Short Abstract:
Using Thoreau’s observations of seeds and forest growth, and pairing these observations with basic learning about seeds, and a reading of the novel *Seedfolks* by Paul Fleischman, students will use the seed as a metaphor for understanding what it means for people to grow and thrive. Excerpts of Thoreau’s writing, as well as inquiry based learning labs, will supply necessary background knowledge on seeds. *Seedfolks*, a fictional novel about a community garden, will provide a link for students to envision growth in the garden, to consider personal growth, and to examine growth in the community. Follow up activities walking through local woods and learning about conservation organizations in the community will help students coalesce this unit of study.

“Though I do not believe a plant will spring up where no seed has been, I have great faith in a seed. Convince me that you have a seed there, and I am prepared to expect wonders.” ~ Henry David Thoreau, 1860, “The Succession of Forest Trees”

Duration and Rationale:
This unit is designed to follow up a unit on Transcendentalism where students will have read excerpts from *Walden* and “Civil Disobedience” by Henry David Thoreau, excerpts from “Nature” and “Self-Reliance” by Ralph Waldo Emerson, and the play *The Night Thoreau Spent in Jail* by Robert E. Lee and Jerome Lawrence. While we will still be reading some of Thoreau’s writings, the excerpts selected will be centered primarily around the notion of seed succession, dispersal, growth, and conservation.

The entire unit is designed to take approximately four weeks (20 class days); however, depending on the community project your students engage in, and the amount of time your
students need to read and write, it may took more or less time. There is a great deal of flexibility in how you choose to incorporate the materials and activities in this unit, and I would suggest you make it your own and adapt it to your students’ needs.

One goal of this unit is to incorporate interdisciplinary learning by connecting science with literature. Thoreau and his contemporary Transcendentalists did not see a separation between the world of the naturalist, and the world of the writer. As Robert D. Richardson Jr. (1993) notes, in his introduction to Faith in a Seed, “Because American Transcendentalism insisted on strengthening the relation between human beings and nature, Emerson and Thoreau considered science both important in itself and inextricable from other kinds of knowledge” (6). I would like my students to see, like Thoreau and his contemporaries, that disciplines of study are linked, and it is not necessary to compartmentalize one’s interests. This insight, that the professional and academic world does not always cleave one’s loves into categories, is a valuable one for high school students to make, as they are beginning to seek who they will become after high school. Likewise, I chose the seed as our subject matter because it provides a foundation and numerous metaphors for critical thinking. The thing about a seed is that it’s a starting place, and what it will grow into depends on where it’s planted and the nourishment it’s provided. My students are the next generation of seeds, growing into a diverse array of opportunities, and it’s important that they consider what it takes for themselves, and the communities around them, to grow and thrive.

Another goal of this unit is to make students aware of the natural beauty that surrounds them, and to help them discover organizations aimed at providing and preserving wild places where they can find solace.

Outline and Detailed Timeline:

Lesson 1: (Three days plus ongoing observations)
The science of seeds; basic overview of seed germination and parts
- Handout: What is in a seed and what does it need?
- Lab Activity: Growing Seeds and Lab Reporting
- Parts of a Seed Webquest and Seed Terminology
- Reading on Seed Germination (available online)

Lesson 2: (Two days)
Thoreau’s writing on seeds; excerpts from a variety of texts
- Excerpts from The Dispersion of Seeds in Arnoldia journal article
- Quotes from Brister’s Hill from Walden Woods website
- Annotated Essay: “The Succession of Forest Trees”

Lesson 3: (Two days)
Waxing poetic about a seed; practice with metaphorical writing
- Playing with Metaphors Activity
- Quotes about seeds from website; “Mother to Son” Poem

Lesson 4: (Overlaps with lesson 6 for two weeks)
Introduction to Seedfolks; set up of journaling
- Read aloud and discuss first chapter or two
- Assign timetable for reading novel and due dates
- Handout: Seedfolks Journal and Sample Journal
Lesson 5: (3 days)
Reading and follow up of *Seedfolks*; personal and creative writing
- Socratic Seminar discussion (one class day)
- Creative writing assignment plus completion of poem (two class days)

Lesson 6: (Two weeks in conjunction with lesson 4)
Planting Seeds in the Community
- (Optional) Read “Conservation” quotes from *Quotable Thoreau*
- Group Brochure on Community Organization and Photo Journal of Trail
- Select Community day of action; Incorporate possible gardening extension

Objectives:

Students will be able to:
- ✓ Observe seed germination and record their findings.
- ✓ Identify and label seed parts, and define seed terminology.
- ✓ Hypothesize about what seeds need to grow and thrive. Make observations and inferences while completing Lab Reports.
- ✓ Analyze Thoreau’s writings on seed dispersal and forest succession and summarize his findings. Identify the evidence he uses to support his claims, and de-construct his rhetorical design. Draw conclusions about the significance of his findings.
- ✓ Read an array of texts for information and enjoyment.
- ✓ Participate in an interdisciplinary approach to learning.
- ✓ Practice using figurative language and abstract thinking.
- ✓ Compare seeds to people and communities in abstract ways using figurative language and poetic writing. Create metaphors and poems.
- ✓ Write creative narrative stories modeled after the chapters in *Seedfolks*.
- ✓ Revise writings based on teacher and student feedback.
- ✓ Reflect thoughtfully over all of their readings.
- ✓ Synthesize knowledge of seeds from labs and Thoreau’s writing in a creative poem, and connect this knowledge to a reading of *Seedfolks* and two collaborative group projects.
- ✓ Collaborate with partners to accomplish several tasks.
- ✓ Design two multimedia presentations using an array of technologies.
- ✓ Gain a sense of place by learning about their own communities, and observing the ways characters in *Seedfolks* gained confidence and trust by learning from others and the garden in the community.
- ✓ Practice speaking and listening skills by giving and watching presentations.
- ✓ Be inspired by the words of Thoreau and other conservationalists!
- ✓ Serve in their communities and re-discover their neighborhoods!

Verbs used in Objectives Selected From:
Lesson Details:
Note: Time period for each class is 55 minutes.

Lesson 1: (Three days plus ongoing observations)
The science of seeds; basic overview of seed germination and parts

Day One:
1. Pass out the following Handout: What is in a seed and what does it need?.
2. Define the word germination, which will be used interchangeably as growth in the lab activities. Explain that the word “thrive” means for a plant to succeed past the germination stage into a mature seedling.
3. Have students individually brainstorm answers to the handout. (7 minutes)
4. After allowing individual time, have students pair up with a partner and share their inferences. They may want to add to their notes. (5 minutes)
5. Bring the class back together. Without making or allowing corrections, have students volunteer answers and record them on the board. (8 minutes)
6. Once you have a long list on the board, open up the discussion to allow students to debate what is absolutely necessary for germination. Have them pose their responses “I think / don’t think ____________ is necessary for germination (growth) because __________________________________________________________________.” Following inquiry-based discussion, provide students with the answers by adding or crossing out answers on the board. Have them do the same on their sheets. (15 minutes)
7. Pass out selected lab from handouts (either Lab 1, or Lab 2). Have students read the lab, gather materials and complete the lab. Make sure they label either their Ziploc baggie or Petri dish with their name using a permanent marker. Place seeds and containers in a dim area of the room. Have students clean up messes and put away materials. (20 minutes)
8. Record participation points (up to 10) for following directions.
9. Collect the What is a seed…? handouts to be graded, and return them with assigned points the next day (students will need these as references).
10. Note – You could extend the seed labs using some of the labs or ideas I’ve included in the Seed Labs Additional Notes.

Day Two:
1. Begin the day by reviewing the What is a seed…? Handout. You could do this with informal questions, a writing activity, or a brief quiz. (3 minutes)
2. After review, return the graded What is a seed? Handouts for comparison.
3. Have students quickly look at their seeds and share with the class what they observe. List observations on the board and discuss. (2 minutes)
4. Explain that students will be required to observe their seeds each day as they are germinating and to transplant them later. Using what you’ve written on the board, discuss some of the terms students might use in their observations. Show students the Lab Template (see website listed in Seed Lab One and Two Handouts). Guide them through it, and have them take notes on what is required in each part. (NOTE: Prior to this, you might want to talk with a science teacher to help walk you through the requirements of a Lab Report, and the steps in the Scientific Method. The one I have included is fairly standard, and also comes with a rubric for grading.) Tell them that over the next two weeks, they will have to complete and submit at least 5 solid Lab Reports that show the progression of their seed as it germinates and matures. (20 minutes)
5. Allow time for students to complete their first lab report. Walk around and monitor them, and answer student questions. (15 minutes)

6. Pass out the reading on Seed Germination available at the following website:
   http://plantphys.info/seedg/seed.html. Allow students time to read it to themselves in preparation for the next day. Have them keep the copies as resources to use when writing Lab Reports. (15 minutes)

Day Three:
1. Provide students an opportunity to observe their seeds and take notes. Remind them to look at their previous handouts for help. (5 minutes)
2. Pass out the Parts of a Seed Webquest and have students read the directions. Either move to a Computer Lab or bring in a Laptop Cart for students to complete the Webquest. Use the remaining class period to complete the Webquest, and to wrap up any activities from the previous two days. Have students turn in the Webquests by the end of class. (50 minutes)
3. Optional: You may want to follow up the next day, or later in the unit, with a quiz, or some other summative assessment about students’ knowledge on seeds gleaned from these first three days of class.
4. See Resources near the end of this unit for additional materials.

Lesson 2: (Two days)
Thoreau’s writing on seeds; excerpts from a variety of texts

Day Four:
1. Continue students’ exploration of seeds by having them read excerpts of Thoreau’s writing on seeds and discussing his insights about seed dispersal and forest succession. These readings, and the previous days’ background, will pave the way for reading Seedfolks, writing creatively, and working in the community.
2. Start by using your classroom computer and a projector to display the following website from the Walden Woods project:
   http://www.walden.org/Explore/Walden_Woods_Ecosystem/Brister's_Hill
3. Ask a student to read the overview on the opening page. Click on the heading in the corner that reads “Thoreau’s Path.” Here is the web link it will take you to:
   http://www.walden.org/documents/file/waldenbroch_hi-sm.pdf Tell students that they will be “walking” one of the paths Thoreau frequently walked. Call on a variety of students to read parts of the brochure aloud. You may want students to take notes on this, as it will prepare them for the Thoreau reading they will complete the next day. Discuss with them the sorts of observations Thoreau made, and the dedication it would take a person to make such observations (they will be doing this when they walk Nature Preserves later in the unit). Invite them to talk about the different roles Thoreau took on (philosopher, scientist, writer, humanitarian), and discuss how he managed to make these roles work together. (25 minutes)
4. After reading and discussing the website, either move to the Computer Lab, or have students get on laptops and go the initial web address and click on the link “Read the Quotations” at the bottom of the page. Have them read all of the quotes and select their five favorites, record them, and respond briefly to them. This will not be a graded assignment, but can be used in the Brochure or Photo Journal projects that students will complete at the end of this unit. Whatever students don’t complete of this assignment, they must complete for homework. (20 minutes)
5. Use the remaining time to bring the class back together and project excerpts from *The Dispersion of Seeds* by Henry David Thoreau in the *Arnoldia* journal article entitled “Faith in a Seed and a Squirrel” available at the following website: [http://arnoldia.arboretum.harvard.edu/pdf/articles/886.pdf](http://arnoldia.arboretum.harvard.edu/pdf/articles/886.pdf). Read the opening introduction (the book review portion), and have them read the remainder of the article for homework (have print copies available for students without web access). This article is included to prepare them for the next day’s reading and questions. (10 minutes)

