Open Spaces as Learning Places
SCHOOLYARD UNIT

THE "OPEN SPACES AS LEARNING PLACES" PROGRAM

The Open Spaces as Learning Places program teaches environmental science through six curriculum units focused New Haven open spaces. The program takes place over 9 weeks in both the spring and fall semesters. Each year, we teach approximately 27 hours of science education to 200 New Haven 6th grade students. In addition, through teacher training workshops and on-going support, we provide professional guidance to New Haven public school teachers.

In the **Schoolyard Unit** students learn that even the schoolyard is part of the natural world. By studying New Haven's history and creating a wildlife enhancement project in their schoolyard, students recognize the role humans and nature play in shaping the landscape.

The **Greenspace Unit** raises student awareness of open space at the neighborhood level. Children learn about local stewardship efforts of neighborhood residents to restore open space by transforming vacant lots into greenspace sites, landscaping yards, and maintaining curb strips. Students note the effects of natural change on the neighborhood environment and examine the special adaptations that allow flora and fauna to thrive in their neighborhood habitats.

The **Park Unit** takes an ecological approach to open space by focusing on a nearby city park to teach students about natural communities and ecosystems within their local park. Students begin to appreciate the ecological significance of open space. They become aware of the dynamic state of nature as they observe materials cycling through the forest environment and learn about successional change.

The **River Unit** makes regional connections, showing how watersheds join together urban communities and suburban towns to open space areas. Students study stream dynamics to see how water shapes the Earth's surface. After learning that water is a limited resource, students identify sources of pollution that threaten local rivers. After a canoe trip on a nearby river, the children explore adjacent wetland habitats rich with wildlife.

The **Pond Unit** ties together concepts from previous lessons and uses the example of a local pond for the study. The children use physical, chemical and biological measurements to analyze water quality. As they sample pond life, students observe food webs, metamorphosis and adaptations to different pond habitats. The students see successional change and learn how overlapping ecosystems provide valuable edge habitat for wildlife.

The **Cemetery Unit** provides a geological overview of landscape change. Students discover that the Earth's crust, composed of rocks and minerals, moves slightly every day. At a local historic cemetery, students look for change over time on gravestones, noting differences in resistance to weathering among rock types. They also learn that cemeteries serve as wonderful habitat for urban wildlife.

To download any of these teaching materials for free, please visit www.urbanresourcesinitiative.org.

SCHOOLYARD UNIT:
SUMMARY

In this unit, students learn that the schoolyard is part of the natural world. Through sensory exploration, children discover that nature is all around them in the urban environment. They begin to appreciate the importance of open space as they trace landscape development from pre-settlement times to the present. By studying the history of their city and creating a wildlife enhancement project that changes their schoolyard, students recognize the role humans and nature play in shaping the landscape. They see their schoolyard as a natural environment that supports a variety of plant and animal species and a range of ecological processes.

SCHOOLYARD UNIT:
LEARNING OBJECTIVES

Journal

- Students demonstrate an understanding of the characteristics of trees through observation and record keeping.
- Students demonstrate the ability to observe using all five senses to examine their special tree. They use descriptive language to record their observations.

Worksheets/Reviews

- Students can identify different types of Open Spaces.
  Review Sheet 1.2–Schoolyard Review
- Students are able to describe ways in which humans have changed New Haven's environment over time.
  Review Sheet 1.1–Map Review
- Students can describe some of the technological innovations that have changed the distribution of Open Spaces in New Haven (such as the port, the canal, Long Wharf, and highways).
  Review Sheet 1.1–Map Review
- Students recognize a map of New Haven and identify major landmarks, such as the Mill, West and Quinnipiac Rivers, East and West Rock, and the New Haven Green.
  Review Sheet 1.1–Map Review
- Students apply the scientific method by writing hypotheses and collecting data about changing the schoolyard by adding birdfeeders.
  Worksheet 1.2–Schoolyard Change and Worksheet 1.3 Bird Study
- Students can identify distinctive characteristics of birds, including color, shape, size, beak and other field markings.
  Review Sheet 1.2–Schoolyard Review

Classroom Performance

- Students work cooperatively in groups, e.g. to share materials and help team members to explore the schoolyard.
- Students demonstrate observation skills by identifying similarities and differences between birds, e.g. bird songs, field markings and feeding habits.
- Students apply listening strategies to bird identification.

