



SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

Name	User ID	College	Department
LES MURRAY	ldm12	Abington College (AB)	Not Available
YVONNE MURPHY LOVE	yymm1	Abington College (AB)	Not Available

Academic Home: Abington College (AB)

Type of Proposal: Add Change Drop

Course Designation

(BIOL 60N) Art in the Natural World

Course Information

Cross-Listed Courses:

Prerequisites:

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: ArtNaturalWorld
Discipline: General Education
Course Listing: Inter-Domain

Special categories for Undergraduate (001-499) courses

Foundations

- Writing/Speaking (GWS)
- Quantification (GQ)

Knowledge Domains

- Health & Wellness (GHW)
- Natural Sciences (GN)
- Arts (GA)
- Humanities (GH)
- Social and Behavioral Sciences (GS)

Additional Designations

- Bachelor of Arts
- International Cultures (IL)
- United States Cultures (US)
- Honors Course
- Common course number - x94, x95, x96, x97, x99
- Writing Across the Curriculum

First-Year Engagement Program

- First-Year Seminar

Miscellaneous

Common Course

GE Learning Objectives

GenEd Learning Objective: Effective Communication

GenEd Learning Objective: Creative Thinking

GenEd Learning Objective: Crit & Analytical Think

GenEd Learning Objective: Global Learning

GenEd Learning Objective: Integrative Thinking

GenEd Learning Objective: Key Literacies

GenEd Learning Objective: Soc Resp & Ethic Reason

Bulletin Listing

Minimum Credits:	3
Maximum Credits:	3
Repeatable:	NO
Department with Curricular Responsibility:	Abington Administration (ABAB_ABADM)
Effective Semester:	Upon Approval
Travel Component:	NO

Course Outline

A brief outline or overview of the course content:

This course will foster appreciation of art and the natural world through exploration of flora, fauna, geology, and water systems. Students will use scientific and artistic observation skills to understand, relate, and respond to connections in nature. Students will learn how to identify species in the field and gain a base knowledge of natural history. Students will develop observational skills and a deeper awareness of their natural surroundings through scientific observation, visual representations, and writing responses. Using a common visual language, utilizing the elements and principles of design, students will begin to develop an aesthetic awareness through observational collecting. Nature presents an installation ready to analyze, deepening the students' natural curiosity and ability to make connections. Most course work will be in the field and will include use of tools such as binoculars, microscopes, cameras, and sketchbooks.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

Week 1: Introduction to the course and the park followed by an activity on observation. The observation will serve as a benchmark to assess students' prior knowledge and skill set. Students will take a quiet walk through the park and record observations in their journals followed by a discussion of their observations and reflections.

Week 2: Introduction to ways of identifying organisms and natural features through the use of field guides and identification apps paired with an introduction to basic drawing and painting materials and techniques. Students will be asked to find, identify, and draw natural objects observed during their walk.

Week 3: Introduction to how eyes and brains process light waves to see color to further understand the perception of color in nature. Students will explore color by filtering and mixing colors. Students will understand the interaction both physically and contextually in nature.

Week 4: An exploration of texture in nature through observation of tree bark. Students will find, identify, and make rubbings of the bark of three different species of tree with varying textures. Students will develop research questions and make drawings based on their observations of the bark.

Week 5: Students will make observations of nature focusing on aural observations. Blind-folded students will be led on a short walk by a partner and will record any sounds they hear during the walk and then will switch places with their partner. Students will then conduct a walk on their own making a map of any sounds observed during this time.

Week 6: Students will become aware of the connections between artists and scientists through exploration of artistic expressions and the writings of naturalists. In small groups, students will review art and writings inspired by similar natural processes to find connections between artists and naturalists. Through this exercises students will explore their personal connections to nature.

Week 7: Students will present their presentations on their artist and writer from last class. Students will also participate in an observational walk and communicate their awareness of their deepening abilities to observe the natural environment.

Week 8: Students will study the effects of scale on their observations. Students will find a natural feature or organism or part of an organism that they think is interesting and then will observe it at different scales including use of microscopes to examine smaller scales. Students will then reflect on their observations in regards to changes at different scales and their ability to use abstraction inspired by their observations.

Week 9: Students will be introduced to examples of patterns in nature and then asked to research a pattern to discover the evolutionary causes and mechanisms for the pattern. Invent a pattern based on the ideas of evolutionary causes and mechanisms.

Week 10: Students will review their observations from the semester to identify an observation or set of observations they would like

to research further.

Week 11 & 12: Students will continue to work on their own project based on their observations from the semester.

Week 13 & 14: Students will give oral presentations of their researched observations and reflect on the synthesis of art and science as demonstrated through their project.

Weeks 15: Students will participate in an observational walk and apply what they have learned from their final projects and their classmates' projects.

Course Description:

This course will foster appreciation of art and the natural world through exploration of the flora, fauna, geology, and water systems. Students will use scientific and artistic observation skills to understand, relate, and respond to connections in nature. Students will learn how to identify species in the field and gain a base knowledge of natural history. Students will develop observational skills and a deeper awareness of their natural surroundings through scientific observation, visual expressions, and writing responses. Using a common visual language, utilizing the elements and principles of design, students will begin to develop an aesthetic awareness through observational collecting. Nature presents an installation ready to analyze, deepening the students' natural curiosity and ability to make connections. Most course work will be in the field and will include use of tools such as binoculars, microscopes, cameras, and sketchbooks. Goals for this course will include enhancing effective communication and critical and creative thinking. Students will use visual, oral, and written communication to express their observations of the natural world. Critical and creative thinking will be used to analyze and synthesize observations to develop independent research projects and presentations.

The name(s) of the faculty member(s) responsible for the development of the course:

1 Name: LES MURRAY (ldm12)

Title: Associate Professor

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Campus: AB

City: Abington

Fax:

1 Name: YVONNE MURPHY LOVE (ymm1)

Title: Assistant Professor

Phone:

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Campus: AB

City: Abington

Fax:

Course Justification

Instructional, Educational, and Course Objectives:

This section should define what the student is expected to learn and what skills the student will develop.

Students will gain critical integrative skills through development of scientific and artistic observation skills. They will gain the ability to understand how observation of nature can inspire inform art and science. Students' abilities to observe and express connections between themselves and the natural world will be developed. Students will develop appreciation for nature and the ability to use observations to express themselves and learn about the natural world.

Evaluation Methods:

Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.

Several instruments will be used to evaluate the quality of student learning. Throughout the semester students will participate in class observations and will respond to observations both visually and in writing in their journals, worth 50% of the final grade. These directed observations are designed specifically to integrate artistic and naturalistic discovery as well as nurturing synthesis in their journal responses. Students will immediately be able to make connections through their use of common language between the disciplines.

