Therefore, 2018-19 science performance index scores cannot be compared to those from prior years; they can serve as a baseline for future years.

# Performance Index-Ct vs. Newtown SPED

District	Special Education Status (SWD)	2017-18			2018-19			2021-22		
		ELA Performance Index	Math Performance Index	Science Performance Index	ELA Performance Index	Math Performance Index	Science Performance Index	ELA Performance Index	Math Performance Index	Science Performance Index
State of Connecticut	Students with Disabilities	47.4	41.7	N/A	47.4	41.7	46.6	45.0	38.8	44.0
	Students without Disabilities	71.1	66.4	N/A	71.4	67.0	66.8	68.0	62.5	64.7

District	Special Education Status (SWD)	2017-18			2018-19			2021-22		
		ELA Performance Index	Math Performance Index	Science Performance Index	ELA Performance Index	Math Performance Index	Science Performance Index	ELA Performance Index	Math Performance Index	Science Performance Index
Newtown School District	Students with Disabilities	54.9	50.3	N/A	55.1	49.5	50.2	55.5	52.4	50.2
	Students without Disabilities	78.5	76.4	N/A	79.4	77.5	72.4	78.0	75.5	72.1





# Performance Index-DRG (District Reference Groups) vs. Newtown SPED

DRG B- Average ELA Score 2021-22 50.38

Newtown Average ELA Score 2021-22 55.5

DRG B- Average Math Score 2021-22 48.3

Newtown Average Math Score 2021-22 52.4

DRG B- Average Science Score 2021-22 51.6

Newtown Average Science Score 2021-22 50.2

# Graduation Rates Report

## Four-Year Graduation Rates, Trend

### State of Connecticut, Special Education Status

[Export .csv file](#)

Notes:

- Four-Year Graduation Rate is the percentage of students who received a standard diploma within four years, including early and summer graduates from the cohort.

		Graduates				
		Four-Year Graduation Rate by Year				
District	Special Education Status	2016-17	2017-18	2018-19	2019-20	2020-21
State of Connecticut	Non-Special Education	91.8	92.0	92.7	93.1	93.6
	Special Education	66.7	65.1	67.9	68.4	69.1

## Four-Year Graduation Rates, Trend

### Newtown School District, Special Education Status

[Export .csv file](#)

Notes:

- Four-Year Graduation Rate is the percentage of students who received a standard diploma within four years, including early and summer graduates from the cohort.

		Graduates				
		Four-Year Graduation Rate by Year				
District	Special Education Status	2016-17	2017-18	2018-19	2019-20	2020-21
Newtown School District	Non-Special Education	98.2	99.0	98.9	99.2	99.4
	Special Education	57.9	65.6	74.4	79.5	72.1

# Five Year Graduation Rates Report

## Five-Year Graduation Rates, Trend

### State of Connecticut, Special Education Status

[Export .csv file](#)

Notes:

- **Five-Year Graduation Rate** is the percentage of students who received a standard diploma within five years, including early and summer graduates from the cohort.

		Graduates				
		Five-Year Graduation Rate by Year				
District	Special Education Status	2015-16	2016-17	2017-18	2018-19	2019-20
State of Connecticut	Non-Special Education	93.0	91.9	93.8	94.2	94.2
	Special Education	72.8	68.2	74.4	73.7	73.6

## Five-Year Graduation Rates, Trend

### Newtown School District, Special Education Status

[Export .csv file](#)

Notes:

- **Five-Year Graduation Rate** is the percentage of students who received a standard diploma within five years, including early and summer graduates from the cohort.

		Graduates				
		Five-Year Graduation Rate by Year				
District	Special Education Status	2015-16	2016-17	2017-18	2018-19	2019-20
Newtown School District	Non-Special Education	99.2	98.2	99.5	99.2	99.7
	Special Education	73.7	62.9	79.1	84.2	86.5

# Six Year Graduation Rates Report

## Six-Year Graduation Rates, Trend State of Connecticut, Special Education Status

[Export .csv file](#)

Notes:

- Six-Year Graduation Rate is the percentage of students who received a standard diploma within six years, including early and summer graduates from the cohort.

		Graduates				
		Six-Year Graduation Rate by Year				
District	Special Education Status	2014-15	2015-16	2016-17	2017-18	2018-19
State of Connecticut	Non-Special Education	92.5	93.1	93.7	94.1	94.3
	Special Education	76.2	77.9	78.8	77.9	76.6

## Six-Year Graduation Rates, Trend Newtown School District, Special Education Status

[Export .csv file](#)

Notes:

- Six-Year Graduation Rate is the percentage of students who received a standard diploma within six years, including early and summer graduates from the cohort.

		Graduates				
		Six-Year Graduation Rate by Year				
District	Special Education Status	2014-15	2015-16	2016-17	2017-18	2018-19
Newtown School District	Non-Special Education	99.5	99.2	98.7	99.5	99.2
	Special Education	78.4	84.2	82.4	86.0	86.5

# Pandemic Recovery Report

The Pandemic Recovery report compares how overall achievement on the state assessments in 2021-22 has changed from 2018-19. The horizontal line (x-axis) shows 2018-19 achievement. The vertical line (y-axis) shows the difference in achievement from 2018-19 to 2021-22. ***If the difference in achievement from 2018-19 to 2021-22 is greater than zero (see horizontal line at 0), then achievement exceeds pre-pandemic levels.*** If the difference is less than zero, then achievement lags pre-pandemic levels.

Select Level

District-Level School-Level

Select Subject

English/Language Arts Mathematics Science

Select Student Group Category

Special Education Status (SWD)

Select Student Group(s)

Student Groups

Select District Type

All Districts

Select District(s)

- New Canaan School Dis...
- New Fairfield School Di...
- New Hartford School Di...
- New Haven School Dist...
- New London School Dis...
- New Milford School Dis...
- Newington School District
- Newtown School District
- Norfolk School District
- North Branford School ...
- North Canaan School Di...
- North Haven School Dis...
- North Stonington Scho...
- Norwalk School District
- Norwich Free Academy ...
- Norwich School District

Change in Performance Index (2018-19 to 2021-22)

Difference 2018-19 to 2021-22



2018-19 Number of Stu...



Student Group

- Students with Disabilities
- Students without Disabilities

Filters Selected: District-Level | English/Language Arts | Special Education Status (SWD) | <No item selected>  
District Type Selected: All Districts | District(s) Selected: Newtown School District

### Select Level

District-Level  School-Level

### Select Subject

English/Language Arts  Mathematics  Science

### Select Student Group Category

Special Education Status (SWD) ▼

### Select Student Group(s)

Student Groups ▼

### Select District Type

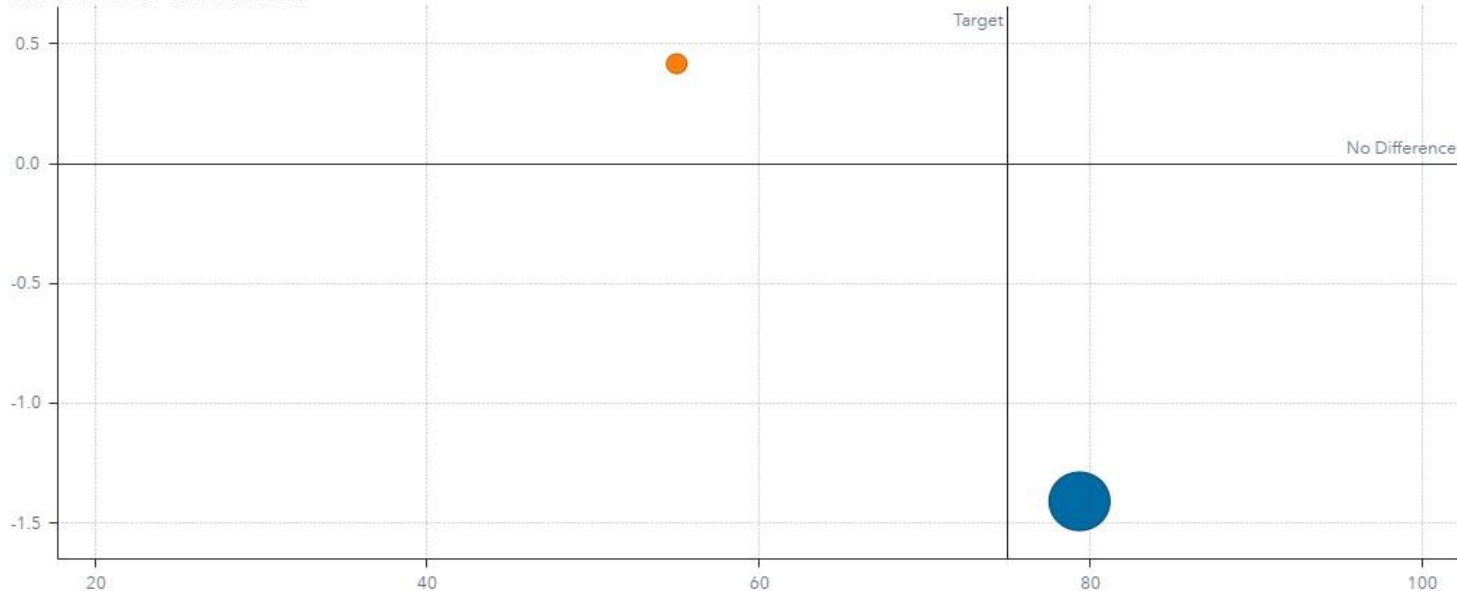
All Districts ▼

### Select District(s)

- Naugatuck School District
- New Beginnings Inc Fa...
- New Britain School Dist...
- New Canaan School Dis...
- New Fairfield School Di...
- New Hartford School Di...
- New Haven School Dist...
- New London School Dis...
- New Milford School Dis...
- Newtown School District
- Norfolk School District
- North Branford School ...
- North Canaan School Di...
- North Haven School Dis...
- North Stonington Scho...

### Change in Performance Index (2018-19 to 2021-22)

Difference 2018-19 to 2021-22



2018-19 Performance Index

2018-19 Number of Stu...



Student Group

- Students with Disabilities
- Students without Disabilities



Select Level

District-Level  School-Level

Select Subject

English/Language Arts  Mathematics  Science

Select Student Group Category

Special Education Status (SWD) ▾

Select Student Group(s)

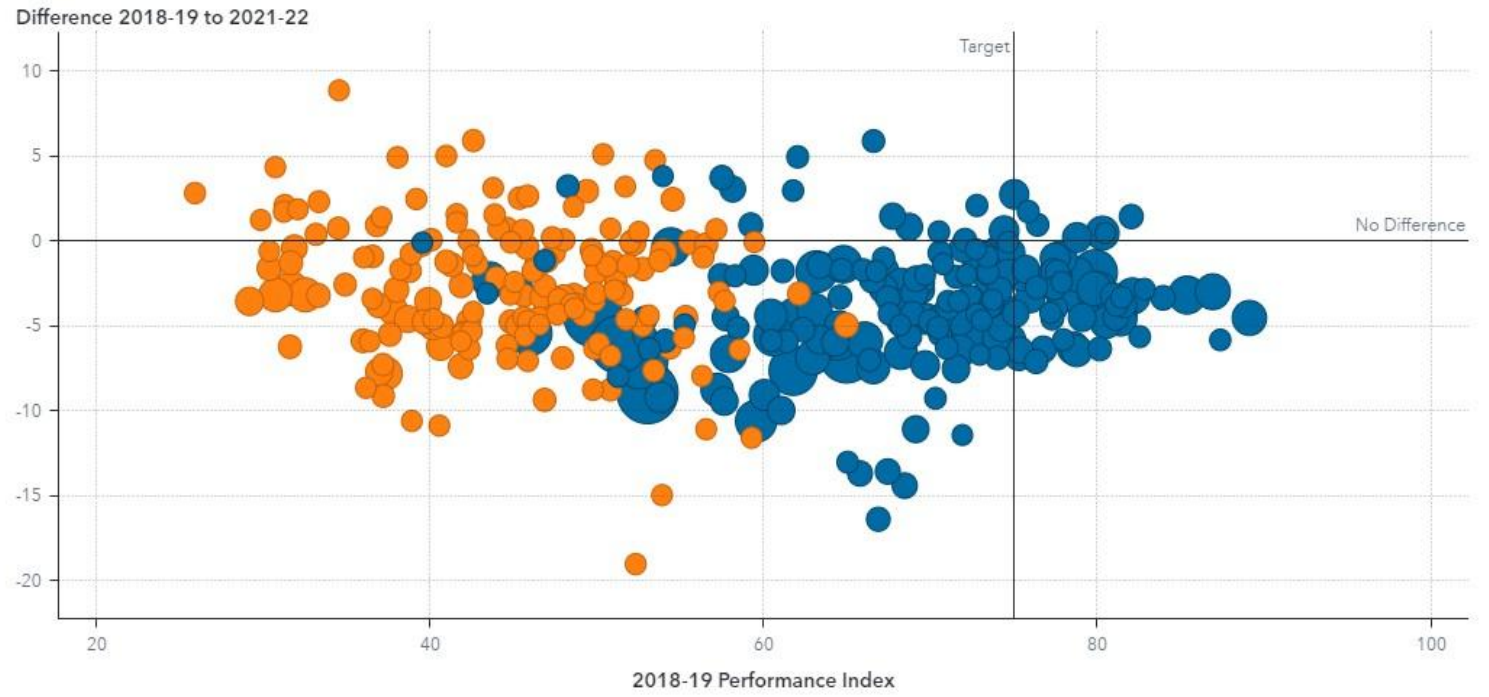
Student Groups ▾

Select District Type

All Districts ▾

- Select District(s)
- New Canaan School Dis...
  - New Fairfield School Di...
  - New Hartford School Di...
  - New Haven School Dist...
  - New London School Dis...
  - New Milford School Dis...
  - Newington School District
  - Newtown School District
  - Norfolk School District
  - North Branford School ...
  - North Canaan School Di...
  - North Haven School Dis...
  - North Stonington Scho...
  - Norwalk School District
  - Norwich Free Academy ...
  - Norwich School District

Change in Performance Index (2018-19 to 2021-22)



2018-19 Number of Stu...