SCHOOLYARD UNIT

Science Curriculum Standards and Framework - Grade 6		Classroom Activities			Outdoor Activities			Focus Activities				Journal
Content Standards	**Expected Performances**	What is Open Space?	Quick Change Artist	New Haven Through Time	Schoolyard Sleuth	Schoolyard change	Bird Hide and Seek	Birding By Ear	Birds on a String	Bird Records	Get to Know Your Tree	
Scientific Inquiry, literacy, and numeracy	**C INQ. 3** Design and conduct appropriate types of scientific investigations to answer different questions	X				X						
	C INQ. 4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment					X						
	C INQ. 5 Use appropriate tools and techniques to make observations and gather data			X	X	X	X	X	X	X		
	C INQ. 8 Draw conclusions and identify sources of errors					X		X				
	C INQ. 9 Provide explanations to investigated problems or questions	X		X		X						
	C INQ. 10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic	X				X	X		X	X		
6.4 Science and Technology in Society	**C 11.** Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem	X		X								

SCHOOLYARD UNIT

English Language Arts Standards and Curriculum Framework - Grade 6		Classroom Activities			Outdoor Activities			Focus Activities			Journal
Content Standards	**Expected Performances**	What is Open Space?	Quick Change Artist	New Haven Through Time	Schoolyard Sleuth	Schoolyard change	Bird Hide and Seek	Birding By Ear	Birds on a String	Bird Records	Get to Know Your Tree
1.1 Students use appropriate stategies before, during, and after reading in order to construct meaning.	**e.** Draw conclusions and use evidence to substantiate them by using texts heard, read, and viewed.			X							
	f. Make and justify inferences from explicit and/or implicit information.			X							
1.2 Students interpret, analyze, and evaluate text in order to extend understanding and appreciation.	**a.** Generate and respond to questions.			X							
	b. Interpret information that is implied in a text.			X							
	e. Discuss and respond to texts by making text-to-self, text-to-text and text-to-world connections.			X							
1.3 Students select and apply strategies to facilitate word recognition and develop vocabulary in order to comprehend text.	**d.** Develop vocabulary through listening, speaking, reading and writing.	X		X							
	e. use content vocabulary appropriately and accurately (math, music, science, social studies, etc).	X					X				
3.1 Students use descriptive, narrative, expository, persuasive, and poetic modes.	**a.** use oral language with clarity, voice and fluency to communicate a message.	X					X				
	c. use the appropriate features of persuasive, narrative, expository or poetic writing.										X
	d. write to delight in the imagination.										X

SCHOOLYARD UNIT													
Math Curriculum Standards and Framework - Grade 6		**Classroom Activities**				**Outdoor Activities**				**Focus Activities**			**Journal**
Content Standard	**Expected Performances**	What is Open Space?	Quick Change Artist	New Haven Through Time	Schoolyard Sleuth	Schoolyard change	Bird Hide and Seek	Birding By Ear	Birds on a String	Bird Records	Get to Know Your Tree		
4.1 Collect, organize and display data using appropriate statistical and graphical methods.	**a. (1)** Compare sets of data graphically using histograms, double bar graphs, back-to-back stem and leaf plots and scatter plots.									X			
	a. (3) Use systematic listing and counting strategies to solve problems.									X	X		

SCHOOLYARD UNIT: BACKGROUND INFORMATION

This unit helps students see their schoolyard as part of the natural world and feel connected to the local environment. The curriculum works towards this connection or "sense of place" by targeting the children's natural curiosity and encouraging environmental appreciation, awareness, concern and stewardship. Activities challenge the students to wonder, discover, explore, understand, care and act. By learning to observe with all their senses, the children recognize that nature is all around them, even in the city.

The unit begins by introducing the unifying themes of the *Open Spaces As Learning Places* program, **open space** and **change**. Open spaces are areas that are not planned for development. In order to help students understand the broad range of places that can be defined as open spaces, they are asked to categorize them as blue, green and brown spaces. Green spaces include parks, community gardens, curb strips, cemeteries, golf courses and schoolyards. Examples of brown spaces are beaches, gravel areas and vacant lots. Blue spaces include rivers, oceans, streams, lakes, ponds and reservoirs.