**Day Five**

1. Pass out the copies of the Annotated Essay: “The Succession of Forest Trees.” Provide students with the entire class time to work individually or in pairs to read the article and notes, and complete the corresponding questions. Students may need additional time, so assign whatever they don’t complete in class for homework. (55 minutes)

**Lesson 3: (Two days)**

Waxing poetic about a seed; practice with metaphorical and poetic writing

**Day 6:**

1. Discuss the reading from the previous day and review answers. Collect the assignment (Annotated Essay). (10 minutes)
2. To prepare for the “Playing with Metaphors” Activity, you will need the following: A) paper bag with a variety of objects pulled from the classroom, home, etc. B) Sentence Strips (small cut up strips from the Handout provided), and C) copies or access to the poem “Mother to Son” by Langston Hughes. Additionally, you and your students will need background knowledge of poetry terms. I would have covered poetry by this point in the semester, as I envision teaching this unit in the spring.
3. Pass out the “Playing with Metaphors” Handout. Complete the first T-chart on Part I as a whole class by following the directions and writing responses on the board. For the second T-chart on Part I, let students first brainstorm on their own and then share answers and record them on the board. (10 minutes)
4. For Part II, pass around the bag of items and have each student select one item. Have them complete the chart, and move around the room to nudge them as necessary. Have students share their creations as a whole class, and allow them to revise their metaphors if they would like. (10 minutes)
5. For Part III, pass around the Sentence Strips and follow the directions on the handout. Share and revise metaphors like in Part II (10 minutes)
6. Use the remaining time to read the poem “Mother to Son” and discuss the extended metaphor apparent in the poem, and complete the questions in Part IV of the handout. Have students consider the theme of this piece as well. Tell students to bring back the handouts for use the next day of class. (15 minutes)

**Day 7**

1. Have students take out their “Playing with Metaphors” Handouts from the previous day and briefly review.
2. Displays the website listed in Part V, or provide students access to laptops.
3. Have students complete the questions / Seed Chart on Part V individually. (15 minutes) Have them share their favorite quotes in pairs and explain to each other why they liked their selected quotes. As a whole class, have them share their comparisons between seeds and people and record their responses on the board. Again, guide to discussion by elaborating on their responses, or getting students to think more abstractly about how the two might be related. Have students add ideas to their own charts (15 minutes)
4. Use the remaining time to allow students to start on the poem assigned in the homework. A rough draft will be due on Day 10, which you will return on Day 11 with feedback. A second draft will be due on Day 15, on which a classmate will provide feedback. A final draft is due with an essay on Day 20, and should have the two previous drafts attached to it. (25 minutes)

**Lessons 4, 5, and 6: (Overlap with each other for 13 class days)**

*Seedfolks and corresponding activities, Group Community Project*

**Day 8:**
1. Give everyone a copy of the novel *Seedfolks* to read. Pass out copies of the *Seedfolks Journal Assignment* (select which version you would like), along with the Sample Journal Handout. Tell them to put the Sample Journal aside.
2. With the students, read aloud Chapter 1 (Kim) and pause to talk about it. Let students know that this chapter sets up the pattern for the following chapters: a character is introduced and describe, they go to the garden, and the garden helps them with a conflict in some way. (20 minutes)
3. Read and explain the Journal Assignment. Follow this up with discussing the Sample Journal. Have students comb through Chapter 1 and pull quotes that they think would work well with the Journal Assignment. (20 minutes)
4. Give students the following reading schedule:
   a. Due Day 9: Chapters on Ana and Wendell
   b. Due Day 10: Chapters on Gonzola & Juan and Leona
   c. Due Day 11: Chapters on Sam and Virgil
   d. Due Day 12: Chapters on Sae Young and Curtis
   e. Due Day 13: Chapters on Nora & Mr. Myles and Maricella
   f. Due Day 14: Chapters on Amir and Florence
5. For each due day, students are expected to have read the chapters and completed their journal entries. Final journals are due on Day 15.
6. Allow students to read Chapter 2 (Ana) or start on their journals with any remaining time. (15 minutes)

**Day 9:**
1. Discuss the chapters on Ana and Wendell. Have a few students share the quotes they selected for their journals. (Note: At some point, students should notice that in each chapter, the character from the previous chapter is always mentioned, directly or indirectly. If they don’t, start pointing out these occurrences). Discuss the setting. (10 minutes)
2. Pass out the Packet for the “Planting Seeds in the Community” project and give each student a copy of the map on the following website: [http://www.greenearthinc.org/logos/GEmap01.10.pdf](http://www.greenearthinc.org/logos/GEmap01.10.pdf)
3. Have students put their names on the map, and circle the Nature Preserve nearest to where they live, and then collect the maps. (5 minutes)
4. Read and discuss with the students the project, the resources, the requirements, and the due date. Let them know that some class time will be granted, but that a large portion of the work will be completed outside of class. By Day 14, they need to have completed their walk and taken their photographs. The final projects for both components are due on Day 19. (15 - 20 minutes)
5. Allow students the remaining time to read their novels and work on their journals. They may read ahead, but they need to be prepared for the assigned days of reading. While they are reading, assign the students to groups based on where they live. Divide the
students evenly among the groups. Let students know which groups they belong to. (15 – 20 minutes)

Day 10:
1. Collect rough drafts of poems assigned on Day 7. Read, provide feedback, and return by the next class period.
2. Discuss the chapters on Gonzola & Juan. Have a few students share the quotes they selected for their journals. (Note: At some point, students should notice that in each chapter, the character from the previous chapter is always mentioned, directly or indirectly. If they don't, start pointing out these occurrences). Discuss how the garden is improving. Focus especially on how Tio Juan is transformed by the garden, and how Leona fights to keep the trash cleaned out of the garden. (10 minutes)
3. Lead a brief discussion on Leona. How is she able to get the garden the attention she needs? What does she do to make it improve? Do you think there are people like her in our community? (10 minutes)
4. Display the Green Earth site on the projector: http://www.greenearthinc.org/. Read the Mission Statement on the home page. Skim through the website, and go to the description of each of the Nature Preserves, showing each group their assigned trail. (15 minutes)
5. Allow students the remaining time to read the novels, work on their journals, and start discussing and working on the projects. Record notes on each group’s participation to keep track of for final project. (20 minutes)

Day 11:
1. For days 11 – 13, spend time discussing the assigned chapters, sharing journal entries, and fielding questions at the beginning of class each day. (10 minutes)
2. For day 11, discuss the chapters on Sam and Virgil. You might mention that the author, Paul Fleischmann, modeled Sam after himself, and this might be a good place to have students read the afterword. (10 minutes)
3. Provide time for silent reading and journal writing. (10 minutes)
4. Provide time for groups to work together on their projects. (15 minutes)
5. Read and discuss the “Conservation” quotes section from The Quotable Thoreau by Jeffrey Cramer. Ask students to consider and share what these quotes have to do with their community projects and nature preserve hikes. (10 minutes)
6. Check each groups progress each day during independent and group work time. Keep records on how well each group is using class time.

Day 12:
1. For days 11 – 13, spend time discussing the assigned chapters, sharing journal entries, and fielding questions at the beginning of class each day. (10 minutes)
2. Provide time for silent reading and journal writing. (20 minutes)
3. Provide time for groups to work together on their projects. (25 minutes)
4. For day 12, the assigned chapters are on Sae Young and Curtis, two of the most interesting characters in the book. During discussion time, ask the students to discuss the question: How does the garden help these two deal with the troubles and mistakes in their past?
5. Check each groups progress each day during independent and group work time. Keep records on how well each group is using class time.

Day 13:
1. For days 11 – 13, spend time discussing the assigned chapters, sharing journal entries, and fielding questions at the beginning of class each day. (10 minutes)
2. Provide time for silent reading and journal writing. (20 minutes)
3. Provide time for groups to work together on their projects. (25 minutes)
4. For day 13, the assigned chapters are on Nora & Mr. Myles and Maricella. discussion time, ask the students to discuss the question: What do these two characters change their minds about? Who in the garden helps them?
5. Check each groups progress each day during independent and group work time. Keep records on how well each group is using class time.

Day 14:
1. The final chapters due today are on Amir and Florence. In these two chapters, several of the earlier characters are directly or indirectly mentioned. Have students find instances of other characters being mentioned. Have students add a response to their journal entry answering these questions: How has the garden changed over the course of the novel? How has it changed the neighborhood? Discuss students’ responses and their reaction to the novel. (20 minutes)
2. Hand out Socratic Seminar and Creative Writing Assignments. Read and explain the instructions on each and allow students to use the remaining time to start writing. Monitor students to make sure they are writing. Remind them that their Socratic Seminar notes and Rough Drafts of Poems are due. (30 minutes)

Day 15:
1. Spend the majority of the time in the Socratic Seminar by having students share their responses to the questions given the day before and their personal connections to the novel. Record participation points based on frequency of speaking, thoughtfulness of comments, and responsiveness to others comments. Collect notes on Socratic Seminar from previous day. (45 minutes)
2. Allow students to ask questions about the writing assignment, and to swap Rough Drafts of the Poems with partners. Let them know that their feedback is due back the next day and must be returned to their partner. Additionally, remind them that they need to continue working on their group projects and wrap up their hikes and photo taking, and material gathering, so they can create the final products. (10 minutes)

Days 16 and 17:
1. Work in a computer lab or provide laptop access.
2. Students can either work on their Creative Writing Assignment or their Poem. The Poem is due on Day 18, while the Rough Draft of the Creative Writing Assignment is due on Day 20, and the Final Draft of it is due on Day 25 to allow additional time to revise. (55 minutes)
3. While students are writing, check on their progress on the written assignments, as well as the group projects.

Day 18:
1. Collect Final Drafts of Poems with the two Rough Drafts with feedback stapled to the back of them.
2. Today is the last day for groups to work on projects! Provide computer access and any materials groups need. Assist with any final editing and monitor each group. (55 minutes)

Days 19 and 20:
1. Students will give their presentations these two days. You may want to invite parents, administrators, or organization representatives in to listen. Grade students according to the rubrics provided. Day 19 – Community Brochures  Day 20 – Nature Preserve Photo Journals

2. Collect the Writing Assignment rough draft on Day 20. Follow this up with a day of action at one of the organizations, or a day of gardening.
**List of Materials:**
Most materials are mentioned in the individual assignment handouts. Here is a condensed list to help prepare lessons:

1. Web access to links on Thoreau’s writing and community resources, as well as to websites for a variety of other activities
2. Computer Lab or Laptop Cart with Printer Access
3. Projector connected to classroom computer to display Internet content
4. Microsoft Publisher and Photo Editing Software for assignments
5. Copies of novel *Seedfolks* by Paul Fleischmann
6. Copies of handouts provided with unit
7. Copies of readings referenced in handouts
8. Lab materials (see labs for details)
9. Bag with concrete objects and sentence strips for Playing with Metaphors
10. Background knowledge of poetry (not included, but recommended)
11. Access to a camera for Photo Journal
12. Students will need to dress appropriately for hiking
13. Phone for students to contact organizations (I would allow structured and monitored time for them to use their cell phones when working in groups).
Rubric:

1. “What is a Seed and What Does it Need?” Handout _______/ 15
2. Lab One or Two Participation / Following Instructions _______/ 15
3. Lab Reports (5 complete entries, taken over two weeks)
   a. Use the rubric on website with Lab Report Template _______/ 50
   b. Assign up to 10 points per entry
4. Questions from “The Succession of Forest Trees” _______/ 40
   a. Assign up to 2 points per question
   b. Base points on thoughtfulness and accuracy of answers
5. “Playing with Metaphors” Activity (see handout for details) _______/ 30
6. Inspired Poem (seed as metaphor) Final Draft _______/ 30
7. Seedfolks Completed Journal _______/ 65
   a. Assign 5 points per entry based on thoughtful answers
8. Seedfolks Culminating Seminar _______/ 35
   a. Assign 10 points for preparation (completed sheet)
   b. Assign 25 points for participation
9. Seedfolks Creative Writing Assignment _______/ 100
10. Writing Assignment Brainstorm Sheet and Rough Draft _______/ 20
11. Community Organization Brochure (see rubric) _______/ 75
12. Nature Preserve Hike Photo Journal (see rubric) _______/ 75

Total Points: _______/ 550

Final Unit Grades:

A (100-90%) Point Range = 550 - 493
B (89.4-80%) Point Range = 492 - 438
C (79.4-70%) Point Range = 437 - 383
D (69.4-60%) Point Range = 382 - 328
F (59.4-0%) Point Range = 372 - 0

Bibliography:


http://www.beautifysouthernillinois.org/


http://www.biologycorner.com/worksheets/labreport.html


http://www.mycaert.com/samples/070026.pdf

http://www.walden.org/Explore/Walden_Woods_Ecosystem/Brister’s_Hill


http://www.greenearthinc.org/

Jackson County Health Department Recycling and Environmental Education Program.  
http://www.jchdonline.org/index.php?option=com_content&task=view&id=54&Itemid


http://plantphys.info/seedg/seed.html.