Experience 1 – Observation Walk – Using their observations during their walk in the journals, students will become aware of more than their own current ability to observe.

Experience 2 – Identification – Students will apply learned skills to identify flora and fauna on a walk, and respond to a newly identified species in their journal.

Experience 3 – Color – After understanding how we process light waves and color, students will experiment with methods of observing, altering and collecting color in nature.

Experience 4 – Texture – After an exploratory texture walk, students will collect visual captures of textures and develop research questions to explain discoveries.

Experience 5 – Aural – Through sensory deprivation, aural senses will be heightened. Students will create sound maps to reflect

their experience.

Experience 6 – Scale – Students will make observations of scale in nature and use micro and macro tools to examine at different rates. Students will create abstractions using shifts in scale.

Experience 7 – Pattern – After observing patterns in nature, students will develop research questions to discover the evolutionary causes – and then invent a pattern based on this research question.

In addition to these experiences, students will research and develop a research project exploring the connections between artists and naturalists, worth 15% of the final grade. This small group project not only targets integrative thinking when identifying commonalities between how scientists and artists work, the use of critical and analytical thinking in having to reason the connections, but they will have to practice effective communication by sharing their ideas within their small group and present those ideas to the entire class.

Similarly, the student's final project, worth 25% of the final grade, synthesizes not only biological and artistic concepts, but it integrates many of the general education learning objectives. Students will develop a final research question, synthesizing their semester observational experiences in a particular area of interest. Students will spend additional time in the field exploring their research question both visually and through writing, as well as using the library and online resources to find answers. Their final project presentation should highlight the synthesis of how they arrived at their question, the process they used to understand the issue, and a final reflection.

Relationship/Linkage of Course to Other Courses:

This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.

This course is a new Inter-domain GE course designed for students of all levels and disciplines.

Relationship of Course to Major, Option, Minor, or General Education:

This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

The course is a new GE course cross-listed in ART and BIOL serving as an Inter-domain GE course integrating art and biology.

A description of any special facilities:

The course requires access to a natural area.

Frequency of Offering and Enrollment:

This course could be offered any semester with enrollment of 18 students.

Alignment with General Education Objectives

EFFECTIVE COMMUNICATION – the ability to exchange information and ideas in oral, written, and visual form in ways that allow for informed and persuasive discourse that builds trust and respect among those engaged in that exchange, and helps create environments where creative ideas and problem-solving flourish.

KEY LITERACIES – the ability to identify, interpret, create, communicate and compute using materials in a variety of media and contexts. Literacy acquired in multiple areas, such as textual, quantitative, information/technology, health, intercultural, historical, aesthetic, linguistic (world languages), and scientific, enables individuals to achieve their goals, to develop their knowledge and potential, to lead healthy and productive lives, and to participate fully in their community and wider society.

CRITICAL AND ANALYTICAL THINKING – the habit of mind characterized by comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating a conclusion. It is the intellectually disciplined process of conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

INTEGRATIVE THINKING – the ability to synthesize knowledge across multiple domains, modes of inquiry, historical periods, and perspectives, as well as the ability to identify linkages between existing knowledge and new information. Individuals who engage in integrative thinking are able to transfer knowledge within and beyond their current contexts.

CREATIVE THINKING – the capacity to synthesize existing ideas, images, or expertise in original ways and the experience of performing, making, thinking, or acting in an imaginative way that may be characterized by innovation, divergent thinking, and intellectual risk taking.

GLOBAL LEARNING – the intellectually disciplined abilities to analyze similarities and differences among cultures; evaluate natural, physical, social, cultural, historical, and economic legacies and hierarchies; and engage as community members and leaders who will continue to deal with the intricacies of an ever-changing world. Individuals should acquire the ability to analyze power; identify and critique interdependent global, regional, and local cultures and systems; and evaluate the implications for people's lives.

SOCIAL RESPONSIBILITY AND ETHICAL REASONING – the ability to assess one's own values within the social context of problems, recognize ethical issues in a variety of settings, describe how different perspectives might be applied to ethical dilemmas, and consider the ramifications of alternative actions. Individuals should acquire the self-knowledge and leadership skills needed to play a role in creating and maintaining healthy, civil, safe, and thriving communities.

What component(s) of the course will help students achieve the General Education Learning Objectives covered in the course? Provide evidence that students in the course have adequate opportunities to achieve the identified learning objectives.

EFFECTIVE COMMUNICATION – Students will learn the importance of being able to communicate ideas forged in a subjective

framework from their personal experiences and observations of nature and objectively through a furthered understanding of the scientific method and research of scientific information. Students will begin the course recognizing their own innate ability to see and make distinctions in the field. Using what they already know, alternative ways of looking, through observational drawings, binoculars, microscopes and written observations, will build on and deepen their natural/prior knowledge. Visual communication through drawing, painting, photography, and scientific study of flora and fauna, will enhance both written observations and oral discussion.

CRITICAL AND ANALYTICAL THINKING – Critical and analytical thinking will be developed throughout the course as students will explore the ideas and issues connected to their observations of nature by analyzing, synthesizing, and evaluating the scientific knowledge regarding the natural phenomenon observed in the field. Critical and analytical thinking are natural to both the arts and the sciences. Collected observations will continually be analyzed and reapplied in each field experience.

INTEGRATIVE THINKING – Integrative thinking will be developed by asking students to view components of nature both as inspiration from an artistic perspective and as the impetus for scientific inquiry with the goal of students being able to integrate scientific information and understanding of the role of a component in the natural world with the expression of nature in art.

CREATIVE THINKING – Students should develop the capacity to synthesize existing ideas, images, or expertise from their observations and research of nature in original ways and the experience of making or thinking in an imaginative way that may be characterized by innovation, divergent thinking, and intellectual risk taking.

How will students be assessed to determine their attainment of the Learning Objective(s) of General Education covered in this course? This assessment must be included as a portion of the student's overall performance in this course.

Evaluation of this course will focus on achievement of the objectives of this course to develop effective communication skills, critical and analytic thinking, creative thinking, and integrative thinking. Several instruments will be used to assess student attainment of the General Education Learning Objectives.