Throughout the program, students are exposed to the notion of environmental change. Students learn to read the changes in the landscape and try to understand the forces that led to current environmental conditions. Change can occur due to natural or anthropogenic forces. Natural landscape changes include phenomena such as soil erosion, plant succession and storm damage. Anthropogenic change can result from planned actions such as damming a river, blazing a trail and developing an area, or an unplanned activity such as pollution.

To better understand why their city looks the way it does today, students go back in time, tracing landscape change from pre-settlement times to the present using maps and models. By understanding the geography of New Haven, students begin to see the way that landscape affects city form. The children also learn about the human history of their environment. Integrating natural and human history allows students to see that places are shaped by a combination of geography, and human and natural forces. The program reinforces this knowledge at a variety of scales, including home and the schoolyard, neighborhood, community, region and biosphere.

Students discover that the major landscape features that drew settlers to the New Haven area still exist today – the harbor, three rivers (Quinnipiac, Mill and West) and East and West Rocks. The nine square city design with the Green at the center of the community also remains. Initially, development was heaviest near the harbor and the rivers where transportation was easiest, and around the Green with its marketplace, meetinghouse, school, cemetery and churches.

Early European settlers focused on agriculture and trade, but after rocky soil discouraged them from farming and shallow waters in the harbor created tough navigational conditions, they shifted to oystering and manufacturing. Trade eventually improved as extensions were added onto Long Wharf and innovations in transportation (highways, bridges, the Farmington Canal and the railroad) connected the city to inland

areas. New Haven was rapidly urbanized and the population exploded as workers moved to the manufacturing city.

As open space disappeared and living conditions deteriorated, city residents recognized the need to preserve natural areas to improve the quality of life. As a result, the **park movement** was launched, leading to an emerald necklace of large city parks on the city's periphery and an inner ring of neighborhood parks close to the center. Today, New Haven boasts a 2,200-acre park system consisting of more than ninety parks. Open space continues to improve with the help of environmental support groups protecting natural areas, city-wide education programs raising ecological awareness and neighborhood residents transforming abandoned lots into greenspaces and community gardens.

The program empowers students to see themselves as instrumental in shaping the future of the world around them. In the schoolyard unit, children enhance the school environment with birdfeeders. Students examine the effects of their actions by monitoring the birds attracted to the feeders. The long-term study gives them a detailed understanding of birds and teaches them to observe closely to see differences in nature.

Students learn to **classify** and **identify** birds by sight and sound. They understand that other members of the animal kingdom can be similarly classified starting with larger categories (**vertebrate** – with a backbone versus **invertebrate** – without a backbone) and then narrowed down with more specific characteristics. The students learn about distinctive features used to identify birds (size, shape, movement, habitat, beak, crest, wings, tail, color and **field marks –** wing bar, wing pattern, rump patch, tail pattern, eye ring and eye stripe). The children also listen to **bird songs** and **calls**, noting differences among bird species. They discover that males do most of the singing. In spring, male birds sing to attract mates and defend their territories. Calls are used to communicate danger, distress and aggression and to help identify food sources and keep migrating flocks together. As students refine their bird watching skills, they become more observant of their natural surroundings, seeing detail, variation and patterns they may never have stopped to look at before.

SCHOOLYARD UNIT:
CLASSROOM ACTIVITIES

CLASSROOM ACTIVITY ONE

Title: What is Open Space?
Objectives: Students will learn how to delineate open space.
Time: 10 minutes
Materials: Pictures of different types of open space, scissors, poster board and tape
Preparation: Cut out and mount pictures of different examples of open space (schoolyard, curb strip, vacant lot, Greenspace, community garden, beach, park, plaza, river, pond, lake, golf course, cemetery, etc.).
Procedure:

- Introduce the *Open Spaces as Learning Places* program and yourself as a teacher. Discuss how the students will be spending the next couple of months thinking about and visiting open spaces in New Haven. Take a few minutes for students to introduce themselves and tell you their names. (Note: Learning students' names will make all the difference, so make the extra effort early on in the program!)
- Define open space as an area that is not planned for development.
- Tell the children that they should think about open spaces using the colors green, blue and brown. Ask them if they know any green open spaces (parks, curb strips, golf courses, schoolyards, cemeteries etc.). Ask if they can think of any brown open spaces (beaches, abandoned developed areas etc.). Use this opportunity to describe a vacant lot, noting that a brown open space may be converted to a green open space. Ask the students about examples of blue open spaces (rivers, ponds, lakes, reservoirs, oceans, etc.).
- Conclude by telling the students about the different open spaces that they will be visiting over the course of the program and reviewing what makes these places open spaces. Explain that the environmental education program includes classroom activities, field trips and journal homework assignments. Lessons before a field trip introduce topics that the students will be exploring at the open space and activities afterwards expand on what they learned. Homework consists of entries in a journal that will encourage them to look for nature at home as well as during school.