Student Group

- Students with Disabilities
- Students without Disabilities



Filters Selected: District-Level | Mathematics | Special Education Status (SWD) | <No item selected>  
District Type Selected: All Districts | District(s) Selected: Newtown School District

### Select Level

District-Level School-Level

### Select Subject

English/Language Arts Mathematics Science

### Select Student Group Category

Special Education Status (SWD)

### Select Student Group(s)

Student Groups

### Select District Type

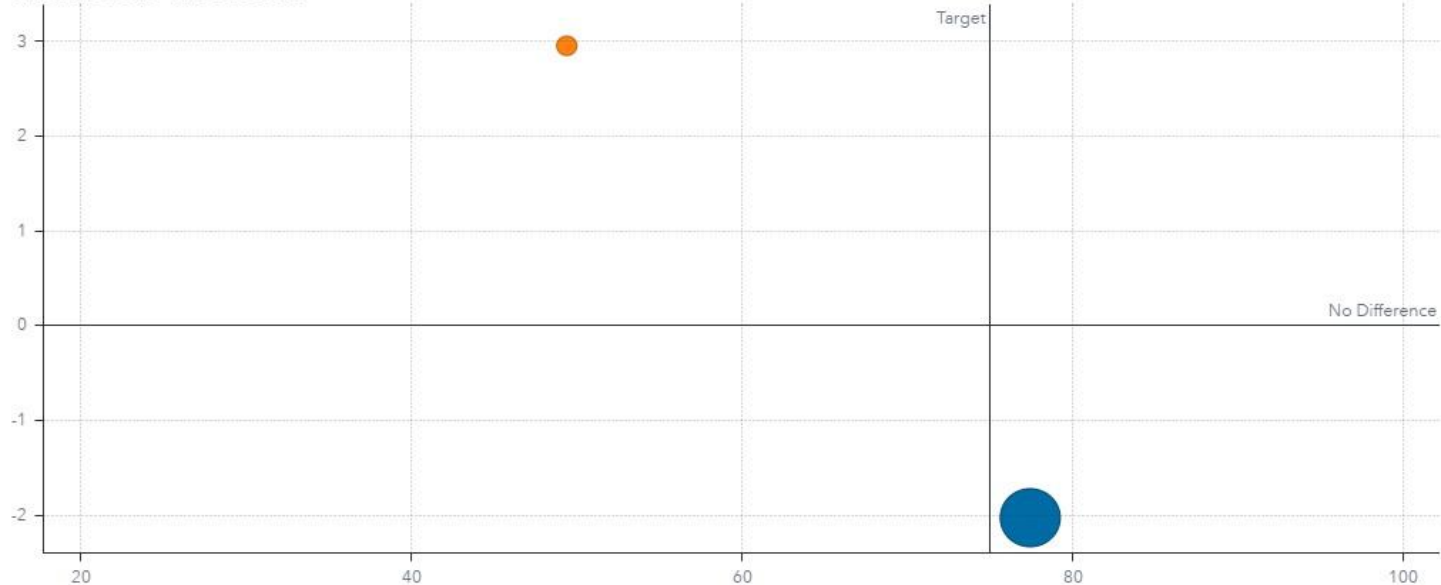
All Districts

### Select District(s)

- Naugatuck School District
- New Beginnings Inc Fa...
- New Britain School Dist...
- New Canaan School Dis...
- New Fairfield School Di...
- New Hartford School Di...
- New Haven School Dist...
- New London School Dis...
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### Change in Performance Index (2018-19 to 2021-22)

Difference 2018-19 to 2021-22



2018-19 Number of Stu...



Student Group

- Students with Disabilities
- Students without Disabilities

# HIGHLIGHTS

- Child Find: Identifying students who require evaluation
- Newtown Special Education students performing higher or commensurate than the 19 other districts in DRG B
- Newtown Special Education students made growth in English and Math as evidenced by the Pandemic Recovery Rate

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# PK-3 Reading Update

Presentation to Board of Education  
December 6, 2022

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Anne Uberti  
Assistant Superintendent

Kara DiBartolo  
Director of Teaching & Learning

# Purpose of Tonight's Presentation

- 1) Provide an understanding of the Science of Reading
- 2) Review the legislation enacted by the state of Connecticut regarding reading
- 3) Outline the process for internal reading review
- 4) Review the Core Review Team's assessment of current programming
- 5) Review the Core Review Team's assessment of approved programs
- 6) Advise the Board the Core Review Team's recommended next steps
- 7) Respond to questions

# The Science of Reading

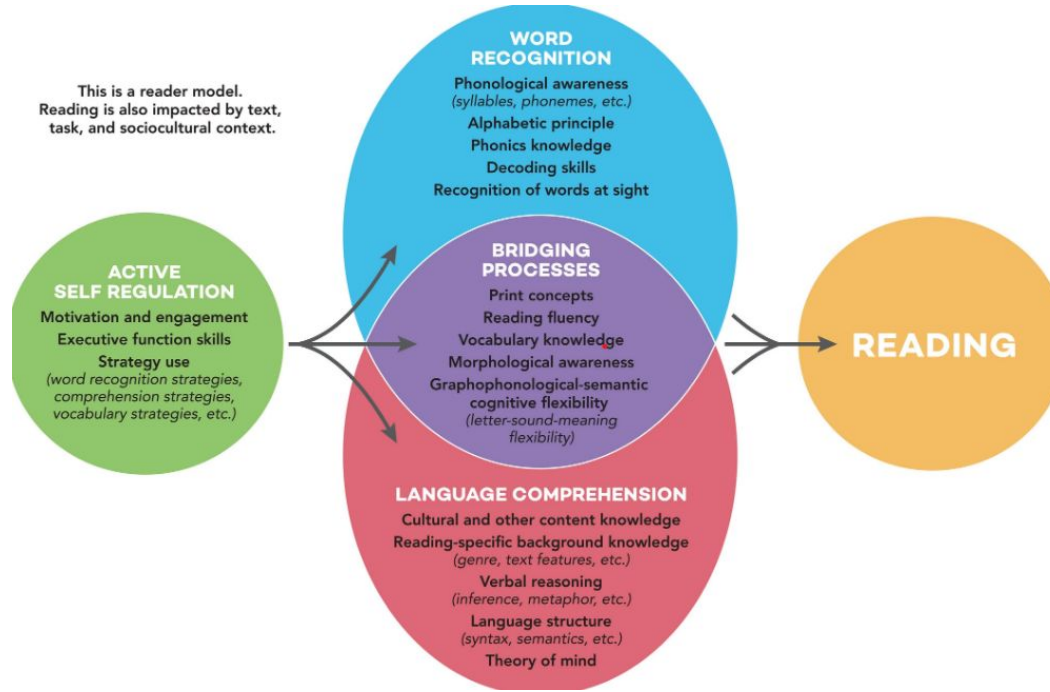
## What it is

- Is a vast, interdisciplinary body of scientifically-based\* research about reading and issues related to reading and writing
- How reading is processed in the brain
- Robust bodies of research address equally vital literacy domains, like writing development, oral language development, the development of English as an additional language, and identity-related aspects of literacy development given that children bring who they are

## What it is not

- An ideology or philosophy
- A fad, trend, new idea, or pendulum swing
- A political agenda
- A one-size-fits-all approach a program of instruction
- A single, specific component of instruction, such as phonic

# Advancement in Research: Active View of Reading



# Instructional Practices Aligned with SOR: Word Recognition

## Examples of instructional practices aligned with findings from the scientific evidence base:

- Phonemic awareness and letter instruction: Instruction in the identification of phonemes in spoken words and how they link to letters.
- Explicit and systematic instruction in how to decode (read) and encode (spell) words, including word part analysis (e.g., syllables, morphemes).
- Connected text reading to build reading accuracy automaticity, fluency, and comprehension.

## Examples of instructional practices **NOT** supported by scientific evidence:

- Emphasis on larger units of speech (syllables, rhyme, onset-rime) rather than individual phonemes.
- Implicit and incidental instruction in word reading, visual memorization of whole words, guessing from context, and picture cues.
- Emphasis on speed or words per minute over accuracy when reading texts (practiced with reading of patterned texts or sustained silent reading for all students).

## Public Act

### No. 21-2 sec. 402 (8c)

- requires the Center for Literacy Research and Reading Success at the CSDE, in consultation with the [Reading Leadership Implementation Council](#);
- review and approve at least five reading curricula/programs;
- that must be implemented by all public-school districts effective the 2023–24 school year.



# Connecticut's Approved K-3 Core Comprehensive Curricula/Programs

- American Reading Company-ARC Core® K-3 (2017)
- Amplify Education Inc.- Core Knowledge Language Arts (CKLA, 2017)
- EL Education, Grades K-3 (2017)
  - Imagine Learning
  - Open Up Resources
- McGraw Hill Education-Wonders (2020)
- Savvas Learning Company-myView Literacy (2020)
- Houghton Mifflin Harcourt: Into Reading

## Commencing July 2023, all Boards of Education are required to:

- ❑ Report and implement Connecticut's PreK to Grade Three Core Comprehensive Reading Curricula and/or Programs approved by the Center.
- ❑ If the local or regional board demonstrates to the Commissioner of Education that such board has insufficient resources or funding to implement any of the approved reading curriculum model or programs, Commissioner shall grant time extension.
- ❑ Commissioner and Center may grant a waiver to local and regional boards of education to implement a model/program other than those approved by Center.
- ✅ Use approved [Universal K-3 Screening Reading Assessments](#) to identify K-3 students.

# 2022 Required Notification

## **By December 16, 2022**

Notify the Reading Center at CSDE of *intentions* for implementation

## **By February 28, 2023**

Submit completed waiver documents

## **By July 1, 2023**

Request of an extension of one year due to insufficient resources or funding

# Evaluation of Curricula and/or Programs

- Who will review programs and conduct the evaluation?
- What should an effective curriculum/program provide?
- To what degree do our current curricula and programs meet the criteria?
- To what degree do the approved programs meet the needs of the district?