Throughout the semester students will participate in class observations and will respond to observations both visually and in writing in their journals, worth 50% of the final grade. The journal will allow for assessment of improvement in effective communication and critical, analytical, integrative, and creative thinking. In addition, students will research and develop a presentation exploring the connections between artists and naturalists, worth 15% of the final grade. This small group project not only targets integrative thinking when identifying commonalities between how scientists and artists work, the use of critical and analytical thinking in having to reason the connections, but they will have to practice effective communication by sharing their ideas within their small group and present those ideas to the entire class. The student's final creative project, worth 25% of the final grade, synthesizes not only biological and artistic concepts, but it integrates many of the general education learning objectives. Students will develop a final research question using critical and analytic thinking to synthesize observations from the semester. Their final project presentation should highlight the integrative thinking important to their project, the process they used to understand the issue, and a final reflection.

General Education Domain Criteria

General Education Designation: Inter-Domain

GA Criteria

- Explain the methods of inquiry in arts fields and describe how the contributions of these fields complement inquiry in other areas
- Demonstrate an expanded knowledge and comprehension of the role that the arts play in various aspects of human endeavor
- Demonstrate competence in the creation of works of art and design
- Demonstrate competence in analysis, critical thinking and interpretive reasoning through the exploration of creative works
- Identify and explain the aesthetic, historic, social, and cultural significance of important works of art and critically assess creative works, their own or others', through evaluative processes of analysis and interpretation

What components of the course will help students achieve the domain criteria selected above?

Arts based research is the use of the artistic process and expression as a way of understanding experiences. The arts compliment the sciences in that they parallel the development of scientific inquiry. Students activities in this course will rely heavily on expanding students abilities to observe and appreciate their natural surroundings. Their awareness will be expanded through experience, individual responses, and developing their own processes for exploration.

Students will respond visually to nature observations in their journals through-out the semester. For their final project, they will review their collected observations and develop a final project that investigates an individual interest, and develop it visually. During this process they become aware of inner passion and voice in pursuing an interest.

Students will respond with visual interpretations of class assignments through-out the semester, they will participate in class critiques of those works using analytical and critical thinking skills continuously. Their mid-term and final projects challenge students to use interpretive reasoning first to find commonalities between the practices of artists and naturalists, and then to apply them to a student initiated final project.

GN Criteria

- Explain the methods of inquiry in the natural science fields and describe how the contributions of these fields complement inquiry in other areas
- Construct evidence-based explanations of natural phenomena
- Demonstrate informed understandings of scientific claims and their applications

- Evaluate the quality of the data, methods, and inferences used to generate scientific knowledge
- Identify societal or philosophical implications of discoveries in the natural sciences, as well as their potential to address contemporary problems

What components of the course will help students achieve the domain criteria selected above?

Understanding of methods of inquiry in the natural science fields will be achieved through field experiences and observations of natural phenomenon with emphasis on making observations from different perspectives and scales to form scientific questions and hypotheses. Students will use their observations to form hypotheses and research questions and through research of scientific information form evidence-based explanations for observed phenomena. Through oral and written communication students will demonstrate informed understanding of a scientific explanation for their observations.

Integrative Studies

Explain how the intellectual frameworks And methodologies of the two Knowledge Domains will be explicitly addressed in the course and practiced by the students.

Integrative thinking is at the core of this course, using the development of scientific and artistic process as the vehicle to carry ideas forward. Class experiences expose students to artistic and scientific methods of observation through nature walks. Students will share how they have interpreted the days natural observations from both an artistic and scientific standpoint. Throughout the semester students will expand on their observations through research projects that integrate artistic and scientific frameworks.

Demonstrate that each Of the two domains will receive approximately equal attention, providing evidence from course topics, assignments, or other course components, and that students will integrate material from both domains.

This course is designed to integrate material from both domains during each class period. Weekly topics and activities are designed to combined observations from art and science. Each unit is designed for students to discover the parallels of observation in art and science but focusing on a particular sense or aspect of observation that can be used to help form scientific hypotheses and inspire artistic work. Throughout the course students will be asked to use their observations to form research questions that can be investigated using scientific knowledge and to create artistic expressions based on their observations and scientific research. Two major course projects are designed to emphasize the integration of science and art. First, students will examine the commonalities in observations and expressions of similar natural features and phenomena as seen in the work artists and naturalist writers. Second, students will select a topic of interest from their observations of the natural world and create a visual representation of the phenomenon incorporating scientific ideas to be presented to the class. Overall, each class period should be an equal division of scientific and artistic activities and discussion.

Briefly explain the staffing plan. Given that each Inter-Domain course is approved for two Knowledge Domains, it will be taught by an instructor (or instructional team) with appropriate expertise in both domains.

This course will be taught by an instructional team of one artist and one biologist.

Describe the assessments that will be used to determine students' ability to apply integrative thinking.

Assessment of integrative thinking will be accomplished mainly through three mechanisms. First, students will be asked to keep journals of their observations and artistic expressions. Periodic reviews of the journals by the instructors will allow evaluation and assessment of improvement of integrative thinking and observational skills by comparing observations and expressions over the course of the semester. Second, an assignment asking students to compare the observations and expressions from a pairing of an artist and naturalist writer in an oral presentation will allow for assessment of students ability to find commonalities in the artistic and scientific observations. Third, students will be assessed based on a final project synthesizing artistic and scientific viewpoints based on their observations.

Campuses That Have Offered () Over The Past 4 Years

semester	AB	AL	BK	BR	BW	CR	DS	ER	FE	GA	GV	HB	HN	HY	LV	MA	NK	PC	SH	SL	UP	WB	WC	WS	XC	XP	XS	YK
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UPLOADED DOCUMENTS FOLLOW:

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Observation Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	First week introduction to the course.
Description	Introduction to the course and the park followed by an activity on observation. The observation will serve as a benchmark to assess students' prior knowledge and skill set. Students will take a quiet walk through the park and record observations in their journals followed by a discussion of their observations and reflections.
Rationale	To begin teaching how to observe the natural world and gauge students' abilities to observe their surroundings. Begin training students to record their observations using different methods. Emphasize the importance of observation in both science and art to strengthen students' awareness of the connection between art and science.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses	Demonstrate current level of observational skills using all senses.
Communicate observations orally, through written word, and visually	Describe the aspects of the natural world they observed during their walk using oral, written, or visual communication.
Reflect on observations orally, through written word, and visually	Share their reflections from their observations during their walk using oral, written, or visual communication.
Demonstrate ability to use and develop maps and mapping	Be able to navigate to designated locations in the park using a paper map.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Be able to develop an idea for expression and formulate a scientific question based on observations of a single natural feature.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class.		
introductory material presentation	20	Course introduction. Introduction to maps and navigation using maps and compasses.		
learning activity #1	60	Use the provided map to navigate to a designated location and record observations of the natural features and organisms observed during the walk.	Were students able to retrieve and return a flag placed at the designated location. Students record observations in their sketchbook.	
Learning activity #2	30	Completion of recording observations and reflection of observations.	Students record observations and reflections in their sketchbook.	
post-activity summing up or transition	30	Discussion of observations, reflections, and experience in navigation using a map.		
Homework		Develop an idea for expression and formulate a scientific question based on observation from the walk.		