“Parts of the seed.” (2011). Elementary & Middle School Lessons & Self-Correcting  
Worksheets for Children in all Subject Areas. Educational Designers, LLC.  

Seeds and cuttings: Quotes for those that love gardens, gardening, and the green way.  
http://www.gardendigest.com/seeds.htm

http://illinois.sierraclub.org/Shawnee/


**Relevant Common Core Standards:**

**Reading Standards for Literature Grades 11-12**

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

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

**Reading Standards for Informational Text Grades 11-12**

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

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

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

**Writing Standards Grades 11-12**

3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
   
   a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.

   b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.
c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution).

d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.

e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

**Speaking and Listening Standards Grades 11-12**

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

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

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

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

**Reading Standards for Literacy in Science and Technical Subjects Grades 11-12**

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

From website: [http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf](http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf)
Handouts and Teacher Guides

Corresponding with Lesson Details and Outline
What is a Seed and What Does it Need?

What do you know about seeds (or think you might know about seeds)? Fill in the answers below based on your knowledge and experience of seeds. We will be sharing these answers and going back to evaluate them later. For now, just write what you know and be ready to share.

**What is a Seed??**
Definition in your own words: ________________________________________________________
______________________________________________________________________________

<table>
<thead>
<tr>
<th>What does a seed need to grow?</th>
<th>What does a seed need to thrive?</th>
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Shared Definition of a Seed: __________________________________________________________
________________________________________________________________________________
What is a Seed and What Does it Need? ANSWER KEY

Teacher Instructions –

The point of this activity is that it leads into an inquiry based discussion and gets students to think about what a seed really needs to grown and thrive. Those two categories differ quite a bit, and as students offer up ideas, your job is to assess the validity of those claims.

What is a Seed???

Definition in your own words: Definitions will vary. Have several students share ideas and maybe jot a few down on the board. This definition is designed to get students to start constructing their own understanding, and will allow them to check their understanding later.

<table>
<thead>
<tr>
<th>What does a seed need to grow?</th>
<th>What does a seed need to thrive?</th>
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<tr>
<td>What a seed needs to grow is not the same as what it needs to thrive. A seed can germinate (produce a sprout) without soil.</td>
<td>Without the right conditions, a germinated seed will most likely not thrive. The hardiness of the seed matters as to where it can thrive.</td>
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<td><strong>NOTE: not all plants have seeds! Different types of plants have different classifications.</strong></td>
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<tr>
<td>1. Air – seeds give off gas, and they require air to grow</td>
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<tr>
<td>2. Water – seeds must have water to germinate</td>
<td></td>
</tr>
<tr>
<td>Seeds actually DO NOT need light or soil to germinate, but do to mature. Seeds typically cannot germinate if exposed to much light.</td>
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To illustrate the concept of what seeds need to grow, try one of the labs included with this activity. You might also try to germinate seeds with different liquids/soils as an experiment.

Seeds actually DO NOT need light or soil to germinate, but do to mature. Seeds typically cannot germinate if exposed to much light.

| 1. Seeds can thrive in water. This is called hydroponic growth. With this method, nutrients are added to make up for what is in soil. |
| 2. Seeds MUST have air and light to thrive. Amounts of light vary depending on the type of plant. |
| 3. Seeds that are not grown hydroponically need soil. They primarily need the nutrients found in soil (nitrogen and phosphorous). |
| 4. Fertilizer adds more nitrogen and phosphorous and is helpful, but is not absolutely essential. |
| 5. Plants prefer different types of soil, but most seeds can grow in potting soil. |

**Shared Definition of a Seed:** After the discussion, have students go back and record this definition on their paper: “Reproductive structure of some plants that contain an embryo, nutrients for the embryo, and is covered by a protective coat.”

Embryo – the part of the seed that develops into a plant
Seed Lab One

Lab 1: “You don’t know beans about beans…”

Overview: Students will grow their own beans without soil.

Materials:

1. Paper Towels (or Newspaper)
2. Ziploc or other plastic baggies
3. Beans – Bag of Kidney or Pinto beans
4. Pots and Potting Soil
5. Water!

Procedure:

1. Each student needs a seed, a paper towel, and a bag.
2. Soak the paper towel in water to where it is damp, but not dripping wet.
3. Roll the seed up in the paper towel so that it can receive moisture.
4. Place the seed in the plastic bag, but leave it open so that it can receive the air it needs. After that, check on the seeds daily to see what happens.
5. Use the following lab report template to record observations for 5 days.
   http://www.biologycorner.com/worksheets/labreport.html
6. In a few days (sometimes even overnight!), the seeds should grow through the paper towel. Once the seeds have germinated, transfer them to a paper cup or a pot with potting soil. Lightly cover the seedlings with soil. Continue to make observations about growth until the beans are big enough to be transplanted in a garden. If you do plan to transplant them, you will need to stake the beans once the shoots grow taller.

"It was a singular experience that long acquaintance which I cultivated with beans, what with planting, and hoeing, and harvesting, and threshing, and picking over and selling them, -- the last was the hardest of all, -- I might add eating, for I did taste. I was determined to know beans." -- Thoreau, Walden
Seed Lab Two

Lab 2: “Plant a radish, get a radish...”

Overview: Students will grow either alfalfa sprouts or radishes without soil.

Materials:

1. Radish or Alfalfa Seeds
2. Paper Towels or Gauze
3. Petri Dishes (recommend borrowing from science teacher)
4. Pots or Paper Cups for planting
5. Water!

Procedure:

1. Each student needs a seed, a paper towel or gauze strip, and a Petri dish. Students can also pair up if necessary or desired.
2. Sprinkle seeds in the bottom of the dish (HOW MANY?).
3. Wet and place the paper towel or gauze strip, and place it on top of seeds.
4. Put the lid on the top of the Petri dish.
5. Place the Petri dish in a place that does not receive much light. Keep the Petri dish seed side down when it is growing. You may flip it seed side up to observe germination. Watch the seeds germinate each day.
6. Once the seeds have germinated, thin them out. Transfer them to a paper cup or a pot with potting soil to continue growing. Lightly cover the seedlings with soil; only cover the roots! Continue to make observations about growth until the plants are big enough to be transplanted into a garden, unless you are directly planting in a pot.

“Plant a radish; get a radish, never any doubt. That’s why I love vegetables; you know what they’re about!” ~Tom Jones and Harvey Schmidt
Seed Labs Additional Information

1. Choose one or both of the labs to illustrate seed germination and continued growth. You may want to coordinate with a science teacher in your school to help you find supplies and to provide guidance.

2. Light inhibits seeds from sprouting. Place seeds away from light.

3. You can grow just about anything that is a seed using the procedures in either of these labs. You may try giving each student a different seed.

4. As an extension activity, you can have students bring a five-gallon bucket (or some other large, wide-mouthed bucket or pot) to transfer the seedlings to take home and continue growing on their own. You could make this an assignment, or offer extra credit for a successful bucket garden.

5. There are several other labs like this one, which provide fundamental knowledge about seed germination and continued growth. They vary from rudimentary labs to more advanced labs. I chose somewhat basic labs to help students understand the difference between what a seed needs to grow, and what it needs to thrive. You can select different labs to emphasize other concepts or to adapt to the background knowledge or ability level of your particular students.

6. One such similar activity is to grow marigolds in milk cartons or Solo cups with soil. However, this is not as effective at illustrating germination.

7. To illustrate hydroponic growth (i.e. plants grown in water without soil) consider conducting the lab found at the following website:

8. There are some other phenomena about plants. You could find labs for any of these intriguing plant behaviors. Here are a few such phenomena:
   a. Bolting – plants that are not given enough light grow thin and fast, which is not the healthiest form of growth and is a sign that they need more light. To correct this, add a lamp with an incandescent bulb and see how plants adapt.
   b. Tropism – plants bend or adapt as they grow toward light.
   c. Hydroponics – soil is a vehicle but it is not actually necessary; to grow plants hydroponically, a solution of nutrients is added to the root to replace what is lost by not having soil
   d. Gravity – plants can sense gravity – lay a plant on its side and it starts growing upward (this is how they make spiral bamboo)
Parts of a Seed and Germination Webquest (30 points)

Stop #1: http://www.myschoolhouse.com/courses/O/1/125.asp

Directions: Careful read the information posted about seeds. Record the answers for questions 1 - 8 here.

1) 2) 3) 4)
5) 6) 7) 8)

Stop #2: http://www.mycaert.com/samples/070026.pdf

Directions: Using the website listed above, define these terms in your own words and using common terminology. Then, print out the graph on page 4 and label the parts using both the technical and everyday terms for the parts, and answer questions #1-3. Attach printout.

Cotyledon –
Dicotyledon –
Embryo –
Endosperm –
Epicotyl –
Hypocotyl –
Monocotyledon –
Plumule –
Radicle –
Seed coat –
Germination –
Parts of a Seed and Germination Webquest

Teacher Instructions

Overview:

The point of this activity is to familiarize students with scientific and vernacular terminology used to describe seeds which they will need to record observations of their seeds as they grow. Grading = (8 points for terms Stop 1, 11 points for Stop 2 vocabulary, 10 points for correctly labeled illustration, 6 points for correctly answered questions)

Basic Information Students Need to Know:

Whether you have students use the scientific terms, or the common terms, here are the essentials that students should know about seeds.

Parts of a plant

1. Seed coat – protects and encloses seed; stores embryo
2. Cotyledon (Seed Leaf) – stored food source during germination
   a. This gets absorbed by the plant eventually. After the seed sprouts, the seed leaf falls off. This can be observed happening in beans.
   b. The endosperm provides the food. Peanut butter is basically the ground up endosperm of a peanut.
3. Root (Radicle) – This part is the first to emerge from the seed. It provides the foundation to allow the plant to secure itself.
4. Shoot – everything above the soil (comprised by two parts)
   a. Hypocotyl – becomes the stem of the plant
   b. Epicotyl / Plummule – becomes the leaves of the plant
   c. Seed parts stay on stem until plant starts making its own food.

Following the activity, students read the article on the following website: [http://plantphys.info/seedg/seed.html](http://plantphys.info/seedg/seed.html). Also, bring in a peanut to show seed parts.