# Current Literacy Programming: What We Teach

<b>Phonemic Awareness</b>	<b>Phonics</b>	<b>Comprehension</b>	<b>Fluency</b>	<b>Writing</b>	<b>Vocabulary</b>
Heggerty (Gr. K)	Foundations (Gr. K-2)	TC Reading Units of Study	Heggerty Foundations TC Reading Units of Study	TC Writing Units of Study	Embedded throughout instruction

# Standards Alignment

## Text Quality and Organization

- ❑ Engaging texts with grade-appropriate complexity
- ❑ Text representative of various cultures and perspectives
- ❑ Coherent text sets that build knowledge systematically

## Foundational Skills

- ❑ Materials that support direct teaching and regular practice of foundational skills
- ❑ Lessons and activities that allow for high-quality daily differentiation of foundational skills

## Classroom Tasks and Instruction

- ❑ Most questions, tasks and assignments are text-based, knowledge building and require textual analysis
- ❑ Materials address grade-level language standards
- ❑ Materials that provide explicit instruction in writing and opportunities for a range of authentic writing
- ❑ Materials that engage students in a range of speaking and listening activities
- ❑ Materials that engage students in a volume of in-class and independent reading

# Classroom Application

## Accessibility for Students

- Materials that help teachers support the diverse needs of students
- Materials provide for varied means of demonstrating learning
- Materials that help teachers ensure provide English learners access to grade level content, challenging tasks and opportunities to develop academic language in English
- Materials that include questions and tasks that promote cultural affirmation and value diverse identities, backgrounds and perspectives

## Usability for Teachers

- Lessons and tasks advance student learning with a clear purpose
- Materials that support teachers with classroom routines and structures
- Reasonable and flexible pacing
- Materials include formal and informal assessments that measure learning and inform instruction
- Materials that include rubrics and exemplars to help teachers set clear and high expectations for students
- Materials include guidance and resources to build teachers' knowledge

## Impact on Learning

- Research demonstrates that the materials have a positive impact on student learning within a school year

# Standards Alignment

## Text Quality and Organization

- ☐ Engaging texts with grade-appropriate complexity
- ☐ Text representative of various cultures and perspectives
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# Domain: Classroom Application

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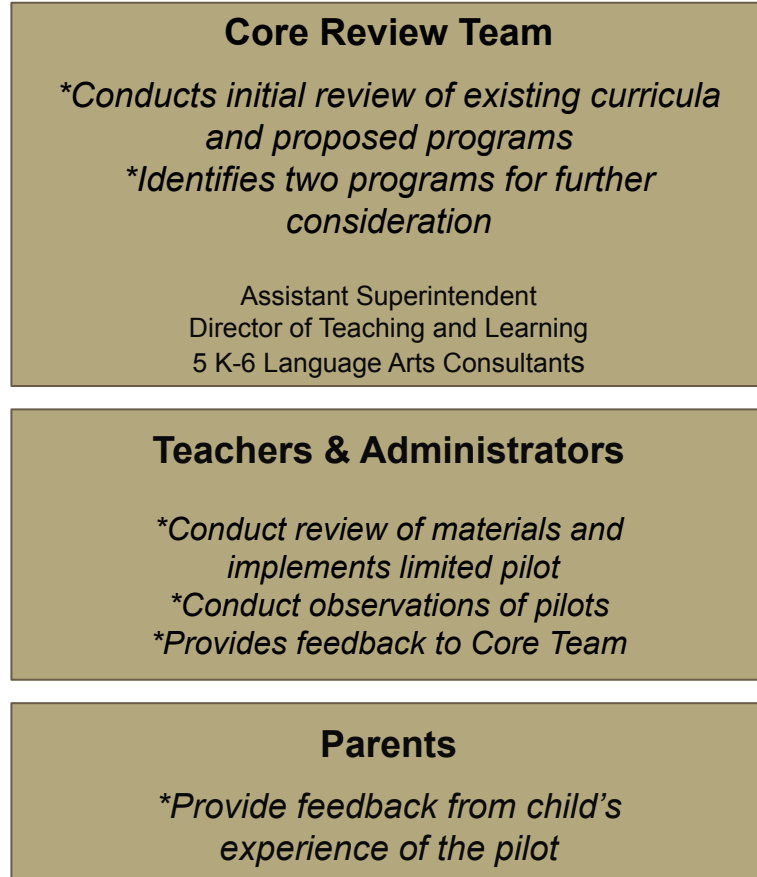
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- Materials include guidance and resources to build teachers' knowledge

## Impact on Learning

- Research demonstrates that the materials have a positive impact on student learning within a school year

# New Program Review



# Timeline

## **December, 2022**

- ❑ As required, notify the CSDE of the District's intention to implement one of the approved reading programs
- ❑ Complete review of approved programs and select two for limited pilot
- ❑ Determine which grades to implement new programs
- ❑ Reallocate existing funds and budget additional funding for the possible purchase of a new program

## **January, 2023**

- ❑ Recruit teachers and plan for a pilot

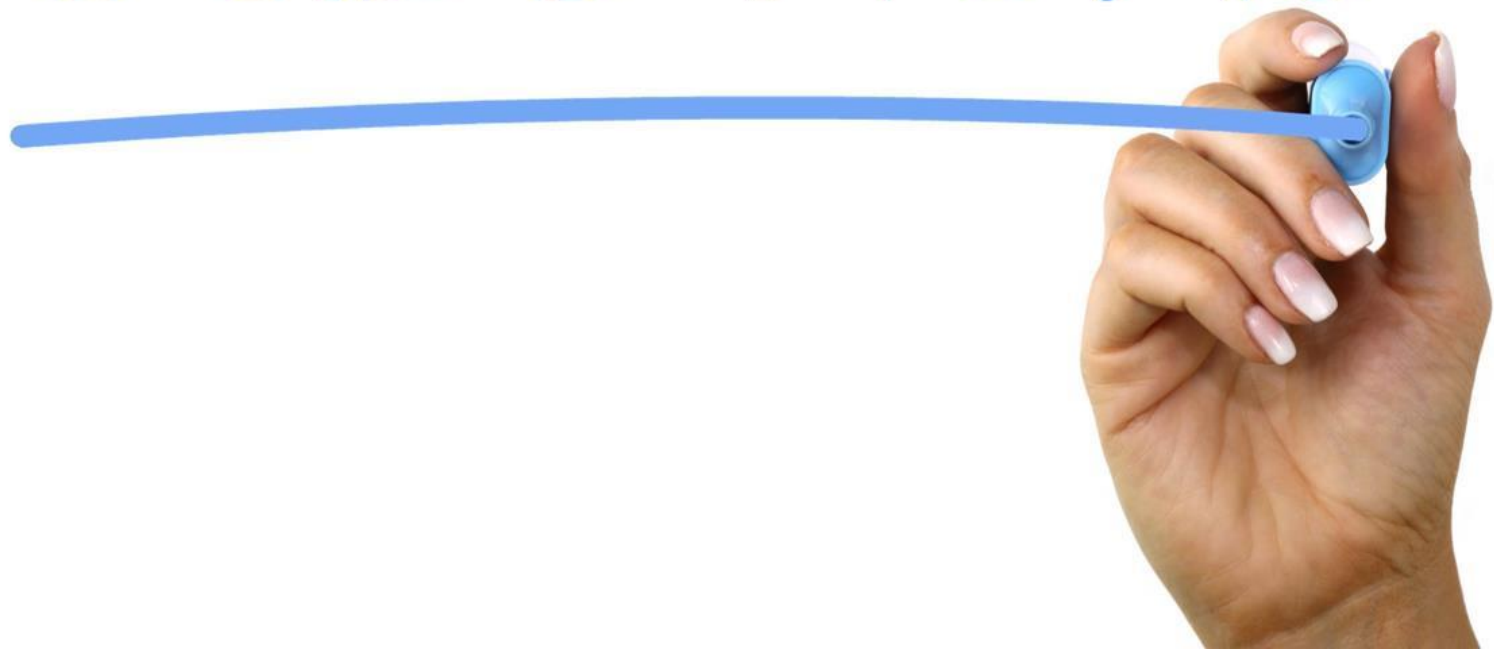
## **February - April, 2023**

- ❑ Implement pilot
- ❑ Conduct structured observations of implementation
- ❑ Gather stakeholder feedback through the pilot process
- ❑ Analyze data and finalize selection
- ❑ Present recommended program to Board for approval

## **May - June, 2023**

- ❑ Order materials and plan professional development for fall 2023

# QUESTIONS





# Greenery (1 & 2)

2 Curriculum Developers | Last Updated: Monday, Oct 31, 2022 by Mullen, Shawn

## Unit Calendar by Year

Unit	Au	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Ju																											
Lessons	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	26	27	28	29	30	31	32	33	34	35	36	37	38
Plant Culture	[Solid black bar]																																					
Plant Science	[Solid black bar]																																					
Plant Classification	[Dotted pattern bar]																																					
Composting & Soil Food Web	[Dotted pattern bar]																																					
Enterprise Practices & Career...	[Solid black bar]																																					

4 5 Units found



# Unit Planner: Plant Culture Greenery (1 & 2)

Newtown High School / 2022-2023 / High School / BEAT/Science / Greenery (1 & 2) / Week 1 - Week 18

Last Updated: Monday, October 31, 2022  
by Shawn Mullen

## Plant Culture

Mullen, Shawn; Stamm, Anastasia

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Interdependence

Concepts: Germination, Propagation, Integrated Pest Management, Wholesale Plug Production, Nursery & Farm Productivity, Plants, Environment

<p><b>G</b> Generalizations / Enduring Understandings</p> <p>1. Germination initiates the process of seeds developing into new plants.</p> <p>2. Propagation produces a new plant from an existing one.</p> <p>3. An environment must be optimized in order to support healthy growth and sustained life</p>	<p><b>Guiding Questions</b> <i>Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]</i></p> <p><b>FACTUAL</b></p> <p>What is Germination? (G1)</p> <p>What is Propagation? (G2, G6)</p> <p>What is Integrated Pest Management? (G3, G5)</p> <p><b>CONCEPTUAL</b></p> <p>How does germination initiate the process of seeds developing into new plants? (G1)</p> <p>How does propagation produce a new plant from an existing one? (G2, G6)</p> <p>How can wholesale plug production drive nursery &amp; farm productivity? (G4)</p> <p>How does Integrated Pest Management relate to a balanced ecosystem? (G3, G5)</p> <p>In what ways can propagation be used to increase greenhouse/farm productivity? (G6)</p> <p><b>PROVOCATIVE</b></p> <p>Is Integrated Pest Management necessary for maintaining a healthy growing environment? (G3, G5)</p> <p>Should greenhouses &amp; farms allow the public to propagate their plants? (G2, G6)</p>
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in plants.

4. Wholesale plug production drives nursery and farm productivity.

5. Integrated Pest Management practices create a balanced ecosystem in the greenhouse and on the farm.

6. Propagation stimulates greenhouse and farm productivity.

## Standard(s)

*Connecticut Core Standards / Content Standards*

**NGSS: Science Performance Expectations (2017)**

**NGSS: HS Life Sciences**

### **HS.Structure and Function**

#### **Performance Expectations**

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

### **HS.Matter and Energy in Organisms and Ecosystems**

#### **Performance Expectations**

HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

### **HS.Interdependent Relationships in Ecosystems**

#### **Performance Expectations**

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.\*

HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on

biodiversity.\*

## **HS.Inheritance and Variation of Traits**

### **Performance Expectations**

HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

## **NGSS: Disciplinary Core Ideas**

### **NGSS: 9-12**

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#### **LS1: From Molecules to Organisms: Structures and Processes**

##### **LS1.A: Structure and Function**

Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1)

##### **LS1.C: Organization for Matter and Energy Flow in Organisms**

The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HS-LS1-5)

## **CT: ASTE-Agricultural Science and Technology Education Standards 2014**

### **Grades 9-12**

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#### **Agriculture, Food, and Natural Resources Foundation Skills**

##### **CT-FS.06. Performance Element: Utilize and maintain tools used in AFNR.**

CT-FS.06.01. Performance Indicator: Evaluate and select the appropriate tool to perform a given task

CT-FS.06.03. Performance Indicator: Maintain tools for efficient use.

#### **Natural Resources Systems**

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and techniques to the management of natural resources.**

**CT-NRS.01. Performance Element: Explain interrelationships between natural resources and humans necessary to conduct management activities in natural environments.**

CT-NRS.04.01. Performance Indicator: Diagnose plant and wildlife diseases and follow protocol to prevent their spread

CT-NRS.04.02. Performance Indicator: Manage insect infestations of natural resources.

#### **Plant Science**

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and techniques to the production and management of plants**

CT-PS.02.02. Performance Indicator: Evaluate soil/media and prepare soil/growth media for use in plant systems

**CT-PS.03. Performance Element: Propagate culture and harvest plants.**



CT-PS.03.01. Performance Indicator: Demonstrate plant propagation techniques.

PS.03.02. Performance Indicator: Develop and implement a plant management plan for crop production.