Nature's Sketchbook
Teaching Activity Framework

Required Resources for Teaching the Unit

Plan for teaching: How will instruction for this unit be divided among instructors?

The course introduction will be divided equally among both instructors. The scientist would lead the introduction to navigation and maps. The artist would lead the introduction to the activity including recording of observations in the journal. Both instructors will be active during learning activity #2 and the discussion interacting with students and guiding the discussion.

Detailed Description of Assignment(s) and Summative Assessment

The observations recorded during the walk will be used as a preliminary assessment of students' observational and recording skills and knowledge of the natural world as a basis for comparison for future summative assessment based on student's development over the semester. The homework assignment will be a summative assessment based on participation.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Identification Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	To further students' abilities to identify aspects of the natural environment early in the semester.
Description	Introduction to ways of identifying organisms and natural features through the use of field guides and identification apps paired with an introduction to basic drawing and painting materials and techniques. Students will be asked to find, identify, and draw natural objects observed during their walk.
Rationale	To improve students observation skills by introducing them to new ways of observing nature and expressing those observations visually.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses.	Be able to identify and create a visual expression from their observations.
Communicate observations orally, through written word, and visually	Be able to visually communicate the necessary information for identification of nature.
Reflect on observations orally, through written word, and visually	Share their reflections about the experience of identifying components of nature.
Demonstrate vision or re-visioning; ability to see in new ways.	Be able to deconstruct a whole into parts for purposes of identification and visual expression.
Demonstrate ability to use available resources to identify and learn about parts of the natural world.	Be able to use field guides, apps, and other sources to identify and learn about nature.
Be able to work independently and gather necessary information to complete work.	Be able to use available resources to create artistic responses.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Understand the importance of seeing the parts that make up a whole in science and art.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class. Become familiar identification apps.		
introductory material presentation	20	Introduction to identification with a focus on parts rather than the whole. Introduction to field guides and apps.	Groups of 3-4 students will be assigned a bird or tree to identify.	
learning activity #1	60	Identify at least two birds and two trees using the field guides and apps and recording any pieces of information used for identification.	Students would record the species identified and identifying characteristics in their journal.	
Demonstration	10	Demonstrate how to use materials to combine recorded observations from the identification walk.		
Learning activity #2	60	Choose one of the identified species and using the recorded pieces of information create a visual representation.	Visual representations will be recorded in their journals.	
post-activity summing up or transition	20	Discussion of the experience identifying and recording species.	Writing response to class discussion in their journal.	

Nature's Sketchbook
Teaching Activity Framework

Homework		Continue working on visual representations.		
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Required Resources for Teaching the Unit

Plan for teaching: How will instruction for this unit be divided among instructors?

The scientist would lead the introduction to identification. The artist would lead the demonstration. Both instructors will be active during the learning activities and the discussion interacting with students and guiding the discussion.

Detailed Description of Assignment(s) and Summative Assessment

Students will be evaluated based on their ability to synthesize the parts to whole approach to identification from their journal entries.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Texture Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This week's lesson is designed as an introduction to developing a research model that synthesizes information from observations and research.
Description	An exploration of texture in nature through observation of tree bark. Students will find, identify, and make rubbings of the bark of three different species of tree with varying textures. Students will develop research questions and make drawings based on their observations of the bark.
Rationale	To develop students ability to use observations to inspire artistic and scientific research.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses.	Be able to identify and create a visual expression based on observations of texture. Be able to identify and create a scientific research question based on observations of texture.
Communicate observations orally, through written word, and visually	Be able to communicate research questions based on observations of texture.
Demonstrate ability to synthesize information	Be able to synthesize information from observations with information from their research.
Demonstrate ability to identify and pursue research questions.	Be able to develop and define a research question in both art and science.
Demonstrate understanding of and appreciation for interconnectedness in nature.	Be able describe the importance of the interaction of trees and their environment to explain the differences in bark textures.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Be able to use observations to develop research questions to inspire and inform art and science.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class.		
introductory material presentation #1	10	Introduction to rubbings in art.		
learning activity #1	90	Identify three species of trees with varying bark textures and collect rubbings of the tree bark.	Create a drawing from one of the rubbings in the journal.	
Learning activity #2	10	Small group discussions on variation in texture based on observations followed with a compiled list of terms from the entire class.	Students will develop ways to describe textures.	
Learning activity #3	15	Each student will take 5 minutes to write down at least three questions about the tree bark they observed. Students will then share one question with a small group of students and discuss the question.	Students will choose one question they are interested in researching and record it in their journal.	
Learning activity #4	15	Students will develop at least three possible explanations for a characteristic of the tree bark they observed and discuss them with a partner/small group.	Students will record their research question and possible explanations in their journal.	

Nature's Sketchbook
Teaching Activity Framework

Homework		Research their question to explain variation in tree bark.	A written paragraph or visual representation explaining the observed texture in their journals.	
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Required Resources for Teaching the Unit

Materials for rubbings.

Plan for teaching: How will instruction for this unit be divided among instructors?

The artist would lead the introduction to rubbings. Both instructors will be active during the learning activities and guide students during the activity and discussion.

Detailed Description of Assignment(s) and Summative Assessment

Students will be evaluated based on their abilities to represent observed textures in a drawing and develop and research a question based on their observations.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Sounds Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This week's lesson is designed as an introduction to observation through sound.
Description	Students will make observations of nature focusing on aural observations. Blind-folded students will be led on a short walk by a partner and will record any sounds they hear during the walk and then will switch places with their partner. Students will then conduct a walk on their own making a map of any sounds observed during this time.
Rationale	To develop students ability to make observations using senses other than vision and using sounds to orient themselves.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses.	Be able to observe sounds in nature.
Communicate observations orally, through written word, and visually	Be able to translate observed into a visual expression.
Reflect on observations orally, through written word and visually.	Be able to reflect on observed sounds through visual representation of observed sounds. Be able to develop explanations for types of sounds observed in nature.
Demonstrate ability to use and develop maps and mapping	Be able to develop a map of sound observations.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Develop and deepen students' abilities to observe and express connections between themselves and the natural world.	Be able to use aural observations to develop a visual representation of their surroundings and orient themselves using sounds.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class.		
introductory material presentation #1	5	Introduction to blind walk.		
learning activity #1	35	Students will choose a partner. And take turns guiding each other on a blind-folded walk (10 minutes) followed by 5 minutes to record aural observations.	Students will record their observations in their journals.	
Summing up activity #1	10	Reflection on sounds heard and exposure to possible sounds with class discussion about the information conveyed via sound.	1-minute essay about the potential information conveyed in a sound observed during their walk in their journal.	
Learning activity #2	130	Sound mapping exercise. Students will record locations of sounds in their journal using shapes, colors, or images as representations of different sounds. Students will create a sound map in their journal based on their observations.		
Homework		Finish sound map in journal.		