Additional Web Resources on Seed Parts:

Image of Seed Parts: [http://theseedsite.co.uk/seedparts.html](http://theseedsite.co.uk/seedparts.html)

Botany Information on Other Topics: [http://theseedsite.co.uk/teachers.html](http://theseedsite.co.uk/teachers.html)

The Succession of Forest Trees

By Henry D. Thoreau

Read to the Middlesex Agricultural Society, September, 1860

"From a scientific point of view, it can be said he documented for the first time how ecological succession works ... The mechanism was animals and weather. Squirrels carry acorns so oak trees replace pine when the pines are cut down. And pine seeds blow over to replace the oak." - Richard T. Forman

EVERY MAN is entitled to come to Cattleshow, even a transcendentalist; and for my part I am more interested in the men than in the cattle. (1) I wish to see once more those old familiar faces, whose names I do not know, which for me represent the Middlesex country, and come as near being indigenous to the soil as a white man can; the men who are not above their business, whose costs are not too black, whose shoes do not shine very much, who never wear gloves to conceal their hands. It is true, there are some queer specimens of humanity attracted to our festival, but all are welcome. I am pretty sure to meet once more that weak-minded and whimsical fellow, generally weak-bodied too, who prefers a crooked stick for a cane; perfectly useless, you would say, only bizarre, fit for a cabinet, like a petrified snake. A ram's horn would be as convenient, and is yet more curiously twisted. He brings that much indulged bit of the country with him, from some town's end or other, and introduces it to Concord groves, as if he had promised it so much sometime. So some, it seems to me, elect their rulers for their crookedness. (2) But I think that a straight stick makes the best cane, and an upright man the best ruler. Or why choose a man to do plain work who is distinguished for his oddity? However, I do not know but you will think that they have committed this mistake who invited me to speak to you to-day.

(1) Thoreau is describing a festival and the act of coming to people-watch. What sort of people does he prefer? Describe them in your own words. What does this preference suggest about him?

(2) Thoreau is using a bit of satire here in commenting on the state of those who govern. What does he seem to be commenting on about those who “rule?” Use textual evidence for support.
In my capacity of **surveyor**, I have often talked with some of you, my employers, at your dinner-tables, after having gone round and round and behind your farming, and ascertained exactly what its limits were. (3) **Moreover, taking a surveyor's and a naturalists' liberty, I have been in the habit of going across your lots much oftener than is usual, as many of you, perhaps to your sorrow, are aware. Yet many of you, to my relief, have seemed not to be aware of it; and when I came across you in some out of the way nook of your farms, have inquire, with an air of surprise, if I were not lost, since you had never seen me in that part of the town or county before; when, if the truth were known, and it had not been for betraying my secret, (4) I might with more propriety have inquired if *you* were not lost, since I had never seen *you* there before. I have several times shown the proprietor the shortest way out of his wood-lot.

(3) One of Thoreau’s jobs was that of a surveyor, but outside the boundaries of his job, he walked for hours a day, often through neighbors farms and others’ land. There, he record notes about observations he made regarding nature. What do you think helped him to be so observant?

(4) Look at the humor in this passage. Can’t you just picture his audience chuckling to themselves? (Maybe that’s just me!) With his use of humor, how is Thoreau setting himself apart from his neighbors? What comparisons is he making, and what point is he trying to convey?

Therefore, it would seem that (5) **I have some title to speak to you to-day**; and considering what that title is, and the occasion that has called us together, I need offer no apology if I invite your attention, for the few moments that are allotted me, to a purely scientific subject.

(5) In these opening paragraphs, he is addressing his audience prior to delving into his subject matter. The previous information is only loosely related to his topic. What is his purpose in opening his speech in this manner?

At those dinner-tables referred to, (6) **I have often been asked, as many of you have been, if I could tell how it happened, that when a pine wood was cut down an oak one commonly sprang up, and *vice versa*. To which I have answered, and now answer, that I can tell, — that it is no mystery to me.** As I am not aware that this has been clearly shown by anyone, I shall lay the more stress on this point. Let me lead you back into your wood-lots again.

(6) What does he suggest is the purpose of his speech?
(7) When, hereabouts, a single forest tree or a forest springs up naturally where none of its kind grew before, I do not hesitate to say, though in some quarters still may sound paradoxical, that it came from a seed. Of the various ways by which trees are known to the propagated. — by transplanting, cuttings, and the like, — this is the only supposable one under these circumstances. No such tree has ever been known to spring from anything else. If any one asserts that it sprang from something else, or from nothing, the burden of proof lies with him.

(7) Most people at the time believed that when plants grew in a forest where none of their type existed before trees, that they had spontaneously generated (i.e. grew out of nothing – an original creation). What claim does Thoreau make here that counteracts that idea? NOTE: It is this claim that he spends the rest of the piece asserting.

(6) It remains, then, only to show how the seed is transported from where it grows, to where it is planted. This is done chiefly by the agency of the wind, water, and animals. The lighter seeds, as those of pines and maples, are transported chiefly by wind and water; the heavier, the acorns and nuts, by animals.

(8) Name the three basic mechanisms, listed above, by which seeds get transported.

(7) In all the pines, a very thin membrane, in appearance much like an insect's wing, grows over and around the seed, and independent of it, while the latter is being developed within its base. Indeed this is often perfectly developed, though the seed is abortive; nature being, you would say, more sure to provide the means of transporting the seed, than to provide the seed to be transported. In other words, a beautiful thin sack is woven around the seed, with a handle to it such as the wind can take hold of, and it is then committed to the wind, expressly that it may transport the seed and extend the range of the species; and this it does, as effectually, as when seeds are sent by mail in a different kind of sack from the patent-office. There is a patent-office at the seat of government of the universe, whose managers are as much interested in the dispersion of seeds as anybody at Washington can be, and their operations are infinitely more extensive and regular.

(9) What characteristics of seeds, provided, of course, by nature, allow them to be transported by the wind?

(8) There is then no necessity for supposing that the pines have sprung up from nothing, and I am aware that I am not at all peculiar in asserting that they come from seeds, though the mode of their propagation by nature has been but little attended to. They are very extensively raised from the seed in Europe, and are beginning to be here.
When you cut down an oak wood, a pine wood will not *at once* spring up there unless there are, or have been, quite, recently, seed-bearing pines near enough for the seeds to be blown from them. But, adjacent to a forest of pines, if you prevent other crops from growing there, you will surely have an extension of your pine forest, provided the soil is suitable.

As for the heavy seeds and nuts which are not furnished with wings, the notion is still a very common one that, when the trees which bear these spring up where none of their kind were notice before, they have come from seeds or other principles ***spontaneously generated there in an unusual manner, or which have lain dormant in the soil for centuries, or perhaps been called into activity by the heat of a burning. I do not believe these assertions, and I will state some of the ways in which, according to my observation, such forests are planted and raised.

***You Might Want to Know:

This notion of spontaneous generation was prevalent at this time, and was support by Louis Agassiz, a prominent scientist, who wrote, “species do not pass insensibly one into another, but that they appear and disappear unexpectedly without direct relations with their precursors.” See the Introduction to *Faith in a Seed*, edited by Bradley P. Dean

Every one of these seeds, too, will be found to be winged or legged in another fashion. Surely it is not wonderful that cherry-trees of all kinds are widely dispersed, since their fruit is well known to be the favorite food of various birds. Many kinds are called bird-cherries, and they appropriate many more kinds, which are not so called. Eating cherries is a bird-like employment, and unless we disperse the seeds occasionally, as they do, I shall think that the birds have the best right to them. See how artfully the seed of a cherry is placed in order that a bird may be compelled to transport it — in the very midst of a tempering pericarp,(1) so that the creature that would devour this must commonly take the stone also into its mouth or bill. If you ever ate a cherry, and did not make two bites of it, you must have perceived it — right in the centre of the luscious morsel, a large earthy residuum left on the tongue. We thus take into our mouths cherry stones as big as peas, a dozen at once, for Nature can persuade us to do almost anything when she would compass her ends. Some wild men and children instinctively swallow these, as the birds do when in a hurry, it being the shortest way to get rid of them. Thus, though these seeds are not provided with vegetable wings, Nature has impelled the thrush tribe to take them into their bills and fly away with them; and they are winged in another sense, and more effectually than the seeds of pines, for these are carried even against the wind.

The consequences is, that cherry-trees grow not only here but there. The same is true of a great many other seeds.

(10) Explain the mode by which birds help to disperse seeds.
But to come to the *observation* which suggested these remarks. As I have said, I suspect that I can throw some light on the fact, that when hereabouts a dense pine wood is cut down, oaks and other hard woods may at once take its place. I have not only to show that the acorns and nuts, provided they are grown in the neighborhood, are regularly planted in such woods; for I assert that if an oak-tree has not grown within ten miles, and man has not carried acorns thither, then an oak wood will not spring up *at once*, when a pine wood is cut down.

*Note the rhetorical style here: Thoreau is getting back to the mystery of why an oak tree will grow where previously there had been only pine trees.*

Apparently, there were only pines there before. They are cut off, and after a year or two you see oaks and other hard woods springing up there, with scarcely a pine amid them, and the wonder commonly is, how the seed could have lain in the ground so long without decaying. But the truth is, that it has not lain in the ground so long, but is regularly planted each year by various quadrupeds and birds.

In this neighborhood, where oaks and pines are about equally dispersed, if you look through the thickest pine wood, even the seemingly unmixed pitch-pine ones, you will commonly detect many little oaks, birches, and other hard woods, sprung from seeds carried into the thicket by squirrels and other animals, and also blown thither, but which are over-shadowed and choked by the pines. The denser the evergreen wood, the more likely it is to be well planted with these seeds, because the planters incline to resort with their forage to the closest covert. They also carry it into birch and other woods. This planting is carried on annually, and the oldest seedlings annually die; but when the pines are cleared off, the oaks, having got just the start they want, and now secured favorable conditions, immediately spring up to trees.

The shade of a dense pine wood, is more unfavorable to the springing up of pines of the same species than of oaks within it, though the former may come up abundantly when the pines are cut, if there chance to be sound seed in the ground.

But when you cut off a lot of hard wood, very often the little pines mixed with it have a similar start, for the squirrels have carried off the nuts to the pines, and not to the more open wood, and they commonly make pretty clean work of it; and moreover, if the wood was old, the sprouts will be feeble or entirely fail; to say nothing about the soil being, in a measure, exhausted for this kind of crop.

If a pine wood is surrounded by a white oak one chiefly, white oaks may be expected to succeed when the pines are cut. If it is surrounded instead by an edging of shrub-oaks, then you will probably have a dense shrub-oak thicket.

(11) Summarize the evidence for seed dispersal and germination Thoreau gives in paragraphs #13 - #17.
I have no time to go into details, but will say, in a word, that while the wind is conveying the seeds of pines into hard woods and open lands, the squirrels and other animals are conveying the seeds of oaks and walnuts into the pine woods, and thus a rotation of crops is kept up.

I affirmed this confidently many years ago, and an occasional examination of dense pine woods confirmed me in my opinion. It has long been known to observers that squirrels bury nuts in the ground, but I am not aware that any one has thus accounted for the regular succession of forests.

"It has long been known to observers that squirrels bury nuts in the ground, but I am not aware that any one has thus accounted for the regular succession of forests."