CT-PS.03.03. Performance Indicator: Develop and implement a plan for integrated pest management

CT-PS.03.04. Performance Indicator: Apply principles and practices of various plant production methods to meet the needs of the market.

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 Access the interactive version of the NGSS [here](#)

### Critical Content & Skills

What students must **KNOW and be able to DO**

Topic	Content	Skills
Seeds	<p>(What students must know in order to demonstrate Skills)</p> <p><b>Explain</b> Germination: Dormancy, Moisture, Temperature, Light, Aeration</p> <p><b>Describe</b> Seed Anatomy: Seed Coat, Cotyledon, Epicotyl, Hypocotyl, Radicle, Embryo</p> <p><b>Identify</b> Plant Parts: Primary Roots, Tap Roots, Root Hairs, Shoots, Stems, Lateral Bud, Terminal Bud, Apical Bud, Leaves</p> <p><b>Recognize</b> Flower Anatomy &amp; Physiology: Stamen, Pistil, Stigma, Anther, Style, Ovary, Sepal, Petal</p> <p><b>Classify</b> Plant Tissues: Parenchyma, Collenchyma, Sclerenchyma, Permanent/Meristematic, Ground Tissue, Vascular Tissue, Dermal Tissue</p>	<p>Seed Starting</p> <p>Propagate Successfully</p> <p>Cross Pollinate Plants</p> <p>Hybridization of Plants</p>
Propagation/Cutting	<p><b>Manage</b> Garden &amp; Greenhouse Environmental Factors: Moisture, Temperature, Lighting, Aeration</p> <p><b>Utilize</b> Safety Practices: Goggles, Gloves, Blades</p> <p><b>Demonstrate</b> Propagation Techniques for Various Plants: Layering, Root Divisions, Asexual Reproduction, Grafting, Optimal Moisture, Optimal Temperature</p> <p><b>Demonstrate</b> use of Propagation Tools &amp; Equipment: Scalpel, Root Hormone, Pruners</p> <p><b>Utilize</b> Cross Pollination Techniques for Various Plants</p> <p><b>Utilize</b> Hybridization Techniques for Various Plants</p> <p><b>Utilize</b> Transplanting Techniques</p>	<p>Implement Safety Practices</p> <p>Observe Environmental Factors</p> <p>Maintain Environmental Factors</p> <p>Manage Tools &amp; Equipment</p> <p>Transplanting Practices</p>
Plugs/Liners	<p><b>Identify</b> Soil Mediums: Clay, Silt, Sand, Humus, Drainage, Water retention, Aeration, Soil-less Mediums, Rockwool, Perlite, Vermiculite, Peet Moss, Coco Coir, Expanded Clay Pellets</p> <p><b>Demonstrate</b> Plug/Liner Production/Process: Vacuum Plug Trays, Wholesale Production, Differences between Plugs &amp; Liners (Seed Grown Juvenile Plants vs Propagated Juvenile Plants), Ebb &amp; Flow</p>	<p>Preparing Soil Mediums</p> <p>Selecting Appropriate Soil Mediums</p>

Watering

**Understand** Connections Between Insects/Fungi/Bacteria for Prevention & Control of Pests

**Describe** Role of Insects: Beneficial Insects, Parasitic Insects, Plant/Insect Relationships

**Describe** Role of Fungi: Beneficial Fungi, Parasitic Fungi, Plant/Fungi Relationships

**Describe** Role of Bacteria (microbes): Beneficial Bacteria, Parasitic Bacteria, Plant/Bacterial Relationships

**Identify** Life Cycles of Pests: Egg, Larva, Pupa, Adult

**Identify** Natural Enemies (different pests have different enemies): Predator, Prey, Parasite

Monitor/Diagnose/Treat:

Prevention of Pests

Observation of Pests

Intervention of Pests

Evaluation of Pests

Develop Treatment Plan 4 Pests

IPM (Integrated Pest Management)

## Core Learning Activities

Seed Germination [Gizmo](#)

Germination [Gizmo](#)

Propagation of Plants [Notes](#)

Propagation of Plants [Worksheet](#)

Propagation of Plants [Crossword](#)

Propagation of Plants [Quiz](#)

IPM (Integrated Pest Management) [Notes](#)

IPM (Integrated Pest Management) [Worksheet](#)

IPM (Integrated Pest Management) [Crossword](#)

IPM (Integrated Pest Management) [Quiz](#)

- Scented Geranium Cuttings
- Banana Root Divisions
- Seed Starting (Germination)
- Preparing & Planting Plug Trays
- Practicing Integrated Pest Management
- Grafting Tomatoes
- Air Layering Fig Plants

- Plant Profiles (Research Project)

Assessments  
 Planting Plugs/Liners  
 Summative:  
 Lab  
 Assignment  
 Planting  
 Rubric

## Resources

*Professional & Student*

### Propagation

\*\* California Rare Fruit Growers - Plant Propagation Chart, Claude Sweet

<http://www.crfq.org/tidbits/protable.html>

\*\* Carolina Biological Supply Company

Possible source for tissue culture kit

<https://www.carolina.com/>

\*\* Fisher Science Education

[https://www.fishersci.com/us/en/education-](https://www.fishersci.com/us/en/education-products.html?LBCID=28393576&href=index.jsp&store=ScienceEducation&segment=scienceEduStandard&storeId=10652)

[products.html?LBCID=28393576&href=index.jsp&store=ScienceEducation&segment=scienceEduStandard&storeId=10652](https://www.fishersci.com/us/en/education-products.html?LBCID=28393576&href=index.jsp&store=ScienceEducation&segment=scienceEduStandard&storeId=10652)

\*\* Food and Agriculture Organization (FAO) - Plant Tissue Culture: An Alternative for Production of Useful Metabolite

<http://www.fao.org/docrep/t0831e/t0831e00.htm>

\*\* Home Harvest Garden Supply - Plant Propagation

<http://plantpropagation.com/>

\*\* Kitchen Culture Kits

This site concerns tissue culture kits for "classroom and home."

<http://www.kitchenculturekit.com/>

\*\* North Carolina Cooperative Extension - Plant Propagation by Stem Cuttings: Instructions for the Home Gardener

<https://content.ces.ncsu.edu/plant-propagation-by-stem-cuttings-instructions-for-the-home-gardener>

\*\* Ohio State University - Propagating Plants, Part I

<https://plantfacts.osu.edu/movies/abstract.lasso?id=2102a>

\*\* Ohio State University - Propagating Plants, Part II

<https://plantfacts.osu.edu/movies/abstract.lasso?id=2102b>

\*\* Online Biology Book - Cell Division: Meiosis and Sexual Reproduction

<http://www2.estrellamountain.edu/faculty/farabee/biobk/BioBookmeiosis.html>

\*\* Texas A & M University - The Many Dimensions of Plant Tissue Culture Research

<https://aggie-horticulture.tamu.edu/tisscult/pltissue/pltissue.html>

\*\* Texas A & M University - Plant Propagation

<https://aggie-horticulture.tamu.edu/earthkind/landscape/plant-propagation/>

\*\* Texas A & M University - Plant Tissue Culture Information Exchange

<https://aggie-horticulture.tamu.edu/tisscult/tcintro.html>

\*\* University of Arizona - Meiosis Tutorial

[http://www.biology.arizona.edu/CELL\\_BIO/tutorials/meiosis/main.html](http://www.biology.arizona.edu/CELL_BIO/tutorials/meiosis/main.html)

\*\* University of Nebraska - How Is Tissue Culture Done?

<http://passel.unl.edu/pages/informationmodule.php?idinformationmodule=957885612&topicorder=4&>

[maxto=8&minto=1](#)

### **Integrated Pest Management**

\*\* Entomology Research Laboratory - Greenhouse IPM  
<https://www.uvm.edu/~entlab/Greenhouse%20IPM/UVMGreenhouseIPM.html>

\*\* Greenhouseipm.org - Integrated Pest Management Basics  
Open each section heading to see detailed information.  
<http://greenhouseipm.org/ipm-basics/>

\*\* Michigan State University - A guide to Greenhouse Sanitation for Growers  
A guide to preparing a greenhouse for a new growing season  
[http://www.canr.msu.edu/news/a\\_guide\\_to\\_greenhouse\\_sanitation\\_for\\_growers\\_prepare\\_now\\_sweat\\_less\\_later](http://www.canr.msu.edu/news/a_guide_to_greenhouse_sanitation_for_growers_prepare_now_sweat_less_later)

\*\* Michigan State University Extension - Integrated Pest Management for Greenhouse Crops  
<https://www.canr.msu.edu/outreach/uploads/files/7-7%20IPM%20factsheet%20JEANNE.pdf>

\*\* University of California - Best Management Practices for Bedding and Container Color Plant Production in California  
<https://mpparrella.faculty.ucdavis.edu/wp-content/uploads/sites/186/2015/02/Bedding-and-Container-Color-Plant-Best-Management-Practices.pdf>

\*\* University of Connecticut - Greenhouse Integrated Pest Management  
<http://ipm.uconn.edu/documents/view.php?id=1095>

\*\* University of Massachusetts Extension - IPM Scouting and Decision Making  
<https://ag.umass.edu/greenhouse-floriculture/fact-sheets/ipm-scouting-decision-making>

\*\* Utah State University Extension - IPM for Greenhouse and Nursery Crops  
This is a PowerPoint presentation with many photographs.  
<https://utahpests.usu.edu/slideshows/ppt/10sh-IPM-greenhouse.pdf>

Student Learning Expectation & 21st Century Skills

Information Literacy  
Critical Thinking  
Spoken Communication  
Written Performance

### Interdisciplinary Connections

Biology

Botany

Chemistry

Ecology

Environmental Science

Geology

Language Arts

Personal Financial Literacy

Business Foundations

Digital Media & Communications

Fine Arts



# Unit Planner: Plant Science Greenery (1 & 2)

Friday, October 20, 2023 12:11:11

Newtown High School / 2022-2023 / High School / BEAT/Science / Greenery (1 & 2) / Week 1 - Week 18

Last Updated: Monday, October 31, 2022  
by Shawn Mullen

## Plant Science

Mullen, Shawn; Stamm, Anastasia

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Structure/Function

Concepts: Dormancy, Hardiness, Pollination, Photosynthesis, Ecosystems

G	Guiding Questions
Generalizations / Enduring Understandings	<b>Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]</b>
1. Hardiness determines the environment a plant can survive in.	<p><b>FACTUAL</b></p> <p>What is pollination? (G3, G5)</p> <p>What is dormancy? (G2, G5)</p> <p>What determines hardiness? (G1, G5)</p> <p>What is photosynthesis? (G4, G5)</p> <p>What is an ecosystem? (G4)</p>
2. Dormancy functions to protect plants from harsh environments.	<p><b>CONCEPTUAL</b></p> <p>What structural systems play specific roles in the function &amp; health of plants? (G5)</p> <p>What function do pollinators serve to ensure survival of plant species? (G3, G5)</p>
3. Pollination ensures the survival of a plant species.	<p>How does photosynthesis drive the ecosystem of our plant? (G4)</p> <p><b>PROVOCATIVE</b></p>
4. Photosynthesis drives the ecosystem	<p>How might our ecosystem function if photosynthesis didn't happen? (G4)</p> <p>What is the best way to protect native pollinators? (G3, G5)</p>

of our planet.

5. Structural systems play specific roles in the function and health of a plant to promote growth, survival, and reproduction

## Standard(s)

*Connecticut Core Standards / Content Standards*

**NGSS: Science Performance Expectations (2017)**

**NGSS: HS Life Sciences**

### **HS.Structure and Function**

#### **Performance Expectations**

HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

### **HS.Matter and Energy in Organisms and Ecosystems**

#### **Performance Expectations**

HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

### **HS.Inheritance and Variation of Traits**

#### **Performance Expectations**

HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

**CT: ASTE-Agricultural Science and Technology Education Standards 2014**

**Grades 9-12**

**Agriculture, Food, and Natural Resources Foundation Skills**

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and practices to all areas of agriculture**

**CT-FS.01. Performance Element: Examine the importance of health, s management systems in organizations and their importance to performance and regulatory safety, and environmental compliance.**

CT-FS.01.01. Performance Indicator: Safety with Contaminants and Equipment: Understand the concepts and procedures of handling contaminants, chemicals and related equipment in an agricultural setting.