Nature's Sketchbook
Teaching Activity Framework

Required Resources for Teaching the Unit

Blind folds.

Plan for teaching: How will instruction for this unit be divided among instructors?

The scientists would lead the introduction and learning activity #1. The artist will lead learning activity #2. Both instructors will be active during the learning activities and guide students during the activity and discussion.

Detailed Description of Assignment(s) and Summative Assessment

Students will be evaluated based on their abilities to represent sound in a map based on observations.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Artist and Naturalist Pairing
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	An introduction to formally synthesizing art and science.
Description	Students will become aware of the connections between artists and scientists through exploration of artistic expressions and the writings of naturalists. In small groups, students will review art and writings inspired by similar natural processes to find connections between artists and naturalists. Through this exercises students will explore their personal connections to nature.
Rationale	Introduce students to the integration of art and science through the work of naturalist artists.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses.	Students will observe how naturalists and artists respond to nature.
Communicate observations orally, through written word, and visually.	Be able to communicate their observations of artists' and naturalists' work within small groups and to the whole class.
Demonstrate ability to synthesize information.	Students will be able to synthesize information obtained through visual expression and writings based on similar natural processes.
Demonstrate understanding of and appreciation for interconnectedness in nature.	Students will be able to describe the interconnectedness of an ecological process as demonstrated through others' visual expressions and writings.
Demonstrate understanding of metaphor.	Students will be able to describe artistic use of metaphor in an artists work.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Develop an appreciation for nature and ability to express how the natural world and humans interact.	Students will be able to describe the interaction between humans and the natural world as expressed through naturalist writings and artistic expression.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class. View images of an assigned naturalist artist's work. Read an assigned excerpt of naturalist writing.		
learning activity #1		Within in assigned groups students will discuss observations of what inspired the artist and the writer.	Within the group, students will make a list of potential inspirations and record these in their journals.	
Learning activity #2		Within in assigned groups students will discuss the processes developed by the artist and naturalists in creating their works.	Within the group, students will make a list of processes and methods used and record these in their journals.	
Learning activity #3		Within in assigned groups students will discuss the artistic content and natural phenomenon central to the art and writing.	Within the group, students will make describe the content of the art and ecological phenomenon and record these in their journals.	
Learning activity #4		Within in assigned groups students will develop a presentation to introduce the rest of the class to the assigned artist and writer they studied with focus on the topics discussed in learning activities 1-3.		

Nature's Sketchbook
Teaching Activity Framework

Homework		Finish the group presentation to be presented next class period.		
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Required Resources for Teaching the Unit

Links to readings and artistic works.

Plan for teaching: How will instruction for this unit be divided among instructors?

Both instructors will be active during the learning activities and guide students during the activity and discussion.

Detailed Description of Assignment(s) and Summative Assessment

Students will be evaluated based on their abilities to synthesize the works of both artists and writer and convey this information to the class. See attached project description.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Color Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	To further students' understanding the basics of perception of color and the interaction of color.
Description	Introduction to how eyes and brains process light waves to see color to further understand the perception of color in nature. Students will explore color by filtering and mixing colors. Students will understand the interaction both physically and contextually in nature.
Rationale	To allow students to apply the foundations of color in their observations, interpretation, and expression of nature.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses.	Be able to identify and create a visual expression from their color studies.
Communicate observations orally, through written word, and visually	Be able to use color to visually communicate.
Demonstrate vision or re-visioning; ability to see in new ways.	Be able to deconstruct and reconstruct colors for visual expression and identification.
Demonstrate ability to synthesize information	Be able to synthesize their understanding of the physical properties of color, perception of color, and color interaction and how these properties manifest themselves in nature.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Develop and deepen students' abilities to observe and express connections between themselves and the natural world.	Students will be able to apply their understanding of color to observe nature from different perspectives.
Develop an appreciation for nature and be able to express how the natural world and humans interact.	Students will appreciate the origin of color in nature and their aesthetic value.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class.		
introductory material presentation #1	20	Video/presentation/discussion of perception of color by humans and other organisms.		
learning activity #1	30	Exploration of colors by using color filters to observe various objects.	Recording perception of the same object using no filters and filters of different colors in their journals.	
Introductory material presentation #2	10	Presentation on the color wheel and the interaction of color.		
Demonstration	10	Demonstration on color mixing.		
Learning activity #2	110	Observational walk using color filters to change the perception of color.	Create an analogous color painting based on observations from the walk.	

Nature's Sketchbook
Teaching Activity Framework

Homework		Finish analogous color painting.		
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Required Resources for Teaching the Unit

Plan for teaching: How will instruction for this unit be divided among instructors?

The scientist would lead the introduction to physical properties of color and vision of color. The artist would lead the introduction to the color wheel and color interaction as well as the color mixing demonstration. Both instructors will be active during the learning activities and guide students during the activity.

Detailed Description of Assignment(s) and Summative Assessment

Students will be evaluated based on their ability to apply understanding of the perception of color to create an analogous color painting.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Presentations and Mid-Semester Observation Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This activity will take place mid-semester to assess students' progress since the first observational walk.
Description	Students will present their presentations on their artist and writer from last class. Students will also participate in an observational walk and communicate their awareness of their deepening abilities to observe the natural environment.
Rationale	To allow students to demonstrate their synthesis of information from their study of an artist and writer and to become aware of changes in their observational skills.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses	Demonstrate current level of observational skills using all senses.
Communicate observations orally, through written word, and visually	Describe the aspects of the natural world they observed during their walk using oral, written, or visual communication.
Reflect on observations orally, through written word, and visually	Share their reflections from their observations during their walk using oral, written, or visual communication.
Communicate observations orally, through written word, and visually.	Be able to communicate their observations of artists' and naturalists' work within small groups and to the whole class.
Demonstrate ability to synthesize information.	Students will be able to synthesize information obtained through visual expression and writings based on similar natural processes.
Demonstrate understanding of and appreciation for interconnectedness in nature.	Students will be able to describe the interconnectedness of an ecological process as demonstrated through others' visual expressions and writings.
Demonstrate understanding of metaphor.	Students will be able to describe artistic use of metaphor in an artists work.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Be able to develop an idea for expression and formulate a scientific question based on observations of a single natural feature.
Develop an appreciation for nature and ability to express how the natural world and humans interact.	Students will be able to describe the interaction between humans and the natural world as expressed through naturalist writings and artistic expression.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class. Be prepared to present.		
Student presentations	60	Each groups of students will give a ~10 minute presentation on their artist and writer from last class.		
learning activity #1	60	Students will go on a walk and record observations of the natural features and organisms observed during the walk.	Students record observations in their journal.	
Learning activity #2	30	Completion of recording observations and reflection of observations.	Students record observations and reflections in their sketchbook.	
post-activity summing up or transition	30	Discussion of observations, reflections, and changes in observations skills since week 1.		
Homework		Identify something that has becoming interesting to you throughout the semester and develop a series of questions pertaining to these observations.		