On the 24th of September, in 1857, as I was paddling down the Assabet, in this town, I saw a red squirrel run along the bank under some herbage, with something large in its mouth. It stopped near the foot of a hemlock, within a couple of rods of me, and, hastily pawing a hole with its forefeet, dropped its booty into it, covered it up, and retreat part way up the trunk of the tree. As I approached the shore to examine the deposit, the squirrel, descending part way, betrayed no little anxiety about its treasure, and made two or three motions to recover it before it finally retreated. Digging there, I found two green pig-nuts joined together, with the thick husks on, buried about an inch and a half under the reddish soil of decayed hemlock leaves, — just the right depth to plant it. In short, this squirrel was then engaged in accomplishing two objects, to wit, laying up a store of winter food for itself, and planting a hickory wood for all creation. If the squirrel was killed, or neglected its deposit, a hickory would spring up. The nearest hickory tree was twenty rods distant. These nuts were there still just fourteen days later, but were gone when I looked again, November 21, or six weeks later still.

I have since examined more carefully several dense woods, which are said to be, and are apparently exclusively pine, and always with the same result. For instance, I walked the same day to a small, but very dense and handsome white-pine grove, about fifteen rods square, in the east part of this town. The trees are large for Concord, being from ten to twenty inches in diameter, and as exclusively pine as any wood that I know. Indeed, I selected this wood because I thought it the least likely to contain anything else. It stands on an open plain or pasture, except that it adjoins another small pine wood, which has a few little oaks in it, on the southeast side. On every other side, it was at least thirty rods from the nearest woods. Standing on the edge of this grove and looking through it, for it is quite level and free from underwood, for the most part bare, red-carpeted ground, you would have said that there was not a hard wood tree in it, young or old. But on looking carefully along over its floor I discovered, though it was not till my eye had got used to the search, that, alternating with thin ferns, and small blueberry bushes, there was not, merely here and there, but as often as every five feet and with a
degree of regularity, a little oak, from three to twelve inches high, and in one place I found a green acorn dropped by the base of a pine.

[22] I confess, I was surprised to find my theory so perfectly proved in this case. One of the principal agents in this planting, the red squirrels, were all the while curiously inspecting me, while I was inspecting their plantation. Some of the little oaks had been browsed by cows, which resorted to this wood for shade.

(12) How does Thoreau’s observations of squirrels in paragraphs 19 – 22 help to support his claims about seed dispersal? Summarize his evidence.

[23] After seven or eight years, the hard woods evidently find such a locality ***unfavorable to their growth, the pines being allowed to stand.

***You Might Want to Know:

For a plant to succeed (or thrive) it needs the right conditions: ample access to light, the right type of soil, enough air and water.

[24] As an evidence of this, I observed a discased red-maple twenty-five feet long, which had been recently prostrated, though it was still covered with green leaves, the only maple in any position in the wood.

[25] But although these oaks almost invariably die if the pines are not cut down, it is probable that they do better for a few years under their shelter than they would anywhere else.

[26] The very extensive and thorough experiments of the English, have at length led them to adopt a method of raising oaks almost precisely like this, which somewhat earlier had been adopted by nature and her squirrels her; they have simply rediscovered the value of pines as nurses for oaks. The English experimenters seem early and generally, to have found out the importance of using trees of some kind, as nurse-plants for the young oaks. I quote from London what he describes as "the ultimatum of the subject of planting and sheltering oaks," — "an abstract of the practice adopted by the government officers in the national forest" of England, prepared by Alexander Milne.

[27] At first some oaks had been planted by themselves, and other mixed with Scotch pines; "but in all cases," says Mr. Milne, "where oaks were planted actually among the pines, and surrounded by them, [though the soil might be inferior] the oaks were found to be much the best." "For several years past, the plan pursued has been to plant the inclosures with Scotch pines
only, [a tree very similar to our pitch-pine,] and when the pines have get to the height of five or six feet, then to put in good strong oak plants of about four or five years growth among the pines, — not cutting away any pines at first, unless they happen to be so strong and thick as to overshadow the oaks. **In about two years, it becomes necessary to shred the branched of the pines, to give light and air to the oaks, and in about two or three more years to begin gradually to remove the pines altogether, taking out a certain number each year, so that, at the end of twenty or twenty-five years, not a single Scotch pine shall be left; although, for the first ten or twelve years, the plantation may have appeared to contain nothing else but pine.** The advantage of this mode of planting has been found to be that the pines dry and ameliorate the soil, destroying the coarse grass and brambles which frequently choke and injure oaks; and that no mending over is necessary, as scarcely an oak so planted is found to fail."

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**You Might Want to Know:**

*Thoreau learned about this method through his vast reading. However, it was his keen observation that allowed him to notice this concept in action on the forest floor.*

*Notice the reference below to nature with a capital “N.” Transcendentalists celebrated Nature as a source of the Divine that is in all living and natural things.*

---

[28] Thus much the English planters have discovered by patient experiment, and, for aught I know, they have taken out a patent for it; but they appear not to have discovered that it was discovered before, and that they are merely adopting the method of *Nature, which she long ago made patent to all. She is all the while planting the oaks amid the pines without our knowledge, and at last, instead of government officers, we send a party of wood-choppers to cut down the pines, and so rescue an oak forest, at which we wonder as if it had dropped from the skies.

[29] As I walk amid hickories, even in August, I hear the sound of green pig-nuts falling from time to time, cut off by the chickaree over my head. In the fall, I notice on the ground, either within or in the neighborhood of oak woods, on all sides of the town, stout oak twigs three or four inches long, bearing half-a-dozen empty acorn-cups, which twigs have been gnawed off by squirrels, on both sides of the nuts, in order to make them more portable. The jays scream and the red squirrels scold while you are clubbing and shaking the chestnut trees, for they are there on the same errand, and two of a trade never agree. I frequently see a red or gray squirrel cast down a green chestnut bur, as I am going through the woods, and I used to think, sometimes, that they were cast at me. In fact, they are so busy about it, in the midst of the chestnut season, that you cannot stand long in the woods without hearing one fall. A sportsman told me that he had, the day before, — that was in the middle of October, — seen a green chestnut but dropt on our great river meadow, fifty rods from the nearest wood, and much further from the nearest chestnut-tree, and he could not tell how it came there. Occasionally, when chestnutting in midwinter, I find thirty or forty nuts in a pile, left in its gallery, just under the leaves, by the common wood-mouse (*musleucopus*).
(13) Thoreau was a naturalist, but he was also a gifted writer. Record an example of personification, and explain the humor, from the previous paragraph.

[30] But especially, in the winter, the extent to which this transportation and planting of nuts is carried on is made apparent by the snow. In almost every wood, you will see where the red or gray squirrels have pawed down through the snow in a hundred places, sometimes two feet deep, and almost always directly to a nut or a pine-cone, as directly as if they had started from it and bored upward, — which you and I could not have done. It would be difficult for us to find one before the snow falls. Commonly, no doubt, they had deposited them there in the fall. You wonder if they remember the localities, or discover them by the scent. The red squirrel commonly has its winter abode in the earth under a thicket of evergreens, frequently under a small clump of evergreens in the midst of a deciduous wood. If there are any nut-trees, which still retain their nuts, standing at a distance without the wood, their paths often lead directly to and from them. We, therefore, need not suppose an oak standing here and there in the wood in order to seed it, but if a few stand within twenty or thirty rods of it, it is sufficient.

Some of my thoughts on Thoreau: Thoreau’s powers of observations work well because he notices detail, like the holes bored in the snow, and he asks questions, like his one about how the squirrels find their nuts in winter. And, he takes meticulous notes of his daily observations.

[31] I think that I may venture to say that every white-pine cone that falls to the earth naturally in this town, before opening and losing its seeds, and almost every pitch-pine one that falls at all, is cut off by a squirrel, and they begin to pluck them long before they are ripe, so that when the crop of white-pine cones is a small one, as it commonly is, they cut off thus almost every one of these before it fairly ripens. I think, moreover, that their design, if I may so speak, in cutting them off green, is, partly, to prevent their opening and losing their seeds, for these are the ones for which they dig through the snow, and the only white-pine cones which contain anything then. I have counted in one heap, within a diameter of four feet, the cores of 239 pitchpine cones which had been cut off and stripped by the red squirrel the previous winter.

[32] The nuts thus left on the surface, or buried just beneath it, are placed in the most favorable circumstances for germinating. I have sometimes wondered how those which merely fell on the surface of the earth got planted; but, by the end of December, I find the chestnut of the same year partially mixed with the mould, as it were, under the decaying and mouldy leaves, where there is all the moisture and manure they want, for the nuts fall first. In a plentiful year, a large proportion of the nuts are thus covered loosely an inch deep, and are, of course, somewhat concealed from squirrels. One winter, when the crop had been abundant, I got, with the aid of a rake, many quarts of these nuts as late as the tenth of January, and though some bought at the store the same day were more than half of them mouldy, I did not find a single mouldy one among these which I picked from under the wet and mouldy leaves, where they had been snowed on once or twice. Nature knows how to pack them best. They were still plump
and tender. Apparently, they do not heat there, though wet. In the spring they were all sprouting.

(14) Again, Thoreau points to the necessity of favorable circumstances for a seed to grow. The squirrel may be the agent for dispersing the seed, but other conditions must be right for it to germinate and then thrive. What are some of these necessary conditions?

(15) One theme in this piece, and others by Thoreau, is that Nature’s design is better than that of man’s. This theme is apparent in this paragraph, and in paragraph 34 below, and is also evident in paragraphs 7 and 11. Why might Nature’s design be better than man’s? What larger point could Thoreau be making by reiterating this theme?

[33] London (4) says that "when the nut [of the common walnut of Europe] is to be preserved through the winter for the purpose of planting in the following spring, it should be laid in a rotheap, as soon as gathered, with the hunk on; and the heap should be turned over frequently in the course of the winter."

[34] Here, again, he is stealing Nature’s "thunder." How can a poor mortal do otherwise? For it is she that finds fingers to steal with, and the treasure to be stolen. In the planting of the seeds of most trees, the best gardeners do no more than follow Nature, though they may not know it. Generally, both large and small ones are most sure to germinate, and succeed best, when only beaten into the earth with the back of a spade, and then covered with leaves or straw. These results to which planters have arrived, remind us of the experience of Kane (5) and his companions at the North, who, when learning to live in that climate, were surprised to find themselves steadily adopting the customs of the natives, simply becoming Esquimaux. So, when we experiment in planting forests, we find ourselves at last doing as Nature does. Would it not be well to consult with Nature in the outset? For she is the most extensive and experienced planter of us all, not excepting the Dukes of Athol. (6)

[35] In short, they who have not attended particularly to this subject are but little aware to what an extent quadrupeds and birds are employed, especially in the fall, in collecting, and so disseminating and planting the seeds of trees. It is the almost constant employment of the squirrels at that season and you rarely meet with one that has not a nut in its mouth, or is not just going to get one. One squirrel-hunter of this town told me that he knew of a walnut-tree which bore particularly good nuts, but that on going to gather them one fall, he found that he had been anticipated by a family of a dozen red squirrels. He took out of the tree, which was hollow, one bushel and three pecks by measurement, without the husks, and they supplied him and his family for the winter. It would be easy to multiply instances of this kind. How commonly in the fall you see the cheek-pouches of the stripped squirrel (7) distended by a quantity of nuts! This species gets its scientific name Tamias, or the steward, from its habit
of storing up nuts and other seeds. Look under a nut-tree a month after the nuts have fallen, and see what proportion of sound nuts to the abortive ones and shells you will find ordinarily. They have been already eaten, or dispersed far and wide. The ground looks like a platform before a grocery, where the gossips of the village sit to crack nuts and less savory jokes. You have come, you would say, after the feast was over, and are presented with the shells only.

(16) Thoreau loved studying word origins. Considering Thoreau’s many observations on squirrels, how does the scientific name of the squirrel reflect its job in nature?