**CT-FS.02. Performance Element: Career Success: Demonstrate those qualities, attributes and skills necessary to succeedin, or further prepare for, a chosen career.**

CT-FS.02.01. Performance Indicator: Understand the use and application of information-based technologies necessary for career success in agriculture

**Plant Science**

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and techniques to the production and management of plants**

CT-PS.01.02. Performance Indicator: Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.

CT-PS.01.03. Performance Indicator: Apply knowledge of plant physiology and energy conversion to plant systems

CT-PS.02.01. Performance Indicator: Determine the influence of environmental factors on plant growth.

CT-PS.02.03. Performance Indicator: Develop and implement a fertilization plan for specific plants or crops.

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 Access the interactive version of the NGSS [here](#)

**Critical Content & Skills**

*What students must **KNOW and be able to DO***

<u>Topic</u>	<u>Content</u>	<u>Skills</u>
	(What students must know in order to demonstrate Skills)	
Plant Groups: Clades, Monocot/Dicot, Flowering/Non-Flowering, Vascular/Non-Vascular	<b>Differentiate</b> between Clade Types <b>Analyze</b> Cladogram Maps	<b>Create</b> Cladogram Maps <b>Identify</b> Monocot/Dicot, Flowering/Non-Flowering,



	<b>Compare</b> the functions of Monocot/Dicot Organisms	Vascular/Non-Vascular
	<b>Compare</b> the functions of Flowering/Non-Flowering Organisms	<b>Categorize</b> Monocot/Dicot, Flowering/Non-Flowering, Vascular/Non-Vascular
	<b>Compare</b> the functions of Vascular/Non-Vascular Organisms	<b>Diagram</b> Monocot/Dicot, Flowering/Non-Flowering, Vascular/Non-Vascular
	<b>Identify</b> Plant Structures: Shoots, Roots, Leaves, Flowers, Seeds, Nodes	<b>Utilize</b> Microscopy to <b>Diagram:</b> Tissue Types, Cell Types, Cell Anatomy, Plant/Cell Organelles, etc
Plant Parts: Tissue Types, Dormancy, Hardiness	<b>Examine</b> Plant Tissues: Parenchyma, Collenchyma, Sclerenchyma, Permanent/Meristematic, Ground Tissue, Vascular Tissue, Dermal Tissue	<b>Identify &amp; Label</b> Plant Parts, Tissue Types, Cell Types, Cell Anatomy, Plant/Cell Organelles, etc
	<b>Interpret</b> Dormancy functions: Hibernation, Weather/Climate, Drought	
	<b>Classify</b> Hardiness: Global Plant Hardiness Zones	
	<b>Explain</b> the function of Germination: Dormancy, Moisture, Temperature, Light, Aeration	<b>Identify</b> Plant Life Cycle Stages
	<b>Describe</b> Seed structure & anatomy: Seed Coat, Cotyledon, Epicotyl, Hypocotyl, Radicle, Embryo	<b>Diagram</b> Plant Life Cycle Stages
Plant Life Cycles	<b>Describe</b> Pollination: Flower, Pollen, Indigenous, Symbiosis, Pesticides	<b>Manipulate</b> Plant Life Cycle Stages
	<b>Discuss</b> Pollinators: Insects, Mammals, Wind, Rain, Manual (Humans)	
	<b>Survey</b> Generation structure: Meiosis, Hybridization, Seed Saving Practices, Fertilization, Spore, Sporophyte, Sporangium, Gametophyte, Haploid, Diploid	
	<b>Summarize</b> the function of Photosynthesis: Sunlight, Catalyst, Carbon Dioxide, Water, Glucose, Oxygen, Photons, Chloroplast, Chlorophyll	<b>Diagram</b> Process of Photosynthesis
	<b>Identify</b> the function of Micro/Macro Nutrients & <b>Indicate</b> the function of Necessary Elements & Minerals: Nitrogen, Phosphorus, Potassium, Calcium, Sulfur, Magnesium, Iron, Manganese, Copper, Zinc, Boron, Chloride, Molybdenum	<b>Test</b> for Micro/Macro Nutrient Levels
Plant Nutrition		<b>Diagnose &amp; Treat</b> Nutrient Deficiencies
	<b>Recognize</b> Nutrient Deficiencies: Overwatering, Compacted Soil, Uptake, PH, Air Flow, Soil Consistency, Organic Materials	<b>Survey</b> Elements & Minerals in Garden
		<b>Feed &amp; Maintain</b> Various Plants in the Garden & Greenhouse

## Core Learning Activities

Microscope practice [Virtual Microscope Lab](#)

ID and Label plant parts, flower anatomy, and life cycles

Purpose games Students race to label various diagrams

From seed to fruit Label the life cycle

Photosynthesis lab (elodea) Elodea Photosynthesis Lab

Cladograms GIZMO

Essential Nutrients Slideshow

Essential Nutrients Background Information

Essential Nutrients Worksheet

Essential Nutrients Crossword Puzzle

Essential Nutrients Test

Nutrient Deficiencies Notes

Nutrient Deficiencies Worksheet

Nutrient Deficiencies Crossword

Nutrient Deficiencies Quiz

Plant Anatomy Slideshow

Plant Anatomy Background

Plant Anatomy Worksheet

Plant Anatomy Crossword

Plant Anatomy Test

Structure of Plants Slideshow

Structure of Plants Background

Structure of Plants Vocabulary

Structure of Plants VEGETATIVE MORPHOLOGY OF FLOWERING PLANTS

Structure of Plants Worksheet

Structure of Plants Crossword

Structure of Plants Test

<b>Assessments</b>	<b>Resources</b> <i>Professional &amp; Student</i>  * Reed College - Nitrogen Fixation <a href="http://www.reed.edu/biology/Nitrogen/">http://www.reed.edu/biology/Nitrogen/</a>  ** e-Gro webinar - Identification of Nutrient Deficiencies (Greenhouse Plants) 42:19-minute video <a href="https://www.youtube.com/watch?v=Cq9tTqMxh2o">https://www.youtube.com/watch?v=Cq9tTqMxh2o</a>  ** Greenhouse Product News - Diagnosing Bedding Plant Nutrient Deficiencies Includes descriptions and many photos <a href="http://gpnmag.com/wp-content/uploads/diagnosingbeddingplant.pdf">http://gpnmag.com/wp-content/uploads/diagnosingbeddingplant.pdf</a>  ** International Plant Nutrition Institute <a href="http://www.ipni.net/">http://www.ipni.net/</a>  ** Michigan State University Extension - Disease or Disorder: How Do I Tell the Difference? Part 1 Discusses common problems related to nutritional disorders and provides pictures <a href="http://www.canr.msu.edu/news/disease_or_disorder_how_do_i_tell_the_difference_part_1">http://www.canr.msu.edu/news/disease_or_disorder_how_do_i_tell_the_difference_part_1</a>  ** Michigan State University Extension - Six Steps to Identifying Nutrient Deficiencies in Ornamental Plants Includes a plant nutrient deficiency key <a href="http://www.canr.msu.edu/news/six_steps_to_identifying_nutrient_deficiencies_in_ornamental_plants">http://www.canr.msu.edu/news/six_steps_to_identifying_nutrient_deficiencies_in_ornamental_plants</a>  ** North Carolina State University Extension - Managing Micronutrients in the Greenhouse <a href="https://hortscans.ces.ncsu.edu/uploads/m/a/managing_51e6d89fe35b2.pdf">https://hortscans.ces.ncsu.edu/uploads/m/a/managing_51e6d89fe35b2.pdf</a>  ** OFA Association of Floriculture Professionals - Geranium Nutrient Deficiencies: A Visual Primer for Grower Diagnosis & Correction Includes many photographs of various nutrient deficiencies in geraniums <a href="https://www.ars.usda.gov/ARSUserFiles/50820500/Publications/FertilityManagement/OFA%20geranium%20nutrient%20deficiencies.pdf">https://www.ars.usda.gov/ARSUserFiles/50820500/Publications/FertilityManagement/OFA%20geranium%20nutrient%20deficiencies.pdf</a>  ** Promix Training Center <a href="https://www.pthorticulture.com/en/training-center/">https://www.pthorticulture.com/en/training-center/</a>  ** University of Florida - Fertilizer Management for Greenhouse Vegetables <a href="http://edis.ifas.ufl.edu/cv265">http://edis.ifas.ufl.edu/cv265</a>
<b>Student Learning Expectation &amp; 21st Century Skills Information</b>	<b>Interdisciplinary Connections</b>  Biology  Botany

Literacy  
Critical  
Thinking  
Spoken  
Communication  
Written  
Performance

Chemistry  
Ecology  
Environmental Science  
Geology  
Language Arts  
Personal Financial Literacy  
Business Foundations  
Digital Media & Communications  
Fine Arts



# Unit Planner: Plant Classification Greenery (1 & 2)

Friday, November 4, 2023 10:41 AM

Newtown High School / 2022-2023 / High School / BEAT/Science /  
Greenery (1 & 2) / Week 11 - Week 17

Last Updated: Monday, October 31, 2022 by  
Anastasia Stamm

## Plant Classification

Mullen, Shawn; Stamm, Anastasia

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Relationship

Concepts: Evolution, Traits, Classification, Hosts, Survival, Indigenous, Invasive, Ecosystems

G

#### Generalizations / Enduring Understandings

1. Evolution impacts traits and relates to plant classification.
2. Hosts maintain survival of another organism.
3. Indigenous populations require similar conditions for survival.
4. Invasive organisms interrupt ecosystems.

#### Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

#### FACTUAL

What is evolution? (G1)

What is a host plant? G2)

What does it mean when a plant is referred to as indigenous? (G3)

What does it mean when a plant is referred to as invasive? (G4)

What indigenous plants are common in our area? (G3)

What invasive plants negatively effect our area? (G4)

What is binomial nomenclature? (G1)

#### CONCEPTUAL

What does evolution look like in plant species? (G1)

Why are host plants considered keystone species? (G2)

How can we use the Linnaeus Classification system to identify plant species? (G1)

How does the Linnaeus Classification system demonstrate

plant species evolutionary relationships? (G1)

How does variation in traits among plant species impact binomial nomenclature? (G1)

PROVOCATIVE

What species could we plant at NHS to help pollinators mitigate the effects of local construction? (G2, G3)

Can invasive plants interrupt an ecosystem in a positive way? (G4)

## Standard(s)

*Connecticut Core Standards / Content Standards*

**NGSS: Science Performance Expectations (2017)**

**NGSS: HS Life Sciences**

### **HS.Matter and Energy in Organisms and Ecosystems Performance Expectations**

HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

### **HS.Interdependent Relationships in Ecosystems Performance Expectations**

HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.\*

HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.\*

### **HS.Inheritance and Variation of Traits Performance Expectations**

HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

## HS.Natural Selection and Evolution

### Performance Expectations

HS-LS4-1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

HS-LS4-2. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

## NGSS: Disciplinary Core Ideas

### NGSS: 9-12

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#### LS3: Heredity: Inheritance and Variation of Traits

##### LS3.B: Variation of Traits

Environmental factors also affect expression of traits, and hence affect the probability of occurrences of traits in a population. Thus the variation and distribution of traits observed depends on both genetic and environmental factors. (HS-LS3-2),(HS-LS3-3)

## CT: ASTE-Agricultural Science and Technology Education Standards 2014

### Grades 9-12

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#### Plant Science

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and techniques to the production and management of plants**

CT-PS.01.01. Performance Indicator: Classify agricultural plants according to taxonomy systems

CT-PS.01.02. Performance Indicator: Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.

CT-PS.02.01. Performance Indicator: Determine the influence of environmental factors on plant growth.