CLASSROOM ACTIVITY TWO

Title: Quick Change Artist!
Objectives: Students will discover that seeing change sometimes requires careful observation.
Time: 10 minutes
Materials: None
Preparation: None
Procedure:

- Explain that change is a theme that they will be studying throughout th*e Open Spaces as Learning Places* program. They will be focusing on how open space has changed over time. Change is perfectly natural but sometimes things change because of people. Humans can improve open space but they also can harm it. The next activity gives students the opportunity to be both instruments and observers of change.
- Divide the class in half. Line up students side by side. Select one student from each group to stand in front, facing the rest of their group.
- Tell the students to observe the person in front of them very closely for one minute.
- Have them turn around while the student in front makes a change to his or her appearance.
- Ask the group to turn back around and see if the students can spot the change.
- Repeat the activity with a new student at the front.

Adapted from Project Seasons, pp. 151-152

CLASSROOM ACTIVITY THREE

Title: New Haven Through Time
Objectives: Students will gain basic mapmaking skills as they trace New Haven from pre-settlement times to the present, learning how natural and human forces influence city form and how urban development impacts the landscape.
Time: 40 minutes
Materials: New Haven maps and photographs, History of New Haven handouts (Handout 1.1), large sheets of drawing paper, colored pencils, a presentation board, glue, felt board and felt pieces
Preparation: Get familiarized with the included handouts on the History of New Haven. Cut different colors of felt into a variety of shapes and sizes so they represent the Mill, West and Quinnipiac Rivers, New Haven Harbor, East and West Rocks, East and West Creeks, the nine squares, the Farmington Canal, Long Wharf, houses, streets, highways, factories, bridges, train tracks, etc. Cover a presentation board with green felt. Glue down the three rivers, the harbor and East and West Rocks to set up the landscape for the activity.
Procedure:

- Give each student a piece of paper and a set of sharpened, colored pencils. Ask them to copy the felt board by drawing New Haven Harbor, the Mill, West and Quinnipiac Rivers, and East and West Rocks. Explain that this is what New Haven looked like

before it became a settlement in 1638. The three rivers, the two rocks and the harbor are still here today even though the rest of New Haven looks quite different.

- Describe the development of New Haven showing old maps and photographs. Illustrate changes in the landscape by adding pieces to the felt board. Ask the students to draw in the changes on their maps. Discuss how New Haven was laid out in a nine square design with the New Haven Green in the middle. Check to be sure the students have drawn the nine square grid leaving the center square green. Talk about the importance of the harbor and the Green to early settlers. Point out to the students that the harbor and the Green are still important to New Haven residents today. Ask them how people use these places (concerts, festivals, boating, swimming at the beach etc.).
- Continue the mapping exercise using the historical narrative to chart change in the spatial distribution of open space. Discuss New Haven's public park movement in response to rapid development. Describe the "emerald necklace" layout of larger parks encircling the city and the "inner ring" of smaller parks within the neighborhoods.
- Ask the students how New Haven has changed over time. Do they think there is more or less open space now than there was in 1638? Do they feel that open spaces are important?
- Conclude by explaining to the students that they can be involved in protecting and creating open space for future generations. Describe how the Urban Resources Initiative, New Haven Land Trust, Livable Cities Initiative and the Community Foundation of Greater New Haven are collaborating with neighborhood residents to convert vacant lots into beautiful pocket parks and community gardens. Mention that volunteers form support groups for parks, rivers and the harbor to help keep these open spaces safe and clean for all to enjoy. Emphasize that the students too can make a difference!
- Have the children mark the approximate location of their school on their drawing to help them feel connected to New Haven's landscape.

At the end of this lesson the teacher may choose to assign the Map Review Sheet.

CLASSROOM ACTIVITY EXTENSIONS

1. Neighborhood Maps: Have students draw a map of their houses and neighborhoods before the program and after program. Be careful to give very general instructions and not to ask them for any specific details in order to not influence their drawings. Also, make sure to give students exactly the same instructions at the end of the program, again being careful not to influence their drawings through these directions. After the second assignment (at the end of the program) is completed, lead the class in a discussion of what is different in the two drawings and why their attitudes and understandings of their neighborhoods may have changed.