Nature's Sketchbook
Teaching Activity Framework

Required Resources for Teaching the Unit

Projector.

Plan for teaching: How will instruction for this unit be divided among instructors?

Both instructors will be active during the learning activities and the discussion interacting with students and guiding the discussion.

Detailed Description of Assignment(s) and Summative Assessment

1. Students will be assessed on their ability to synthesize and communicate information as demonstrated in their presentations.
2. Students will be assessed based on the evidence of change in their observational skills since the first observational walk.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Scale Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This activity will take place later in the semester and continue building observational skills using technology to enhance their senses.
Description	Students will study the effects of scale on their observations. Students will find a natural feature or organism or part of an organism that they think is interesting and then will observe it at different scales including use of microscopes to examine smaller scales. Students will then reflect on their observations in regards to changes at different scales and their ability to use abstraction inspired by their observations.
Rationale	To have students begin to think about observing the natural world from different perspectives and seek more than they see with the naked eye.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses	Be able to use tools to enhance visual observation.
Communicate observations orally, through written word, and visually	Be able to visually represent observations at different scales.
Reflect on observations orally, through written word, and visually	Share their reflections from their observations at different scales using oral, written, or visual communication.
Demonstrate vision or re-visioning; ability to see in new ways.	Be able to deconstruct and construct visual expressions at different scales.
Demonstrate ability to use available resources to identify and learn about parts of the natural world.	Be able to use the microscope to examine and learn about parts of a whole.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Be able to use tools to deconstruct natural features record their observations visually.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class.		
Introduction	20	Introduction to scale and microscopes.		
learning activity #1	90	Students will go on a walk and find a natural feature to observe at multiple scales and will collect a sample to observe using a microscope.	Students record observations on provided paper.	
Learning activity #2	40	Micro-scale observation of the sample from the natural feature.	Students record observations on provided paper and reflections in their journal.	
post-activity summing up or transition	30	Matching exercise of features at different scales to pair micro and macro perspectives either from student drawings or images provided by the instructor.		
Homework		Complete images and glue into journal.		

Required Resources for Teaching the Unit

Nature's Sketchbook
Teaching Activity Framework

Microscope (dissecting and compound)

Plan for teaching: How will instruction for this unit be divided among instructors?

The scientists will lead the introduction to microscopes and scale with contribution from the artist on the ideas of scale. Both instructors will be active during the learning activities and the discussion interacting with students and guiding the discussion.

Detailed Description of Assignment(s) and Summative Assessment

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Natural Selection of Patterns
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This activity will take place later in the semester and is a good activity for a rainy day as well.
Description	Students will be introduced to examples of patterns in nature and then asked to research a pattern to discover the evolutionary causes and mechanisms for the pattern. Invent a pattern based on the ideas of evolutionary causes and mechanisms.
Rationale	To introduce the ideas of natural selection and help students connect science applications to art.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate ability to identify and pursue research questions.	Be able to develop hypotheses to explain observed patterns in nature.
Demonstrate venturing beyond through risk taking and productive failure.	Be able to development of hypotheses that may be incorrect. Be able to risk taking through using techniques and materials that may not be familiar with.
Demonstrate creative and critical thinking.	Be able to creative and critical to form hypotheses and develop an original technique.
Demonstrate ability to use available resources to identify and learn about parts of the natural world.	Be able to use available resources to learn about patterns in nature and the evolutionary causes and mechanisms of patterns.
Demonstrate ability to synthesize information.	Be able to develop a pattern and explain the evolutionary cause or mechanism being expressed.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Students will become aware of how the observation of patterns in nature can inspire scientific inquiry and artistic expression.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class. Optional: Bring a patterned objects from nature.		
Introduction	20	Introduction to patterns in nature, basics of natural selection, and causes patterns including videos.		
learning activity #1	20	Students will choose a pattern they have observed or provided by the instructor and develop hypotheses for the evolutionary causes and mechanisms for the pattern.	Students will record hypotheses in their journals.	
Learning activity #2	30	Research their pattern to falsify or support their hypotheses.	Students will record the evolutionary causes and mechanisms to explain pattern that they found in their research in their journals.	
Demonstration	15	Demonstration on creating patterns with natural materials.		
Learning activity #3	90	Students will create a technique for expressing a pattern caused by an evolutionary cause or mechanism.	Students will create a pattern in their journals.	

Nature's Sketchbook
Teaching Activity Framework

Homework		Complete patterns in their journals.	Students will explain through writing in their journal the evolutionary causes and mechanisms of the pattern they researched.
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Required Resources for Teaching the Unit

Animals or objects from nature with patterns. Collection of objects from nature to make a pattern during demonstration.

Plan for teaching: How will instruction for this unit be divided among instructors?

The scientists will lead the introduction to natural selection and patterns in nature. The artist will give a demonstration on making patterns from natural objects. Both instructors will be active during the learning activities and the discussion interacting with students and guiding the discussion.