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Access the interactive version of the NGSS [here](#)

## Critical Content & Skills

*What students must **KNOW and be able to DO***

### Content

#### Topic

(What students must know in order to demonstrate Skills)

#### Skills

Indigenous Plants

**Locate** Host Plants, Indigenous Plants, Invasive Plants, Keystone Species.

**Identify** Keystone Species within our Local

**Defend** Identification of Host Plants, Indigenous Plants, Invasive Plants.

**Discuss** the relationship of Host Plants, Indigenous Plants, Invasive Plants.

Binomial  
Nomenclature

**Classify** Plants: Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species

Environment

**Map** Host Plants, Indigenous Plants

**Remove** Invasive Plants

**Classify** Plants with the Linnaeus System  
**Name** Plants Utilizing Binomial Nomenclature

**Compare** Characteristics of Plants using Binomial Nomenclature

**Organize** Plant Fruits & Flowers according to Characteristics within the Linnaeus System

## Core Learning Activities

Planting Pollinator Garden

Pollinator [Pathway](#) Site Assessment

Using Native Plants [Notes](#)

Using Native Plants [Worksheet 1](#)

Using Native Plants [Worksheet 2](#)

Using Native Plants [Worksheet 3](#)

Using Native Plants [Worksheet 4](#)

Using Native Plants [Crossword](#)

Using Native Plants [Quiz](#)

Classifying and Naming Plants (Taxonomy) [Notes](#)

Classifying and Naming Plants (Taxonomy) [Worksheet](#)

Classifying and Naming Plants (Taxonomy) [Crossword](#)

Classifying and Naming Plants (Taxonomy) [Quiz](#)

Using Dichotomous Keys [GIZMO](#)

Assessments

Resources

*Professional & Student*



### Using Native Plants

\*\* Minnesota Department of Natural Resources -  
Landscaping with Native Plants

A good example of information provided by a state. Includes landscaping information, plant sources, species listing, etc.  
<https://www.dnr.state.mn.us/gardens/nativeplants/index.html>

\*\* K-State University - Prairie Flowers: Hardy for Kansas  
2:12-minute video shows examples of native plants suitable for Kansas.

<https://www.youtube.com/watch?v=Wi8Nq4REB2g>

\*\* PlantNative - Making a Naturescape Plan

Choosing native trees, shrubs and herbaceous plants for an urban setting

[http://www.plantnative.org/how\\_plan.htm](http://www.plantnative.org/how_plan.htm)

\*\* PlantNative - Community Services Directory

Find national or regional organizations offering information about native plantings.

[http://www.plantnative.org/cs\\_nat\\_reg.htm](http://www.plantnative.org/cs_nat_reg.htm)

\*\* University of Florida Extension - Native Plants: An Overview

A fact sheet on how "native" is defined

<http://edis.ifas.ufl.edu/ep297>

\*\* University of Illinois - Using Native Plants in the Garden

<https://extension.illinois.edu/downloads/hkmw/45648.pdf>

\*\* Utah State University Forestry Extension - Are Native Trees Always the Best Choices?

<https://forestry.usu.edu/trees-cities-towns/tree-selection/native-trees>

\*\* Wild Ones

A not-for-profit environmental education group advocating native plants and natural landscapes

<https://wildones.org/>

### Student Learning Expectation & 21st Century Skills

Information Literacy

Critical Thinking

Spoken Communication

Written Performance

### Interdisciplinary Connections

Biology

Botany

Chemistry

Ecology

Environmental Science

Geology

Language Arts

Personal Financial Literacy

Business Foundations

Digital Media & Communications

Fine Arts



# Unit Planner: Composting & Soil Food Web Greenery (1 & 2)

Friday, November 4, 2023, 1:47 PM

Newtown High School / 2022-2023 / High School / BEAT/Science / Greenery (1 & 2) / Week 1 - Week 10

Last Updated: Monday, October 31, 2022  
by Shawn Mullen

Composting & Soil Food Web  
Mullen, Shawn; Stamm, Anastasia

- [Unit Planner](#)
- [Lesson Planner](#)

## Concept-Based Unit Development Graphic Organizer (Download)

### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

Please attach your completed Unit Web Template here

Lens: Interdependence

Concepts: Soil, Organisms, Plants, Decomposition, Survival, Nutrition, Environment, Ecosystem

#### G Generalizations / Enduring Understandings

1. Soil, a complex living ecosystem, comprises billions of organisms from thousands of species.

2. All plants - grass, trees, shrubs, agricultural crops - depend on the soil food web for their nutrition.

3. Microorganisms can only survive in optimal conditions.

4. Decomposition of organic

#### Guiding Questions

**Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]**

#### FACTUAL

What is the soil food web? (G2)

What is decomposition? (G5)

What is a healthy ecosystem? (G1, G5)

What is PH? (G3)

What is moisture? (G3)

What is temperature? (G3)

What is air flow? (G3)

What is symbiosis? (G2, G5)

What roles do microorganisms play in the soil food web? (G2, G3)

#### CONCEPTUAL

What are optimal conditions for microorganism survival? (G3)

How does soil quality impact plant survival? (G1, G3)

How does PH Level effect soil and compost? (G3)

matter in soils is vital for the survival of any ecosystem.

5. As individual plants and soil organisms work to survive, they depend on interactions with each other.

What is the relationship between plants, soil, and nutrients? (G2, G5)

How can moisture content effect the rate of decomposition within a compost pile? (G4)

What could happen to plants if decomposition did not occur? (G4, G5)

PROVOCATIVE

What is the most effective method of starting a compost pile? (G4, G5)

Is composting food scraps from a home kitchen worthwhile? (G2)

## Standard(s)

*Connecticut Core Standards / Content Standards*

**NGSS: Science Performance Expectations (2017)**

**NGSS: HS Life Sciences**

### **HS.Matter and Energy in Organisms and Ecosystems**

#### **Performance Expectations**

HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

### **HS.Interdependent Relationships in Ecosystems**

#### **Performance Expectations**

HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.\*

**CT: CTE: Agricultural Science (2011)**

**Grades 9-12**

#### **Plant Science**

**A. Plant Science: Understand the concepts and skills necessary related to plant science technology.**

3. Describe the influence of soil (including growing media), water and other environmental factors on horticultural plant growth.

**CT: ASTE-Agricultural Science and Technology Education Standards 2014**

**Grades 9-12**

#### **Agriculture, Food, and Natural Resources Foundation Skills**

**CT-FS.09. Performance Element: Scientific Inquiry: Utilize scientific inquiry as an investigative method.**

CT-FS.09.02. Performance Indicator: Design and conduct a scientific investigation.

#### **Natural Resources Systems**

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and techniques to the management of natural resources.**

**CT-NRS.01. Performance Element: Explain interrelationships between natural resources and humans necessary to conduct management activities in natural environments.**

CT-NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of natural resource systems

CT-NRS.01.02. Performance Indicator: Classify natural resources.

CT-NRS.02.01. Performance Indicator: Develop a safety plan for work with natural resources.

CT-NRS.06.01. Performance Indicator: Apply soil science principles to environmental service systems

**Plant Science**

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and techniques to the production and management of plants**

CT-PS.02.02. Performance Indicator: Evaluate soil/media and prepare soil/growth media for use in plant systems

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**Critical Content & Skills**

*What students must **KNOW and be able to DO***

TOPIC	CONTENT	SKILLS
Microbes	<b>Describe</b> the effects of "Good" Microbes and "Bad" Microbes in Compost & Soil	<b>Harvest</b> Lactobacillus bacteria from rice
	<b>Explain</b> the role of Microbes in Compost & Soil	<b>Make</b> Compost Teas
	<b>Select</b> the best method for harvesting Microbes from Compost & Soil	<b>Apply</b> Compost Teas
	<b>Manage</b> the Microbes in Compost & Soil	<b>Inoculate</b> Soil with Lactobacillus
	<b>Distinguish</b> between three groups of bacteria working at three different temperature zones: Psychrophilic, Mesophilic, and Thermophilic bacteria	
Micro & Macro Invertebrates	<b>Define</b> the role of Micro-invertebrates / Macro-invertebrates in the Food Web and Decomposition.	<b>Identify</b> the Role of Micro-invertebrates / Macro-invertebrates in the Food Web and Decomposition.
	<b>Explain</b> positive & negative effects of Micro-invertebrates / Macro-invertebrates in the Food Web and Decomposition.	<b>Predict</b> positive & negative effects of Micro-invertebrates / Macro-invertebrates in the Food Web and Decomposition in the Garden at NHS.
	<b>Explain</b> the role of PH, Moisture, Temperature, and Air Flow in maintaining a productive compost pile.	<b>Monitor</b> the moisture, pH, air flow, and temperature in our school compost pile.
Environmental Factors	<b>Define</b> the three phases that compost can be in under various temperatures: Psychrophilic, Mesophilic, and Thermophilic phases.	<b>Amend</b> the compost pile according to moisture, pH, air flow, and temperature
	<b>Explain</b> how PH, Moisture, Temperature, and Air Flow	<b>Determine</b> the current phase of the composting process by measuring the

are interdependent to one another in composting and decomposition.

**Identify** Micro/Macro Nutrients & **Indicate** Necessary Elements & Minerals: Nitrogen, Phosphorus, Potassium, Calcium, Sulfur, Magnesium, Iron, Manganese, Copper, Zinc, Boron, Chloride, Molybdenum

Elements and Minerals

**Monitor** environmental factors (PH, Moisture, Temperature, Air Flow) in nutrient uptake.

**Explain** effects of environmental factors (PH, Moisture, Temperature, Air Flow) in nutrient uptake.

**Utilize** Mycorrhizal Fungi in soil and compost

Fungi

**Understand** complex interrelationship of plants & fungi

**Describe** symbiotic relationship of fungi and plants

temperature within the compost pile.

**Identify** when it is appropriate to mix the contents of the pile according to temperature.

**Test** soil and compost for Nutrient Levels

**Make** amendment decisions based on Nutrient Level in soil and compost

**Survey** Elements & Minerals in soil and compost

**Feed & Maintain** soil and compost in the Garden & Greenhouse

**Harvest** indigenous fungi

**Monitor** campus fungi levels

**Adjust** environmental factors (PH, Moisture, Temperature, Air Flow) to ensure fungi grow and thrive.

## Core Learning Activities

Composting [Slideshow](#)

Composting [Vocabulary](#)

Composting [Worksheet](#)

Composting [Crossword Puzzle](#)

Compost [campaign](#)

soil testing and other soil based [activities](#)

Garden Soil [Lesson](#)

[Dig Deeper](#) (soil activities and games)

Compost Jin [card game](#)

compost [teas](#)

[Making LAB](#) (Lactobacillus)

[Korean](#) Natural Farming Practices

Fermented plant [extract](#) and [juices](#)

Properties of Soil [Slideshow](#)

Properties of Soil [Background Information](#)

Properties of Soil [Worksheet](#)

Properties of Soil [Crossword Puzzle](#)

## Assessments

**Properties of  
Soil Test**

**Summative:  
Written Test**

[Properties of  
Soil Test](#)

**Composting  
Test**

**Summative:  
Written Test**

[Composting  
Test](#)

**Cornell**

**Compost Quiz  
Game**

**Summative:  
Written Test**

[Cornell  
Composting](#)

[Quiz Game](#)

## Resources

*Professional & Student*

[Cornell Composting](#)

[Composting 101](#)

[Soils 4 Teachers](#)

\*\* Colorado State University Extension - Composting Yard Waste  
<http://extension.colostate.edu/docs/pubs/garden/07212.pdf>

\*\* Cornell Waste Management Institute - Composting  
Includes resources on composting for farms, residences and businesses  
<http://cwmi.css.cornell.edu/composting.htm>

\*\* Lowe's Project Center - Making Compost  
<https://www.lowes.com/projects/gardening-and-outdoor/learn-to-compost/project>

\*\* National Public Radio - Science Friday Videos - A Compost Guru Shares His Secrets 3:59-minute video interviewing Malcolm Beck of Texas  
<https://vimeo.com/30598097>

\*\* North Carolina Cooperative Extension Service - Backyard Composting of Yard, Garden, and Food Discards  
<https://content.ces.ncsu.edu/backyard-composting-of-yard-garden-and-food-discards>

\*\* North Carolina State University - Vermicomposting for Households  
Vermicomposting uses worms in the composting process.  
<https://composting.ces.ncsu.edu/vermicomposting-2/vermicomposting-for-households/>

\*\* Ohio State University - Compost Facility Tour, Part I  
<https://plantfacts.osu.edu/movies/abstract.lasso?id=1906a>

\*\* Ohio State University - Compost Facility Tour, Part II  
<https://plantfacts.osu.edu/movies/abstract.lasso?id=1906b>

\*\* Ohio State University Extension - Composting at Home  
[http://www.therockpile.com/wp-content/uploads/2010/01/OSU\\_composting.pdf](http://www.therockpile.com/wp-content/uploads/2010/01/OSU_composting.pdf)

\*\* U.S. Environmental Protection Agency - Composting at Home  
A good basic description of composting, including lists of what should and should not be composted  
<https://www.epa.gov/recycle/composting-home>

\*\* U.S. National Arboretum - Creating Compost  
A simple description of composting  
<https://www.usbg.gov/creating-compost>