(17) Record the simile from the previous paragraph.

[36] Occasionally, when threading the woods in the fall, you will hear a sound as if some one had broken a twig, and, looking up, see a jay pecking at an acorn, or you will see a flock of them at once about it, in the top of an oak, and hear them break off. They then fly to a suitable limb, and placing the acorn under one foot, hammer away at it is busily, making a sound like a woodpecker's tapping, looking round from time to time to see if any foe is approaching, and soon reach the meat, and nibble at it, holding up their heads to swallow, while they hold the remainder very firmly with their claws. Nevertheless, it often drops to the ground before the bird has done with it. I can confirm what Wm. Bartram (8) wrote to Wilson, the Ornithologist, (9) that "The jay is one of the most useful agents in the economy of nature, for disseminating forest trees and other nuciferous and hard seeded vegetables on which they feed. Their chief employment during the autumnal season is foraging to supply their winter stores. In performing this necessary duty they drop abundance of seed in their flight over fields, hedges, and by fences, where they alight to deposit them in the post-holes, &c. It is remarkable what numbers of young trees rise up in field and pastures after a wet winter and spring. These birds alone are capable, in a few years' time, to replant all the cleared lands."

[37] I have noticed that squirrels also frequently drop their nuts in open land, which will still further account for the oaks and walnuts which spring up in pastures, for, depend on it, every new tree comes from a seed. When I examine the little oaks, one or two years old, in such places, I invariably find the empty acorn from which they sprung.

[38] So far from the seed having lain dormant in the soil since oaks grew there before, as many believe, it is well known that it is difficult to preserve the vitality of acorns long enough to transport them to Europe; and it is recommended in Loudon's Arboretum, as the safest course, to sprout them in pots on the voyage. The same authority states that "very few acorns of any species will germinate after having been kept a year," that beechmast, "only retains its vital properties one year," and the black-walnut, "seldom more than six months after it has ripened." I have frequently found that in November, almost every acorn left on the ground had sprouted or decayed. What with frost, drouth, moisture, and worms, the greater part are soon destroyed. Yet it is stated by one botanical writer that "acorns that have lain for centuries, on being ploughed up, have soon vegetated."
Mr. George B. Emerson, in his valuable *Report on the Trees and Shrubs of this State*, says of the pines: "The tenacity of life of the seeds is remarkable. They will remain for many years unchanged in the ground, protected by the coolness and deep shade of the forest above them. But when the forest is removed, and the warmth of the sun admitted, they immediately vegetate." Since he does not tell us on what observation his remark is founded, I must doubt its truth.

Besides, the experience of nurserymen makes it the more questionable.

(18) Thoreau switches gears here and focuses on theories about seed dormancy. He first questions such theories, until he is able to find evidence. Define seed dormancy.

The stories of wheat raised from seed buried with an ancient Egyptian, and of raspberries raised from seed found in the stomach of a man in England, who is supposed to have died sixteen or seventeen hundred years ago, are generally discredited, simply because the evidence is not conclusive.

Several men of science, Dr. Carpenter among them, have used the statement that beach-plums sprang up in sand which was dug up forty miles inland in Maine, to prove that the seed had lain there a very long time, and some have inferred that the coast has receded so far. But it seems to me necessary to their argument to show, first, that beach-plums grow only on a beach. They are not uncommon here, which is about half that distance from the shore; and I remember a dense patch a few miles north of us, twenty-five miles inland, from which the fruit was annually carried to market. How much further inland they grow, I know not. Dr. Chas. T. Jackson speaks of finding "beach-plums" (perhaps they were this kind) more than one hundred miles inland in Maine.

It chances that similar objections lie against all the more notorious instances of the kind on record.

Yet I am prepared to believe that some seeds, especially small ones, may retain their vitality for centuries under favorable circumstances. In the spring of 1859, the old Hunt House, so called, in this town, whose chimney bore the date 1703, was taken down. This stood on land which belonged to John Winthrop, the first Governor of Massachusetts, and a part of the house was evidently much older than the above date, and belonged to the Winthrop family. For many years, I have ransacked this neighborhood for plants, and I consider myself familiar with its productions. Thinking of the seeds which are said to be sometimes dug up at an unusual depth in the earth, and thus to reproduce long extinct plants, it occurred to me last fall that some new or rare plants might have sprung up in the cellar of this house, which had been covered from the light so long. Searching there on the 22d of September, I found, among other rank weeds, a species of nettle (*Urtica urens*), which I had not found before; dill, which I had not seen growing spontaneously; the Jerusalem oak (*Chenopodium botrys*), which I had seen wild in but one place; black nightshade (*Solanum nigrum*), which is quite rare here-abouts, and common tobacco,
which, though it was often cultivated here in the last century, has for fifty years been an unknown plant in this town, and a few months before this not even I had heard that one man in the north part of the town, was cultivating a few plants for his own use. I have no doubt that some or all of these plants sprang from seeds which had long been buried under or about that house, and that that tobacco is an additional evidence that the plant was formerly cultivated here. The cellar has been filled up this year, and four of those plants, including the tobacco, are now again extinct in that locality.

(19) From paragraphs #41 - #44 Thoreau speculates on the likelihood of seeds remaining viable after years of dormancy. What claim does he ultimately make, and what evidence does he find to support his claim?

[45] It is true, I have shown that the animals consume a great part of the seeds of trees, and so, at least, effectually prevent their becoming trees; but in all these cases, as I have said, the consumer is compelled to be at the same time the disperser and planter, and this is the tax which he pays to nature. I think it is Linnaeus, (11) who says, that while the swine is rooting for acorns, he is planting acorns.

"I have great faith in a seed ... Convince me that you have a seed there, and I am prepared to expect wonders."

[46] Though I do not believe that a plant will spring up where no seed has been, I have great faith in a seed — a, to me, equally mysterious origin for it. Convince me that you have a seed there, and I am prepared to expect wonders. I shall even believe that the millennium is at hand, and that the reign of justice is about to commence, when the Patent Office, or Government, begins to distribute, and the people to plant the seeds of these things.

(20) This is probably Thoreau’s most well known and most frequently cited quote from this piece. Respond to this quote and consider how it might be a metaphor not only for seeds, but also for humanity.

[47] In the spring of 1857, I planted six seeds sent to me from the Patent Office, and labeled, I think "Poilraine jaune grosse," large yellow squash. Two came up, and one bore a squash which
weighed 123½ pounds, the other bore four, weighing together 186¼ pounds. Who would have believed that there was 310 pounds of poitrine jaune grosse in that corner of my garden? These seeds were the bait I used to catch it, my ferrets which I sent into its burrow, my brace of terriers which unearthed it. A little mysterious hoeing and manuring was all the abra cadabra presto-change, that I used, and lo! true to the label, they found for me 310 pounds of poitrine jaune grosse there, where it never was known to be, nor was before. These talismen had perchance sprung from America at first, and returned to it with unabated force. The big squash took a premium at your fair that fall, and I understood that the man who bought it, intended to sell the seeds for ten cents a piece. (Were they not cheap at that?) But I have more hounds of the same breed. I learn that one which I dispatched to a distant town, true to its instinct, points to the large yellow squash there, too, where no hound ever found it before, as its ancestors did here and in France.

[48] Other seeds I have which will find other things in that corner of my garden, in like fashion, almost any fruit you wish, every year for ages, until the crop more than fills the whole garden. You have but little more to do, than throw up your cap for entertainment these American days. Perfect alchemists I keep, who can transmute substances without end; and thus the corner of my garden is an inexhaustible treasure-chest. Here you can dig, not gold, but the value which gold merely represents; and there is no Signor Blitz (12) about it. Yet farmers’ sons will stare by the hour to see a juggler draw ribbons from his throat, though he tells them it is all deception. Surely, men love darkness rather than light.

**Explanation**

This original text, without annotations, is available at the following website:


I added questions #1-20 from my own close reading of the text to help scaffold students’ reading of this difficult text.

Additionally, I added all of the information in the text box from my background knowledge gained from other readings and seminars on Thoreau. I don’t claim to be an expert on Thoreau, but I tried to be as accurate as possible.

As a suggestion, this may be a good piece to read with your students, or to have them read and discuss with each other.

**Notes**
1. A pericarp is the outer, often edible layer of a fruit. - back
2. The Assabet River flows into the Sudbery River at Concord, Massachusetts. - back
3. The modern name for the common wood mouse is *Apodemus sylvaticus*. - back
4. John Claudius Loudon (1783-1843), Scottish botanist, garden designer, editor - back
5. Elisha Kent Kane (1820-1857) surgeon and historian on an 1850 Arctic expedition, to look for survivors of the Franklin Expedition. Kane led a second expedition in 1853, and became icebound, but with help from the Inuit, he kept his men alive for two years. They were rescued after a journey over ice and open water. - back
6. When Thoreau read this paper, there had been six Dukes of Athol in Scotland - back
7. A chipmunk - back
8. John Bartram (1699-1777) American botanist, horticulturalist, considered the father of American Botany, and a co-founder, with Benjamin Franklin, of the American Philosophical Society in 1743 - back
10. George B. Emerson, American educator (1797-1881) - "Report on the Trees and Shrubs Growing Naturally in the Forests of Massachusetts" (1846, 1875) - back
11. Carl Linnaeus, (1707-1778), Swedish botanist, physician, zoologist, known as the father of modern taxonomy - back
12. Signor Blitz (1810-1877), well known English-American magician, ventriloquist, juggler and bird handler; his real name was Antoni van Zandt. - back
A metaphor is a comparison between two different and unlike objects that links them in imaginative ways.

Metaphors work well because they compare certain aspects of the two objects, without comparing everything about them.

**Part I: Comparing Features (5 pts.)**

Let’s start out by comparing aspects of the two objects listed below. List all the ways you can think of that the brain is like a sponge.

<table>
<thead>
<tr>
<th>Mind/ Brain</th>
<th>Sponge</th>
</tr>
</thead>
</table>

Now, create your own comparison of a tree and a family in the space provided.

<table>
<thead>
<tr>
<th>Tree</th>
<th>Family</th>
</tr>
</thead>
</table>
Part II: Everyday Objects as Metaphors (5 pts.)

Without looking, select an object from the bag. You will be creating a metaphor using your object.

**My Object:** ______________________

Features and uses of my object (adjectives): ______________________

________________________________________________________________

Other things / concepts my object reminds me of: ______________________

________________________________________________________________

**My Metaphor:**


Part III: Concept Metaphors (5 pts.)

Use the strip of paper provided to create a metaphor. We will be sharing these metaphors with the class.

_________ is a ________________________________.

My Classmates’ Metaphors I Liked:

_________ is a ________________________________.

_________ is a ________________________________.


Part IV: “Mother to Son” by Langston Hughes (5 pts.)

An extended metaphor is a metaphor that is developed over several lines, and compares multiple aspects of two items.

<table>
<thead>
<tr>
<th>Life</th>
<th>Stairs</th>
</tr>
</thead>
</table>
Part V: Seeds as Metaphors (10 pts.)

Now that you have had practice playing with metaphors, you can take what you’ve learned and apply it to seeds. Henry David Thoreau waxed poetically about seeds, and all things in nature, and your task is to do the same.

First, go to the website: http://www.gardendigest.com/seeds.htm

Select three seed / gardening quotes that you like and record them here as models of inspiration

1.

2.

3.

Again, start by brainstorming all the ways seeds are like people by filling out this chart.