Detailed Description of Assignment(s) and Summative Assessment

1. Students will be assessed on their ability to synthesize information and create a pattern based on the evolutionary causes and mechanisms of the pattern they researched.
2. Students will also be assessed on their ability to explain the evolutionary causes and mechanisms of the pattern they researched.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Research Project Beginning
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This is an end of the semester activity to begin to synthesize observations recorded in journals.
Description	Students will review their observations from the semester to identify an observation or set of observations they would like to research further.
Rationale	To allow students to develop their own project based on their observations.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Reflect on observations orally, through written word or visually.	Be able to use journal observations to develop research interests.
Demonstrate understanding of and appreciation for interconnectedness.	Be able to expand their observations to consider multiple scales and/or connectedness in the natural world.
Demonstrate ability to use available resources to identify and learn about parts of the natural world.	Be able to use available resources to learn about journal observations.
Demonstrate ability to synthesize information.	Be able to use previous research and observations to inform research questions.
Demonstrate ability to identify and pursue research questions.	Be able to use journal observations to develop research interests.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Students will become aware of how the observation of patterns in nature can inspire scientific inquiry and artistic expression.
Develop and deepen students' abilities to observe and express connections between themselves and the natural world.	Students will be able to choose an area of interest based on observations of nature.
Develop an appreciation for nature and ability to express how the natural world interacts.	Students will express the interactions of the natural world through synthesized scientific and artistic approaches.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class.		
Introduction	10	Introduction to the overall project asking students to synthesize information from their observations and research to create a visual representation of a natural feature and an accompanying oral presentation.		
Discussion	20	Discussion on previous instances where students have synthesized information throughout the semester.	List of examples of synthesis of information in their journal.	
learning activity #1	30	Students will review their observations in their journals and brain storm potential research topics.	List of potential research topics.	
Learning activity #2	30	Students will research potential topics and choose a final topic for their project.	Students will record the notes on potential topics and why they chose their final topic in their journal.	
Learning activity #3	90	Students will create a technique for expressing a pattern caused by an evolutionary cause or mechanism.	Students will create a pattern in their journals.	

Nature's Sketchbook
Teaching Activity Framework

Homework		Gather necessary materials for the project for next week.		
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Required Resources for Teaching the Unit

Plan for teaching: How will instruction for this unit be divided among instructors?

Both instructors will be active during the introduction, discussion, and learning activities, interacting with students and guiding the discussion.

Detailed Description of Assignment(s) and Summative Assessment

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Research Project Development
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This is an end of the semester activity to begin to synthesize observations recorded in journals.
Description	Students will continue to work on their own project based on their observations from the semester.
Rationale	To allow students to work with faculty supervision on their own project based on their observations.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Reflect on observations orally, through written word or visually.	Be able to use journal observations to develop research interests.
Demonstrate understanding of and appreciation for interconnectedness.	Be able to expand their observations to consider multiple scales and/or connectedness in the natural world.
Demonstrate ability to use available resources to identify and learn about parts of the natural world.	Be able to use available resources to learn about journal observations.
Demonstrate ability to synthesize information.	Be able to use previous research and observations to inform research questions.
Demonstrate ability to identify and pursue research questions.	Be able to use journal observations to develop research interests.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Students will become aware of how the observation of patterns in nature can inspire scientific inquiry and artistic expression.
Develop and deepen students' abilities to observe and express connections between themselves and the natural world.	Students will be able to choose an area of interest based on observations of nature.
Develop an appreciation for nature and ability to express how the natural world interacts.	Students will express the interactions of the natural world through synthesized scientific and artistic approaches.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring any necessary materials for their project.		
Review	10	Review of project of objectives to reinforce research methods.		
Project work time	170	Students will work on their own projects with faculty supervision.		
Homework		Continue working on their project.		

Required Resources for Teaching the Unit

Plan for teaching: How will instruction for this unit be divided among instructors?

Both instructors will be active during the review and project work time.

Detailed Description of Assignment(s) and Summative Assessment

See project description handout.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	Student Presentations
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This is an end of the semester activity for students to share their research, further synthesize their art and science objectives, and communicate observations orally.
Description	Students will give oral presentations of their researched observations and reflect on the synthesis of art and science as demonstrated through their project.
Rationale	To allow students to orally communicate observations, reflections, and synthesis.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Communicate observations orally, through written word or visually.	Be able to communicate their observations orally to their classmates and instructors.
Reflect on observations orally, through written word or visually.	Be able to use journal observations to develop research interests.
Demonstrate understanding of and appreciation for interconnectedness.	Be able to expand their observations to consider multiple scales and/or connectedness in the natural world.
Demonstrate ability to use available resources to identify and learn about parts of the natural world.	Be able to use available resources to learn about journal observations.
Demonstrate ability to synthesize information.	Be able to use previous research and observations to inform research questions.
Demonstrate ability to identify and pursue research questions.	Be able to use journal observations to develop research interests.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Students will become aware of how the observation of patterns in nature can inspire scientific inquiry and artistic expression.
Develop and deepen students' abilities to observe and express connections between themselves and the natural world.	Students will be able to choose an area of interest based on observations of nature.
Develop an appreciation for nature and ability to express how the natural world interacts.	Students will express the interactions of the natural world through synthesized scientific and artistic approaches.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		To have oral presentation prepared before class.		
Student presentations	180	Students will give oral presentations about their project.		

Required Resources for Teaching the Unit

Plan for teaching: How will instruction for this unit be divided among instructors?

Both instructors will review and grade the oral presentations.

Detailed Description of Assignment(s) and Summative Assessment

See student presentation description handout.

Nature's Sketchbook
Teaching Activity Framework

Title of Activity	End of Semester Observation Walk
Unit Developers & Contact Information	<i>Yvonne Love, Penn State Abington (ymm1@psu.edu)</i> <i>Les Murray, Penn State Abington (ldm12@psu.edu)</i>
Context	This activity will take place at the end of semester to assess students' progress since the early and mid-semester observational walk.
Description	Students will participate in an observational walk and apply what they have learned from their final projects and their classmates' projects.
Rationale	To allow students to become aware of changes in their observational skills.

Nature's Sketchbook
Teaching Activity Framework

Course-level Learning Outcomes and Learning Objectives	
Course-level Learning Outcome	Learning Objectives
Which course-level learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each course-level learning outcome?
Demonstrate observation skills through all senses	Demonstrate current level of observational skills using all senses.
Communicate observations orally, through written word, and visually	Describe the aspects of the natural world they observed during their walk using oral, written, or visual communication.
Reflect on observations orally, through written word, and visually	Share their reflections from their observations during their walk using oral, written, or visual communication.
Demonstrate ability to synthesize information.	Students will be able to synthesize information obtained through visual expression and writings based on similar natural processes.
Demonstrate understanding of metaphor.	Students will be able to describe artistic use of metaphor in an artists' work.

Nature's Sketchbook
Teaching Activity Framework

Integration	
Integrative Learning Outcomes	Learning Objectives
Which Integrative learning outcomes are addressed in this unit?	What specific learning objectives are addressed in this unit for each Integrative learning outcome?
Students will become aware of the importance of observation skills to both science and art. With emphasis on how observation of nature can inspire and inform art and science.	Be able to develop an idea for expression and formulate a scientific question based on observations of a single natural feature.
Develop an appreciation for nature and ability to express how the natural world and humans interact.	Students will be able to describe the interaction between humans and the natural world as expressed through naturalist writings and artistic expression.