\*\* University of Florida Extension - Farm Scale Composting

[http://blogs.ifas.ufl.edu/smallfarms/2017/11/30/composting/?mc\\_cid=64fe46323f&mc\\_eid=b9bb859ac1](http://blogs.ifas.ufl.edu/smallfarms/2017/11/30/composting/?mc_cid=64fe46323f&mc_eid=b9bb859ac1)

**\*\* University of Minnesota Extension Service - Composting and Mulching**  
<https://conservancy.umn.edu/bitstream/handle/11299/54827/3296.pdf>

**\*\* University of Missouri-Columbia - Making and Using Compost**  
Includes detailed information for constructing compost piles  
<https://extension2.missouri.edu/G6956>

**\*\* Whatcom County Public Works - Easy Composting**  
Includes two methods for making compost -- an easy way and a quicker way  
<http://www.whatcomcounty.us/DocumentCenter/View/1871/Easy-Composting-PDF>

### **Soils**

**\*\* Dr. Dirt - Soil Air and Composition**  
Uses marbles, golf balls, beads, and water to illustrate soil components  
<https://www.doctordirt.org/teachingresources/idealsoil>

**\*\* Smithsonian Environmental Research Center - Dig It! The Secrets of Soil**  
Reports on an exhibit at the Smithsonian Museum of Natural History  
<http://forces.si.edu/soils/> **\*\* U.S. Department of Agriculture - FFA Students Learn To Judge Land And Soil**  
1:38-minute video showing FFA students in soils judging contest  
<https://www.youtube.com/watch?v=jj3eEbxDmr8>

**\*\* USDA Natural Resources Conservation Service (NRCS) - Soils home page**  
<https://www.nrcs.usda.gov/wps/portal/nrcs/site/soils/home/>

**\*\* USDA (NRCS) - Distribution Maps of Dominant Soil Orders**  
Shows photos of each type of soil and maps showing where those types are found.  
[https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/?cid=nrcs142p2\\_053589](https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/?cid=nrcs142p2_053589)

**Student Learning Expectation & 21st Century Skills**

Information Literacy  
Critical Thinking  
Spoken Communication  
Written Performance

### **Interdisciplinary Connections**

Biology

Botany

Chemistry

Ecology

Environmental Science

Geology

Language Arts

Personal Financial Literacy



Business Foundations

Digital Media & Communications

Fine Arts



# Unit Planner: Enterprise Practices & Career Readiness Greenery (1 & 2)

Newtown High School / 2022-2023 / High School / BEAT/Science /  
Greenery (1 & 2) / Week 2 - Week 18

Last Updated: Wednesday, June 29, 2022  
by Shawn Mullen

## Enterprise Practices & Career Readiness

Mullen, Shawn; Stamm, Anastasia

- [Unit Planner](#)
- [Lesson Planner](#)

### Concept-Based Unit Development Graphic Organizer (Download)

#### Unit Web Template (Optional)

#### Concepts / Conceptual Lens

*Please attach your completed Unit Web Template here*

Lens: Systems

Concepts: Enterprise, Opportunity, Industry, Supply & Demand, Profit, Marketing, Design, Safety

G

#### Generalizations / Enduring Understandings

1. The US Agriculture Industry provides a multitude of career opportunities - no farms, no food.
2. Different careers require employees to possess specific skills and traits.
3. Safety practices and systems ensure all are safe in a working environment.
4. Effective marketing and supply & demand practices drive enterprise success, measured by profit margin.

#### Guiding Questions

*Please identify the type of question: (F) Factual, (C) Conceptual, (P) Provocative [Debatable]*

FACTUAL

What is an enterprise? (G4)

What career opportunities are available in the agriculture industry? (G1)

What skills and traits should a person possess for specific careers within the agriculture industry? (G2)

What safety practices must we follow in the lab, greenhouse, and garden? (G3)

CONCEPTUAL

What systems can be put in place to ensure all work safely in the lab, greenhouse, and garden? (G3)

What are different marketing strategies for different target consumers? (G4)

How can profit from sales efforts be guaranteed? (G4)

How does an enterprise determine which products to sell? (G4)

PROVOCATIVE

How can an organization ensure each individual and the

job they perform is vital to greater success? (G1)

What are the best ways to market a product? (G4)

What makes the design of a product aesthetically pleasing to different consumers? (G4)

## Standard(s)

*Connecticut Core Standards / Content Standards*

### **NGSS: Crosscutting Concepts**

#### **NGSS: 9-12**

#### **Crosscutting Statements**

**1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.**

Patterns of performance of designed systems can be analyzed and interpreted to reengineer and improve the system.

**2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.**

Systems can be designed to cause a desired effect.

**4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.**

Systems can be designed to do specific tasks.

**7. Stability and Change – For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.**

Feedback (negative or positive) can stabilize or destabilize a system.

#### **Connections to Engineering, Technology and Applications of Science**

##### **Interdependence of Science, Engineering, and Technology**

Science and engineering complement each other in the cycle known as research and development (R&D).

### **CT: CTE: Agricultural Science (2011)**

#### **Grades 9-12**

#### **Plant Science**

**D. Marketing: Understand the sequence of the channels of distribution and marketing including their impact on the agriculture industry.**

20. Understand supply and demand principles in Agriculture, Food, and Natural Resource systems.

21. Identify strategies frequently employed in agricultural marketing programs.

22. Define the concept of profit and loss in agricultural business.

24. Explain the impact of positive customer/client relations.

**E. Career Exploration and Development: Understand the diversity of careers related to the agricultural industry and strategies to acquire and advance in an agricultural career.**

25. Identify the employability skills required for various careers in agriculture.

28. Identify ways to develop and maintain professional relationships to enhance career success.

### **CT: ASTE-Agricultural Science and Technology Education Standards 2014**

#### **Grades 9-12**

#### **Agriculture, Food, and Natural Resources Foundation Skills**

**CT-FS.02. Performance Element: Career Success: Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career.**

CT-FS.02.01. Performance Indicator: Understand the use and application of information-based technologies necessary for career success in agriculture

**CT-FS.03. Performance Element: Utilize economic principles to establish and manage an AFNR enterprise.**

CT-FS.03.01. Performance Indicator: Understand the sequence of the channels of distribution and marketing including their impact on the agriculture industry.

**CT-FS.04. Performance Element: Apply principles of environment science.**

CT-FS.04.01. Performance Indicator: Observe required regulations to maintain/improve safety, health and environmental management systems.

**CT-FS.05. Performance Element: Apply safety/health practices to AFNR worksites.**

CT-FS.05.04. Performance Indicator: Assess workplace safety.

**CT-FS.07. Performance Element: Utilize appropriate management planning principles in AFNR business enterprises.**

CT-FS.07.01. Performance Indicator: Apply economic principles to AFNR systems (e.g., supply, demand and profit).

CT-FS.07.02. Performance Indicator: Apply skills with computer software to accomplish a variety of business activities.

**CT-FS.08.0. Performance Element: Utilize technology within AFNR.**

CT-FS.08.02. Performance Indicator: Relate technology advancements to the need for Continuing Education/Career Development.

**CT-FS.10. Performance Element: Technical Skills: Compare and contrast issues affecting the AFNR industry.**

CT-FS.10.01. Performance Indicator: Apply economic principles to AFNR systems (e.g., supply, demand and profit).

CT-FS.10.02. Performance Indicator: Apply skills with computer software to accomplish a variety of business activities.

CT-FS.10.03. Performance Indicator: Flexibility / Adaptability: Describe traits that enable one to be capable and willing to accept change.

**CT-FS.11. Performance Element: Systems: Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.**

CT-FS.11.01. Performance Indicator: Examine performance and goals to appreciate organizations and industries within AFNR.

**CT-FS.12. Performance Element: Systems: Identify how key organizational structures and processes affect organizational performance and the quality of products and services.**

CT-FS.12.01. Performance Indicator: Manage organizational structures and processes to better serve customers.

### **Leadership Skills**

**Pathway Content Standard: The student will demonstrate competence in the application of leadership, personal growth and career success skills necessary for a chosen profession while effectively contributing to society**

CT-LS.01.01. Performance Indicator: Action: Exhibit the skills and competencies needed to achieve a desired result

CT-LS.01.02. Performance Indicator: Relationships: Build a constituency through listening, coaching, understanding and appreciating others.

**CT-LS.02. Performance Element: Personal Growth: Develop a skill set to enhance the positive evolution of the whole person.**

CT-LS.02.03. Performance Indicator: Professional Growth: Develop awareness and apply skills necessary for achieving career success.

CT-LS.02.04. Performance Indicator: Mental Growth: Demonstrate the effective application of reasoning, thinking, and coping skills.

**CT-LS.03. Performance Element: Career Success: Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.**

CT-LS.03.01. Performance Indicator: Communication: Demonstrate oral, written and verbal skills

CT-LS.03.03. Career Exploration and Development: Understand the diversity of careers related to the agricultural industry and strategies to acquire and advance in an agricultural career

### **Natural Resources Systems**

**Pathway Content Standard: The student will demonstrate competence in the application of scientific principles and techniques to the management of natural resources.**

**CT-NRS.01. Performance Element: Explain interrelationships between natural resources and humans necessary to conduct management activities in natural environments.**

CT-NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of natural resource systems

CT-NRS.03.01. Performance Indicator: Produce, harvest, process and use natural resource products

CT-NRS.05.01. Performance Indicator: Communicate natural resource information to the public

### **Plant Science**

**CT-PS.03. Performance Element: Propagate culture and harvest plants.**

CT-PS.03.04. Performance Indicator: Apply principles and practices of various plant production methods to meet

the needs of the market.

**CT-PS.04. Performance Element: Employ elements of design to enhance an environment.**

CT-PS.04.01. Performance Indicator: Create designs using plants.

CT-PS.04.02 Performance Indicator: Determine supplies needed to create landscape designs and develop a marketing plan

**Power Structural and Technical Systems (Agriculture Mechanics)**

**CT-PST.05. Performance Element: Plan, build and maintain agricultural structures.**

CT-PST.05.01. Performance Indicator: Create sketches and plans of agricultural structures.

CT-PST.05.03. Performance Indicator: Examine structural requirements for materials and procedures and estimate construction cost.

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 Access the interactive version of the NGSS [here](#)

**Critical Content & Skills**

*What students must **KNOW and be able to DO***

<u>Topic</u>	<u>Content</u>	<u>Skills</u>
Safety	<b>Demonstrate</b> use of tools and equipment aligning with safe work habits.	<b>Exhibit</b> safe work practices in the lab, greenhouse, and garden.
	<b>Recognize</b> when others do something unsafely, and help to redirect to work more safely <b>Develop</b> purchase lists for plant sales.	Implement safe use of tools and equipment in the lab, greenhouse, and garden.
Sales, Finance, & Budgeting	<b>Determine</b> pricing for plant sales.	<b>Collaborate</b> with peers to make decisions for plant sales
	<b>Analyze</b> profit margin for plant sales. <b>Design</b> systems to monitor & document inventory, sales, and deposits.	<b>Manage</b> pricing, bookkeeping, and inventory for plant sales <b>Execute</b> plant sales
Marketing & Advertising	<b>Create</b> systems for communicating upcoming sales to consumers.	<b>Produce</b> marketing materials for distribution to bring awareness of sales to consumers.
	<b>Design</b> systems for selling products to consumers during sales periods. <b>Survey</b> past and future consumers to determine product demand	<b>Communicate</b> with consumers the methods for transactions and delivery of plants.
Agricultural & Floral Design	<b>Design</b> aesthetically pleasing outdoor landscaping that is appropriate for the project scope and function.	<b>Construct</b> aesthetically pleasing outdoor landscaping that is appropriate for the project scope and function.
	<b>Design</b> aesthetically pleasing indoor arrangements (centerpieces/wreathes/bouquets,	<b>Create</b> aesthetically pleasing indoor arrangements (centerpieces/wreathes/bouquets,

etc) of cut plants/flowers, appropriate for the project scope and function.

**Explore** careers within the Agriculture Industry

Occupational  
Preparation

**Determine** individual aptitude & interest in specific careers within the Agriculture Industry

**Discuss** logistics and management systems within the Agriculture Industry.

etc) of cut plants/flowers, appropriate for the project scope and function.

**Research** careers within the Agriculture Industry

**Express** rationale for personal aptitude & interest in specific careers within the Agriculture Industry

**Compare** logistics and management systems within the Agriculture Industry to those systems used working in our Greenhouse and Garden.