<table>
<thead>
<tr>
<th>Seeds</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HOMEWORK: (30 points)

Using a seed as a metaphor, create a poem. You could create any type of poem you would like, and your poem could be in free verse or rhyme. It could also follow a set form, like a sonnet, aubade, or catalog poem. Think abstractly about seeds; your poem doesn’t directly have to be about seeds, but it should apply the principles we’ve covered (seed dispersal, germination, dormancy, thriving vs. surviving, favorable environment) about seeds in some way. You will submit 3 drafts of this poem for revision. These 3 drafts must be submitted with your final poem, which is due when your essay for Seedfolks is due.
Sentence Strips for “Playing with Metaphors” Activity

**Directions:**

For Part III, give each student a sentence strip. No more than two students should have the same sentence strips. Students will record their sentence strip on their handout, and complete them using imagination and creativity. After students complete their strips, have them share with partners and try to create new ones using their classmates’ sentence strips. Remind students that they are not to use like or as. Also, suggest to them that their metaphor should be a descriptive phrase rather than a word.

Friendship is a ________________________________________________

Time is a ______________________________________________________

Illness is a ____________________________________________________

Hope is a ______________________________________________________

Forgetfulness is a ______________________________________________

Doubt is a _____________________________________________________

Confusion is a ________________________________________________

Forgiveness is a ______________________________________________

War is a ______________________________________________________

Ugliness is a __________________________________________________

Anger is a ____________________________________________________
Hatred is a __________________________________________________________________________

Joy is a _____________________________________________________________________________

Riding a bike is a _____________________________________________________________________

Going to a dance is a __________________________________________________________________

Falling in love is a ____________________________________________________________________

Rejection is a _______________________________________________________________________

Ambition is a _______________________________________________________________________

Sorrow is a _________________________________________________________________________

Beauty is a _________________________________________________________________________

Disappointment is a __________________________________________________________________

Summer is a _________________________________________________________________________

An idea is a _________________________________________________________________________

Morning is a _________________________________________________________________________

Note: There are no right or wrong answers. However, encourage students to revise initial answers and to be creative. As they provide answers, remind them of the difference between literal and figurative. The point of this activity is to develop creativity with figurative language and to connect concepts or activities to unrelated objects.
A. What does each seedfolk bring to the garden? As we read each chapter, consider who the speaker seems to be in body, mind, and heart. Choose one phrase or sentence that helps you understand this person, and write it in your journal; find out why you chose it by writing an exploratory paragraph about it.

B. What does each seedfolk get from the garden? By the end of each chapter, consider what the speaker seems to get out of interacting—body, mind, and heart—with the garden. Choose one phrase or sentence that helps you understand this person’s relationship with the garden—or other people in the garden, and write it in your journal; again, find out why you chose it by writing an exploratory paragraph.

In your journal, write both A and B above for the following titular characters and additional characters:

Kim
Ana
Wendell
Gonzola… and Tio Juan
Leona
Sam… and the Puerto Rican teenager
Virgil
Sae Young
Curtis
Nora… and Mr. Myles
Maricella
Amir
Florence
Alternative Journal (Re-phrased for differentiated instruction) – choose the wording that fits your students’ needs

**Seedfolks Journal Assignment**

*Created by Jan Presley and Betsy Geiselman, CCHS*

A. **What conflict, challenges, or attitude does each seedfolk bring to the garden?** What resources, (physical, spiritual, emotional, mental) do they possess that might help them in the garden, and what resources do they lack? Choose one phrase or sentence from that character’s chapter that helps you understand what this person initially brings to the garden, and write it in your journal and then, in two to three sentences, respond to it.

B. **What does each seedfolk gain from the garden?** How does the garden change them? How is a previous conflict or challenge resolved? How does the garden help your character to grow, change, heal, or thrive? Choose one phrase or sentence that helps you understand this person’s relationship with the garden—or other people in the garden, and write it in your journal and then, in two to three sentences, respond to it.

In your journal, write both A and B above for the following titular characters and additional characters:

- Kim
- Ana
- Wendell
- Gonzola… and Tio Juan
- Leona
- Sam… and the Puerto Rican teenager
- Virgil
- Sae Young
- Curtis
- Nora… and Mr. Myles
- Maricella
- Amir
- Florence
Seedfolks Sample Journal Entry

Created by Betsy Geiselman, CCHS

Assignment:

Here is a sample of what a quality journal entry should look like. Each journal entry should start with a clear description of the character that shows thoughtful reading and effectively summarizes the character. In your description, consider gender, ethnicity, socioeconomic status, words, actions, physical description, conflict, and motivation. Each journal entry should have a thoughtfully selected, and properly cited, quote in Parts A and B, and an insightful response to each quote. Your analysis should carefully examine the character’s development as he or she interacts with the garden.

Ana: An older Caucasian woman who has lived in the neighborhood since she was a young girl in 1919, Ana has witnessed her working class neighborhood change substantially since her childhood. As different groups of people moved in and out, her neighborhood changed from being a primarily Caucasian, middle class community, to a community that offered low-income housing and appealed to an increasingly itinerant immigrant population. She is largely suspicious of her neighbors, and spies on them out her windows, from a mixture of boredom and distrust. She witnesses Kim “burying” something in the lot and she decides to take action.

Part A Quote:

“… I just about knew what she’d buried. Drugs most likely, or money, or a gun” (8).

Part A Response:

When Ana sees Kim in the vacant lot, she can’t fully see what she’s doing. She sees her burying something and immediately becomes suspicious. Ana decides to do some investigative work and, a few days later, she digs up what Kim has buried. Ana brings suspicion and distrust to the garden initially. Her suspicion stems from years of living alone in what seems to be a run-down neighborhood in Cleveland. Perhaps because she is older, she is also bored, and looking out the window is a way to occupy the time.

Part B Quote:

“The truth of it slapped me full in the face. I said to myself, ‘What have you done?’ Two beans had roots. I knew I’d done them harm. I felt like I’d read through her secret diary and had ripped out a page without meaning to” (9).

Part B Response:

When Ana digs up Kim’s buried item, she discovers beans and is afraid they won’t grow because of her actions. She immediately feels remorse for what she’s done. I think Ana feels ashamed of how she has viewed people, and she begins to trust people more rather than feel distant. Ana takes steps to remedy what she has done and she helps Kim to be successful in her garden, and she ultimately becomes more trusting and open to people.
Socratic Seminar

Created by Jan Presley and Betsy Geiselman, CCHS

Final Journal entries for Seminar—write 40+ words for each question WITH quoted support from the book:

- Which three people seem to need the garden most, and why?

- Which three people would you rather hang out with in the garden, and why? (Are they the same as the above three people, or different people?)

- How, and why, did this garden seed and grow community in ways the neighborhood itself did not? Explore with details. Is there anything like this in Carbondale? If yes, what? If not, could or should there be?
Name: ____________________________

Seedfolks Creative Writing Assignment

Created by Betsy Geiselman, CCHS

*Seedfolks* is organized in a series of short stories each told from the perspective of one character. After that character speaks, he or she does not speak again in the novel, although he might appear in another character’s story indirectly. For instance, Sam appeared in Sae Young’s story as the man judging the contest for getting water to the garden, and Royce appeared in several stories.

The author, Paul Fleischman, leaves the novel open so that we could imagine other exchanges between the characters in the garden. The open-ended nature of this book made me wonder: how else might the characters in the story have interacted with one another?

**Assignment:**

*Your task is to either choose a character from the story, or create a new character of your own, and create another short story set in the garden wherein your character interacts with other characters.*

You may pick up any point in this story, or continue by imagining the garden in the coming years.

**Requirements:**

- Essay should be two to three pages, typed or handwritten, double-spaced.
- At least two other characters must be indirectly referred to in your story.
- Your character should have a conflict that the garden helps him/her grow, change, or thrive.
- Brainstorming sheet (see below) should be completed prior to writing.
- Your story should include a clear description of the following:
  - Setting (describe the garden, what’s being planted, time of year)
  - Character traits (especially if creating a new one)

**Brainstorm Sheet:**

1. Which character are you going to write about?

2. What traits (physical, personality, etc.) does your character possess?

3. What conflict or problem might your character have?

4. Which other characters could interact with your character?

5. How could the garden help your character to cope with the conflict / problem?
Planting Seeds in the Community

Overview:

In Seedfolks, urban dwellers in Cleveland find refuge in a garden and find sanctuary in the plants they grow, and the friends they make. Over the next week or so, while reading Seedfolks and completing your journals, you will also investigate organizations in our community that seek to provide and preserve such outdoor sanctuaries where people can find themselves and find each other. In addition to learning about a conservation and community-minded organization in Carbondale, you will visit one of the best-kept secrets in Carbondale: one of the Green Earth Nature Preserve Trails closest to where you live.

Project Outcomes:

- Learn about one conservation and community-minded community organization in Carbondale, and discover their mission and ascertain their resources.
- Present what you have learned to classmates by creating a professional quality brochure.
- Create a photo-journal of your hike recording your observations in nature.

Instructions:

Groups were assigned based on where you live so that way you can find a trail within short walking or driving distance. Your group will coordinate to visit and hike the trail at least once in the next two weeks, and will also work together to research your selected organization. I have paired the nature preserves with area community organizations. See the list below to find your assigned pairing. Use your class-time well to learn about your organization and nature preserve, compile materials, and create your photo-journal and brochure. Any work not completed during class-time will have to be completed on your own time.

Final Products:

- Brochure / Presentation of Organization and Photo-journal of Nature Preserve
  - Follow requirements listed in enclosed handout and rubrics
Nature Preserves and Community Organization Resources

**Group 1:** Oakland Nature Preserve  
**Group 2:** Pyles Fork Nature Preserve  
**Group 3:** Chautauqua Bottoms Recycling  
**Group 4:** Brush Hill Nature Preserve  
**Group 5:** Fernlands Nature Preserve

**Beautify Southern Illinois**  
**SIUC Ecodawgs & Student Alliance**  
**Nature Preserve Jackson Co. Health**  
**Sierra Club Shawnee Branch**  
**Touch of Nature**

**Directions:**

Select your assigned pairing and use the resources below to aid in your project research. Use class time effectively and cooperate well with your group members.

**Group 1 Resources:**

Beautify Southern Illinois [http://www.beautifysouthernillinois.org/](http://www.beautifysouthernillinois.org/) in conjunction with~


**Group 2 Resources:**

SIUC Ecodawgs Website [http://sustainability.siuc.edu/](http://sustainability.siuc.edu/)

**Group 3 Resources:**

Jackson County Health Department Recycling and Environmental Education Program  
[http://www.jchdonline.org/index.php?option=com_content&amp;task=view&amp;id=54&amp;Itemid](http://www.jchdonline.org/index.php?option=com_content&amp;task=view&amp;id=54&amp;Itemid)

**Group 4 Resources:**

Sierra Club Shawnee Branch [http://illinois.sierraclub.org/Shawnee/](http://illinois.sierraclub.org/Shawnee/)

**Group 5 Resources:**

Touch of Nature [http://www.ton.siu.edu](http://www.ton.siu.edu)

**All Groups:**

Map of Nature Preserve Locations [http://www.greenearthinc.org/logos/GEmap01.10.pdf](http://www.greenearthinc.org/logos/GEmap01.10.pdf)

**Brochure & Presentation Requirements**

- Create a brochure using Microsoft Publisher or other similar software.
  - Brochure must include graphics that match the text, and should reflect the organization’s mission and role in the community.
  - Brochure must also include the title, address, and website of the organization.
  - Brochure must be colorful, creative, professional looking, and visually stunning.
- Deliver a 6-8 minute presentation on your selected organization.
- All group members must equally divide responsibilities and presentation time.
- Use class time effectively and work well as a group.
- Interview a representative from your organization and include a quote in brochure.
- Print enough color copies for each classmate and the teacher to receive one copy.
- Be prepared with all materials on your assigned date. (10% off per day late)
- See rubric below for grading guidelines on overall brochure design.
- An additional 25 points will be added to rubric grade based on participation during class, group cooperation, adherence to expectations, and dynamic quality of presentation.
- Your brochure should make people excited to get involved in volunteering with the organization. Consider how you can sell the services they provide.