Nature's Sketchbook
Teaching Activity Framework

Class Presentation Plan

Action	Time (min)	Activity	Formative Assessment	Explanation, notes, suggestions, tips
Preclass assignments /activities		Bring required materials to class.		
learning activity #1	60	Students will go on a walk and record observations of the natural features and organisms observed during the walk.	Students record observations in their journal.	
Learning activity #2	30	Completion of recording observations and reflection of observations.	Students record observations and reflections in their sketchbook.	
post-activity summing up or transition	30	Discussion of observations, reflections, and changes in observations skills since week 1.		

Required Resources for Teaching the Unit

Plan for teaching: How will instruction for this unit be divided among instructors?

Both instructors will be active during the learning activities and the discussion interacting with students and guiding the discussion.

Detailed Description of Assignment(s) and Summative Assessment

Nature's Sketchbook
Teaching Activity Framework

1. Students will be assessed based on the evidence of change in their observational skills over the course of the semester based on their journals and instructors' observations.

BIOL 060N.001 Art and the Natural World

Fall 201X

Friday 9:05am-12:05pm – Pennypack Ecological Restoration Trust

Instructors:

Yvonne Love, Assistant Professor

Office: 229 Woodland

Office Hours: T,Th 3-4pm

Email : ymm1@psu.edu

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Les Murray, Associate Professor

Office: 228 Woodland

Office Hours: M,W 11-1; F 1-2

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Course Description:

This course will foster appreciation of art and the natural world through exploration of the flora, fauna, geology, and water systems. Students will use scientific and artistic observation skills to understand, relate, and respond to connections in nature at various scales. Students will learn how to identify species in the field and gain a base knowledge of natural history. Students will develop observational skills and a deeper awareness of their natural surroundings through scientific observation, drawing, painting, photography, and writing responses. Using a common visual language, utilizing the elements and principles of design, students will begin to develop an aesthetic awareness through observational collecting. Nature presents an installation ready to analyze, deepening the students' natural curiosity and ability to make connections. Most course work will be in the field and will include use of tools such as binoculars, microscopes, cameras, and sketchbooks.

After completing this course students will have used;

1. creative and critical thinking
2. risk taking and productive failure
3. reflected on observations orally, through written word and visually
4. metaphor

Learning Outcomes

1. Demonstrate observation skills through all senses
2. Communicate observations orally, through written word and visually
3. Demonstrate ability to identify and pursue research questions
4. Demonstrate understanding of and appreciation for interconnectedness
5. Demonstrate ability to synthesize information
6. Demonstrate ability to use and develop maps and mapping
7. Demonstrate ability to use resources to identify and learn about the natural world

Attendance

Attendance is mandatory and students are expected to arrive on time. Students missing class without an excused absence might not be provided the opportunity to make up all class activities and assignments. Excused absences include religious holidays and documented illness).

Expectation of Academic Honesty

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at the Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of conduct states that all students should act with personal integrity, respect other student's dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonest violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

This course encourages sharing ideas and cooperative learning. It is expected that all work submitted will be yours. Any work submitted that is not your own will be considered a violation of the Penn State University's Academic Integrity Policy.

The Office for Disability Services: Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Disability Services Coordinator for the Abington campus is Heather van Brackel (hxv15@psu.edu or [215-881-7962](tel:215-881-7962)). Her office is located in Sutherland 223, through the Testing Center.

In order to receive consideration for reasonable accommodations, you must contact Heather van Brackel, participate in an intake interview, and provide documentation: <http://equity.psu.edu/sdr/guidelines>. If the documentation supports your request for reasonable accommodations, the coordinator will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your course as possible. You must follow this process for every semester that you request accommodations.

Learning Center: The Learning Center at Penn State Abington, located in room 315 Sutherland Hall, is a resource to aide students in achieving academic success. Professional and peer tutors with an extensive background in a variety of subject areas, are available to assist students in: Mathematics, Writing and English, ESL, Languages, Sciences, Accounting and Statistics. Workshops on study skills, time management, note taking, and college reading strategies are also offered through the Learning Center. The Learning Center is open 9am to 5pm, Monday through Friday. Tutoring is available to students as walk-in appointments, however, scheduling appointments in advance is strongly encouraged. Students can register and make appointments at <https://abington.mywconline.com>. Free Online Tutoring is available through NetTutor for all Penn State Abington students. Students can register by visiting, www.nettutor.com, clicking the "Students" button, and following the log-in directions.

Grades

Grading will be assessed first based on the comprehension of design issues, technical and conceptual skills, class participation and discussions and how well you clean up your workspace. **(If you come to class without any supplies you will be marked absent)** Each of your projects will be graded based on the above-mentioned criteria. Assignments turned in late will be marked down 3 points for each class period it is late. Even if you do not complete an assignment on time you are expected to come and participate in the critique of your fellow students work. **Being absent on a critique day will drop that project grade an additional 10 points.**

Artist/Naturalist Presentation	15 points
Final Project and Presentation	25 points
Journal grade	50 points
Class participation	10 points
Total	100 points

University Grading Scale

A	Outstanding 93-100
A-	90-92
B+	87-89
B	Good 83-86
B-	80-82
C+	77-79
C	Satisfactory 70-76
D	Poor 60-69
F	Unsatisfactory < 60

Supply List

Walking shoes

A supply kit has been prepared for you at:

Allegheny Art Company
318 Leedom Street
Jenkintown PA

Tentative Class Outline

Date	Topic	Assignment
F Aug 24	Observation Walk	
F Aug 31	Identification	Visual representations in journal
F Sep 7	Color Walk	Finish analogous color painting
F Sep 14	Texture Walk	Research explanations for tree bark variation
F Sep 21	Sound Map	Finish sound map in journal
F Sep 28	Artist – Naturalist Connections	Finish group presentation
F Oct 5	Presentations and Mid- semester Walk	Development questions of interest
F Oct 12	Scale Walk	Complete images and glue into journal
F Oct 19	Pattern Walk	Complete patterns and explain evolutionary mechanisms of observed pattern
F Oct 26	Individual Research	Gather materials for next week
F Nov 2	End of semester Walk	
F Nov 9	Individual Research	Continue working on project
F Nov 16	Individual Research	Continue working on project
F Nov 23	Thanksgiving Break!!!	
F Nov 30	Student Presentations	
F Dec 7	Student Presentations	