## Core Learning Activities

Productivity/Professionalism Rubric

Generic Flyer Document

Fall Mums sale

Fall Mums Flyer

Learning About Chrysanthemums Notes

Learning About Chrysanthemums Worksheet

Learning About Chrysanthemums Crossword

Learning About Chrysanthemums Quiz

Holiday Centerpiece Photos

Holiday Centerpieces Rubric

Holiday Poinsettia Sale

Video about the Paul Ecke Poinsettia Ranch

Growing Poinsettias Notes

Growing Poinsettias Worksheet

Growing Poinsettias Crossword

Growing Poinsettias Quiz

Valentines Day Carnation Sale

[Valentines Day Flyer](#)

[Spring Plant sale Flyer](#)

[Spring Sale Advertisement](#) for faculty and staff

### Assessments

#### **Career Profile**

#### **Summative: Exhibition**

develop an understanding of several jobs related to the field of Greenery, Agriculture, Botany, Farming, Soil management, Etc.

[Career Profile](#)

### Resources

*Professional & Student*

[US Dept of Agriculture Careers](#)

[Agriculture Careers Database by US Region](#)

[US Occupational Health & Safety Administration - Agricultural Operations](#)

[US Dept of Agriculture - Nat'l Institute of Farms & Agriculture - Farm Safety](#)

### Student Learning Expectation & 21st Century Skills

[Information Literacy](#)

[Critical Thinking](#)

[Spoken Communication](#)

[Written Performance](#)

### Interdisciplinary Connections

Biology

Botany

Chemistry

Ecology

Environmental Science

Geology

Language Arts

Personal Financial Literacy

Business Foundations

Digital Media & Communications

Fine Arts



# DRAFT

## NEWTOWN BOARD OF EDUCATION 2023 SCHEDULE OF MEETINGS

Meetings will be held in the Newtown Municipal Center Council Chamber, 3 Primrose Street, at 7:00 p.m. with the exception of those which will be held in the Reed Intermediate School library as indicated below.

January 3 – *Reed Library*  
January 17 (budget overview) – *Reed Library*  
January 19 (budget) – *Reed Library*  
January 24 (budget)  
January 26 (public hearing & discussion)  
January 31 (budget adoption)  
February 7  
February 22 (Wednesday) – *Reed Library*  
March 7  
March 21  
April 4  
April 18  
May 2  
May 16  
June 6  
June 20  
July 11  
August 22  
September 5 – *Reed Library*  
September 19  
October 3  
October 17  
November 8 (Wednesday) – *Reed Library*  
November 21  
December 5  
December 19

January 2, 2024 – *Reed Library*  
January 16, 2024 – *Reed Library*

Approved

**Please note: These minutes are pending Board approval.  
Board of Education  
Newtown, Connecticut**

Minutes of the Board of Education meeting held on November 15, 2022, at 7:00 p.m. in the Council Chambers, 3 Primrose Street.

D. Zukowski, Chair (virtually)	C. Melillo
J. Vouros, Vice Chair	A. Uberti
D. Ramsey, Secretary	T. Vadas
D. Cruson	4 Staff
J. Kuzma	1 Public
J. Larkin	
A. Plante	
K. Kunzweiler (absent)	
D. Godino	

Ms. Zukowski called the meeting to order at 7:01 p.m.

Ms. Zukowski asked Mr. Vouros to run the meeting because she was unable to attend the meeting in person.

Item 1 – Pledge of Allegiance

Item 2 – Consent Agenda

MOTION: Mrs. Kuzma moved that the Board of Education approve the consent agenda which includes the donations to Reed Intermediate School, the NHS Band, Chorus and Orchestra Field Trip to Boston, and the correspondence report. Mr. Ramsey seconded.

Motion passes unanimously.

Item 3 – Public Participation

Item 4 – Reports

Chair Report: Ms. Zukowski will share her chair report at the next Board of Education meeting.

Superintendent's Report:

Mr. Melillo reported that all of the schools celebrated Veteran's Day on Friday, November 11<sup>th</sup>. He attended a Veteran's breakfast at Newtown Middle School followed by a parade at Sandy Hook School and celebration ceremony at Newtown High School. Mr. Melillo believes having the students in school teaches them about appreciation for our Veterans. He provided an update on mandated reading programs that are required by State Legislation. There are currently six programs that are approved by the State of Connecticut. We plan to bring recommendations to the Board by early December. On November 7<sup>th</sup> the Strategic Planning group met and discussed the SWOT analysis which stands for "strengths, weaknesses, opportunities and threats". The group also shared their hopes and dreams for Newtown Public Schools. The next meeting will be on November 21<sup>st</sup>. He also sent a letter to Newtown Middle School parents regarding student walkers. The intent for the letter was to open communication between the parents and students. He also wanted the parents to be aware of the reports he was receiving from the public.

Committee Reports:

Mrs. Larkin reported on the CFF/CIP subcommittee meeting. The subcommittee discussed the Hawley HVAC project status and Mr. Gerbert provided the committee with a detailed outline of the expenses to date. The project remains to be on time and on budget with no major deviations from the schedule. Additionally, the committee made a motion to add to the agenda for a follow up conversation regarding the playground at Middle Gate Elementary School. The subcommittee will continue the conversation after the first of the year. Mrs. Larkin reported that

Mrs. Vadas provided the subcommittee with an update on the financial report. There are no significant emergency repairs to report on the building and maintenance side.

Mr. Ramsey reported on the Curriculum & Instruction subcommittee meeting. The subcommittee met on November 9<sup>th</sup>. Staci Stamm and Shawn Mullen presented the Greenery 1 & 2 curriculum. They will be presenting to the Board tonight for the first read. Mrs. Uberti provided an update on the status of the State Department of Education's K-3 reading mandate. Presentations for the five approved programs have been scheduled and will be concluded this week. A sixth program has been added and will be scheduled as soon as possible. Mrs. Uberti, along with Mrs. DiBartolo and the ELA Specialists will be reviewing the programs to determine which might be a fit for our district.

Mr. Ramsey reported on the Communications subcommittee where they discussed the recent newsletter. Unfortunately, they were unable to go over the analytics because it was sent out as a PDF. They also reviewed editing procedures to ensure future editions will go out on time.

Mr. Cruson reported on the Policy subcommittee which met November 9<sup>th</sup>. In addition to reviewing the policies for first read tonight, the subcommittee had further discussion on the consultant's policy. They decided it was not appropriate for the 4000 series and will be considering a potential policy in the 6000 series which is the "Instruction" series. The next group of policies that the subcommittee is currently working on is the technology/personnel policies. Mrs. D'Eramo and Mr. Colclough are working with the policy subcommittee on editing those policies.

#### Student Report:

Mr. Godino reported that Ms. Kunzweiler was unable to attend the meeting because dress rehearsal for the fall drama "Almost Maine", running Thursday, November 17 through Sunday, November 20. He reported that the fall sports season comes to a close as we reach the midpoint of November. Newtown High School students are very excited that The Newtown Nighthawks Express re-opened for the first time since 2020. On Veteran's Day, the staff of NHS and members of the Hawks Honors Association hosted a lunch for Veterans followed by an assembly at which the band and choir preformed. Last week was GSA Solidarity Week which offers an opportunity for students with a variety of identities to share their support for one another. NHS students also attended the 2022 Homecoming Dance.

#### Financial Report:

Mrs. Vadas presented the financial report.

MOTION: Mrs. Kuzma moved that the Board of Education approve the financial report and transfers for the month of October 31, 2022. Mrs. Larkin seconded. Motion passes unanimously.

#### Item 5 – Presentations

Staci Stamm and Department Chair, Eric Holst-Grubbe, presented the curriculum for Greenery 1 & 2. Ms. Stamm wrote this curriculum with Shawn Mullens, who was unable to attend the meeting. This class is offered in the fall and spring and can act as an elective credit or a science credit.

Mrs. Larkin asked which grades this class was available to.

Ms. Stamm answered that it is an elective open to grades 9 through 12. It provides an opportunity to have every type of student in the same room at the same time.

Mrs. Larkin asked if all five units were used in the same course.

Ms. Stamm said that depending on which time of the year they are taking the course, all but five units are discussed in the semester. It is a half-year class so students get two chances to take this course.

Mrs. Larkin can understand why students would want to take it every year.

Ms. Stamm believes that there are some students that do take it every year.

Mrs. Plante commented that she thinks this class is very cool.

Mrs. Kuzma asked what the average class size was.

Ms. Stamm answered that they currently have five sections and due to space in the greenhouse, they are capped at 14 students per section which turns out to be around 140 students per year.

Mr. Ramsey visited this class with Shawn Mullen and, after talking with students, said it was gratifying to go into the classroom and see that the curriculum was being implemented the same way it looked on paper.

Ms. Zukowski commented that she believes it is an excellent course and hope to learn something from the students.

Mr. Vouros encouraged everyone to go to visit.

Mr. Melillo said that he loved going to visit this course. Connecting this course to the food pantry and culinary program gave students a purpose. It is rare to find a course where students are so engaged that they are coming in on their own time to work in the garden or work on their sales.

Fine Arts Update:

Director of Fine Arts, Michele Hiscavich, presented some updates and accomplishments in the Fine Arts Department. She started her presentation by stating that her program is focused on "Creative Futures" and setting up a future for their students within the fine arts.

Ms. Zukowski asked how often the students go to a visual arts class during the week or six day cycle.

Ms. Hiscavich answered that at the elementary schools, the students meet once every six days. At Reed, the students meet twice every six days. At Newtown Middle School, the students meet twice every seven days for art and they meet twice a week for band, music and orchestra but there are no lessons. Lastly, at Newtown High School, the students have their music and art classes every day but are dropped twice out of the eight day rotation.

Mrs. Kuzma asked if there was a decline in interest in arts during COVID and if so, what was being done to regain interest.

Ms. Hiscavich said that they are doing things to regain interest in the students. They have gone to Reed to showcase the NMS/NHS band and choir. She also plans to create programs to help recruit elementary students in the future. Older students talking to younger students can be a powerful tool as well.

Mrs. Kuzma asked which department took the biggest decline.

Ms. Hiscavich said that music did.

Mr. Vouros thanked Ms. Hiscavich for her passion and love for the Fine Arts.

Mr. Melillo said he had the pleasure to attend many of the events and see the students in action. They have done a wonderful job and it is another instance that shows how dedicated students are coming back on their own time to practice and work on their craft. This can be a career path and colleges value music/fine arts. Mr. Melillo thanked Ms. Hiscavich for her leadership.

Item 6 - Old Business

## Second Read of Policies:

MOTION: Mrs. Kuzma moved that the Board of Education approve Policies 4118.231 and 4218.231 Alcohol, Tobacco, and Drug-Free Workplace. Mrs. Plante seconded. Motion passes unanimously.

MOTION: Mrs. Kuzma moved that the Board of Education approve to rescind Policy 4-111 Student Teachers. Mrs. Plante seconded. Motion passes unanimously.

MOTION: Mrs. Kuzma moved that the Board of Education approve to rescind Policy 4-702 Drug Free Workplace. Mr. Ramsey seconded. Motion passes unanimously.

Item 7 – New Business

## First Read of Policies:

Mr. Cruson explained that Policy 4111/4211 – Recruitment and Selection is an existing policy but the subcommittee is recommending some adjustments to better designate that the Superintendent is the one to do the recruiting and hiring for non-administrative certified and non-certified staff.

Mr. Cruson explained that Policy 2151 – Hiring School Administrators is also an existing policy. The edits are to clarify the practice of hiring administrators and the Board's role in doing so.

Mr. Cruson reported that Policy 4121 – Substitute Teachers was edited with the help of Newtown's Director of HR, Suzanne D'Eramo. The subcommittee removed language that would restrict substitutes from possibly receiving health insurance in the future.

Mr. Cruson reported that the subcommittee is recommending rescinding Policy 4-501 – Substitute Teachers and Policy 4-501.1 – Leave Provisions for Per Diem Substitutes.

MOTION: Mrs. Kuzma moved that the Board of Education approve the minutes of November 1, 2022. Mrs. Larkin seconded. Motion passes unanimously.

Item 8 – Public Participation

MOTION: Mr. Plante moved to adjourn. Mrs. Larkin seconded. Motion passes unanimously.

Item 9 – Adjournment

The meeting adjourned at 8:21 p.m.

Respectfully submitted:

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Donald Ramsey  
Secretary