**Photo-Journal Requirements**

- Create a photo-journal using Animoto, Microsoft Photostory 3, Windows Movie Maker, or some other photo streaming software that allows incorporation of text, music, and images.
- Locate and read the brochure for your nature preserve prior to your hike.
- Select 10 - 15 native plants and trees described in your nature preserve’s brochure (see Green Earth website or visit trailhead) to research prior to your hike.
- Incorporate at least 5 photographs of your plants and trees in your photo journal. Include captions and descriptions that teach your classmate about the plant or tree.
- Incorporate at least 5 Thoreau quotes about nature / conservation in Photo Journal.
- Include at least one picture of everyone in the group hiking the trail.
- Use class time effectively to coordinate date, time, and meeting place for hike.
- Select effective transitions and music that matches the mood of your journal.
- Be prepared with all materials on your assigned date. (10% off per day late)
- See rubric below for grading guidelines on overall brochure design.
- An additional 25 points will be added to rubric grade based on participation during class, group cooperation, adherence to expectations, and dynamic quality of presentation.
- Your photo journal should capture the topography and features of your trail. Imagine that you are creating it for the Tourism branch of the Carbondale Chamber of Commerce.
### Brochure Rubric for your Community Organization

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>10</th>
<th>7</th>
<th>4</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attractiveness and Organization</strong></td>
<td>The brochure has exceptionally attractive formatting and well-organized information.</td>
<td>The brochure has attractive formatting and well-organized information.</td>
<td>The brochure has well-organized information, but it lacks visual appeal and creativity.</td>
<td>The brochure’s formatting and organization of material are confusing to the reader.</td>
</tr>
<tr>
<td><strong>Graphics/Pictures</strong></td>
<td>Graphics go well with the text and there is a good mix of text and graphics. Graphics are visually stunning.</td>
<td>Graphics go well with the text, but there are so many that they distract from the text.</td>
<td>Graphics go well with the text, but there are too few and the brochure seems &quot;text-heavy&quot;.</td>
<td>Graphics do not go with the accompanying text or appear to be randomly chosen.</td>
</tr>
<tr>
<td><strong>Content – Accuracy and Effectiveness</strong></td>
<td>All facts in the brochure are accurate and effectively represent your organizations purpose.</td>
<td>90-80% of the facts in the brochure are accurate or representative of your agency’s purpose.</td>
<td>79-70% of the facts in the brochure are accurate or representative of your agency’s purpose.</td>
<td>Fewer than 70% of the facts in the brochure are accurate or representative of your agency’s purpose.</td>
</tr>
<tr>
<td><strong>Usage and Mechanics</strong></td>
<td>There are no grammatical mistakes or mechanical errors in the brochure.</td>
<td>There are 1–2 minor grammatical mistakes or mechanical errors in the brochure.</td>
<td>There are a few distracting grammatical mistakes or mechanical errors in the brochure.</td>
<td>There are frequent severe grammatical mistakes or mechanical errors in the brochure.</td>
</tr>
<tr>
<td><strong>Knowledge Gained</strong></td>
<td>All students in the group can accurately answer all questions related to facts in the brochure and to technical processes used to create the brochure.</td>
<td>All students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.</td>
<td>Most students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.</td>
<td>Several students in the group appear to have little knowledge about the facts or technical processes used in the brochure.</td>
</tr>
</tbody>
</table>


**Overall Points for Brochure Based on Rubric Above:** _____/50

**Additional Points for Presentation Quality and Group Effectiveness:** _____/25

**Total Points:** _____/75
### Photo Journal Rubric for your Nature Preserve

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>10</th>
<th>7</th>
<th>4</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visual Appeal</strong></td>
<td>Makes excellent use of font, color,</td>
<td>Makes good use of font, color,</td>
<td>Makes use of font, color, graphics,</td>
<td>Use of font, color, graphics, effects,</td>
</tr>
<tr>
<td></td>
<td>graphics, effects, etc. to enhance the</td>
<td>graphics, effects, etc. to enhance to</td>
<td>effects, etc. but occasionally these</td>
<td>etc. but these often detract from the</td>
</tr>
<tr>
<td></td>
<td>presentation.</td>
<td>presentation.</td>
<td>detract from the presentation content.</td>
<td>presentation content.</td>
</tr>
<tr>
<td><strong>Originality</strong></td>
<td>Product shows a large amount of original thought. Ideas and layout are creative and inventive.</td>
<td>Product shows some original thought. Work shows new ideas and insights.</td>
<td>Uses other people's ideas (giving them credit), but there is little evidence of original thinking.</td>
<td>Uses other people's ideas, but does not give them credit.</td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td>All requirements are met and exceeded.</td>
<td>All requirements are basically met.</td>
<td>One requirement was not completely met.</td>
<td>More than one requirement was not completely met.</td>
</tr>
<tr>
<td><strong>Content / Integration</strong></td>
<td>Covers topic in-depth. Subject knowledge is excellent. Smoothly integrates all media components</td>
<td>Includes essential knowledge and images about the topic. Subject knowledge appears to be good. Integration could be more effective.</td>
<td>Includes essential information and images about the topic but there are 1-2 factual errors. Media components are not smoothly integrated</td>
<td>Content is minimal OR there are several factual errors. Media selections do not work well together.</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>Content is well organized making effective use of captions and other text. Picture sequence and transitions make sense.</td>
<td>Overall organization is adequate but does not transition or use text as effectively as possible</td>
<td>Content is logically organized for the most part, but is clunky and awkward or makes poor use of text or images.</td>
<td>There was no clear or logical organizational structure, just lots of pictures.</td>
</tr>
</tbody>
</table>


**Overall Points for Photo Journal Based on Rubric Above:** ____/ 50

**Additional Points for Presentation Quality and Group Effectiveness:** ____/ 25

**Total Points:** ____/ 75
Other Potential Resources ~
Thoreau, Hiking, or Gardening

Gardening/ Seeds:

Humorous Food Quotes: http://www.quotegarden.com/food.html

Knowledge: http://www.thegardeningbible.com/growing-plants-from-seed

Great Article on Heirloom Beans to pair with “Bean Field” chapter in Walden:
http://www.concordma.com/blog/2010/02/i-too-am-determined-to-know-beans.html

More information relevant to the bean lab:

Seed Parts: http://highered.mcgraw-hill.com/sites/0078617375/student_view0/

Tips on Community Gardening with Kids of all Ages:
http://www.kidsgardening.org/article/getting-youth-garden-started

Grants for Creating a Community Garden in Your School or Town:
http://www.kidsgardening.org/grants-and-awards

Grants for Creating School Habitats:
http://dnr.state.il.us/education/entice/forms/shagapp06.pdf
Thoreau:

“Thoreau’s First Year at Walden in Fact & Fiction” by Richard Smith

http://thoreau.eserver.org/smith.html


Hiking:

Department of Natural Resources Grants for Schools:

http://parks.state.co.us/SiteCollectionImages/parks/Programs/Trails%20Program/GrantsInfo/Env%20outdoor%20Ed%20Grants.pdf

Local Southern Illinois Recommended Hiking Trails:


Biodiversity Field Trips: http://dnr.state.il.us/education/entice/forms/ibftgapp06.pdf

Seeds:

Seed Travel. Article by Ann Ackroyd with quiz From Website:

http://sharepoint.leon.k12.fl.us/pmon/dacim/Assessment/Reading/grade5/G5_LAA227_FA.pdf

“A man receives only what he is ready to receive, whether physically or intellectually or morally...We hear and apprehend only what we already half know...Every man thus tracks himself through life, in all his hearing and reading and observation and travelling. His observations make a chain. The phenomenon or fact that cannot in any wise be linked with the rest which he has observed, he does not observe.” ~ Henry David Thoreau, Journal
The Seed Story (Source Unknown – from an email)

A successful businessman was growing old and knew it was time to choose a successor to take over the business. Instead of choosing one of his Directors or his children, he decided to do something different. He called all the young executives in his company together.

He said, “It is time for me to step down and choose the next CEO. I have decided to choose one of you.”

The young executives were shocked, but the boss continued. “I am going to give each one of you a SEED today – one very special SEED. I want you to plant the seed, water it, and come back here one year from today with what you have grown from the seed I have given you. I will then judge the plants that you bring, and the one I choose will be the next CEO.”

One man, named Jim, was there that day and he, like the others, received a seed. He went home and excitedly, told his wife the story. She helped him get a pot, soil and compost and he planted the seed. Every day, he would water it and watch to see if it had grown. After about three weeks, some of the other executives began to talk about their seeds and the plants that were beginning to grow.

Jim kept checking his seed, but nothing ever grew. Three weeks, four weeks, five weeks went by, still nothing. By now, others were talking about their plants, but Jim didn’t have a plant and he felt like a failure.

Six months went by — still nothing in Jim’s pot. He just knew he had killed his seed. Everyone else had trees and tall plants, but he had nothing. Jim didn’t say anything to his colleagues, however, he just kept watering and fertilizing the soil – he so wanted the seed to grow.

A year finally went by and all the young executives of the company brought their plants to the CEO for inspection. Jim told his wife that he wasn’t going to take an empty pot. But she
asked him to be honest about what happened. Jim felt sick to his stomach, it was going to be the most embarrassing moment of his life, but he knew his wife was right. He took his empty pot to the board room. When Jim arrived, he was amazed at the variety of plants grown by the other executives.

They were beautiful — in all shapes and sizes. Jim put his empty pot on the floor and many of his colleagues laughed, a few felt sorry for him!

When the CEO arrived, he surveyed the room and greeted his young executives. Jim just tried to hide in the back. “My, what great plants, trees and flowers you have grown,” said the CEO. “Today one of you will be appointed the next CEO!”

All of a sudden, the CEO spotted Jim at the back of the room with his empty pot. He ordered the Financial Director to bring him to the front. Jim was terrified. He thought, “The CEO knows I’m a failure! Maybe he will have me fired!”

When Jim got to the front, the CEO asked him what had happened to his seed – Jim told him the story. The CEO asked everyone to sit down except Jim. He looked at Jim, and then announced to the young executives, “Behold your next Chief Executive Officer! His name is Jim!” Jim couldn’t believe it. Jim couldn’t even grow his seed.

“How could he be the new CEO?” the others said.

Then the CEO said, “One year ago today, I gave everyone in this room a seed. I told you to take the seed, plant it, water it, and bring it back to me today. But I gave you all boiled seeds; they were dead – it was not possible for them to grow.

All of you, except Jim, have brought me trees and plants and flowers. When you found that the seed would not grow, you substituted another seed for the one I gave you. Jim was the only one with the courage and honesty to bring me a pot with my seed in it. Therefore, he is the one who will be the new Chief Executive Officer!”

* If you plant honesty, you will reap trust.
* If you plant goodness, you will reap friends.
* If you plant humility, you will reap greatness.
* If you plant perseverance, you will reap contentment.
* If you plant consideration, you will reap perspective.
* If you plant hard work, you will reap success.
* If you plant forgiveness, you will reap reconciliation.

So, be careful what you plant now; it will determine what you will reap later.

Original Source Unknown – Found at: http://jessicabarnett.com/?category_name=seed-worthies