2. Excursion! Take students on a trip to the New Haven Colony Historical Society. The museum is located at 14 Whitney Avenue. Call (203) 562-4183 for information and the current price of admission. Ask the staff to provide you with activities to do on site.

SCHOOLYARD UNIT:
OUTDOOR ACTIVITIES

OUTDOOR ACTIVITY ONE

Title: Schoolyard Sleuth

Objectives: Students will explore and discover nature in the schoolyard while learning to orient themselves on a map.

Time: 40 minutes

Materials: Example Schoolyard Map worksheets (Worksheet 1.1), clipboards, pencils, natural objects from the schoolyard, Ziploc bags, labels and a permanent marker

Preparation: Develop a rough sketch of the schoolyard. Collect eight examples of ten different natural objects from the schoolyard (leaves, flowers, seeds, sand, worm castings, moss, lichens, etc.). Try to choose items with distinctive characteristics that are site specific. Encourage students to explore the entire schoolyard by selecting a wide range of locations. Be careful to avoid areas with poison ivy. Place objects in numbered Ziploc bags and organize them so that each group of students gets ten mystery items.

*Note: The preparation time is worth it!

Procedure:

Before going outside:

- Give each student in the class a clipboard with a map of the schoolyard. Have the children point to various places on their maps (Where is the playground? Where is the front door? Where is a specific street?). Be sure they can orient themselves on the map.
- Separate students into small groups and give them a series of natural objects in numbered Ziploc bags. Tell them that they are to work in teams to try to locate each of the objects in the schoolyard. Explain that when their team finds a given item, they must locate where they are on the map and mark down the object number in the appropriate location. Emphasize that they are not collecting matching items from the schoolyard. They just need to find where an object came from and mark it on the map. Tell the students that once they find all of the objects, they must go as a team to one of the facilitators, who will check their answers. Stress that the activity is not a race.

Once outdoors:

- Define the boundaries for the activity. Demonstrate the activity to the entire class before sending the teams out on their own.
- Float between groups to ensure that all of the children are successful in the task. Encourage them to carefully observe the objects using their senses.
- Gather the class together to discuss the answers when all the groups have finished. Identify and talk about the function of the different natural objects in the schoolyard environment.

OUTDOOR ACTIVITY TWO

Title: Schoolyard Change

Objectives: Students will use the scientific method to design a study in which they create and observe change in their schoolyard.

Time: 20 minutes

Materials: Five different birdfeeders, five types of birdseed (suet, thistle, black oil sunflower, millet and mixed), chains, stepladder, bird field guides, posters, binoculars and Schoolyard Change and Bird Study worksheets (Worksheets 1.2 and 1.3)

Preparation: Select five birdfeeders designed to attract different types of birds. Choose five different kinds of birdseed appropriate for the selected birdfeeders.

Procedure:

- Show the students the five different birdfeeders and explain that they will be adding them to their schoolyard. Point out the characteristics of each feeder and describe the birdseed used to fill the different feeders. Allow the students to help decide where to put up the feeders.
- Ask the students how they think the schoolyard will change as a result of adding the birdfeeders (attracting more birds and other animals like squirrels, seeing plants sprout from fallen seeds, etc.).
- Ask the children if they think the various feeders will attract different types of birds. Do they think some feeders will be more successful than others? Ask them which ones and why. Have them guess how many types of birds they will observe at the feeders. Ask if they have seen any birds in the schoolyard and if they remember what they looked like.
- Explain to the students that they will be responsible for monitoring the birds that come to the feeders over the next twelve weeks (see Focus Activity Three, Schoolyard Unit). Encourage consistent data collection by preparing data sheets with specific observation dates and times. Provide binoculars, field guides and posters for bird identification.
- Back in the classroom, the students apply the scientific method to the study by writing up the purpose, hypothesis, materials and procedure on the Schoolyard Change worksheet.

OUTDOOR ACTIVITY THREE

Title: Bird Hide And Seek
Objectives: Students will observe birds to distinguish identifying characteristics.
Time: 20 minutes
Materials: Realistic bird models, pencils, clipboards and binoculars
Preparation: Hide bird models in locations appropriate for the different bird species. Hiding spots should be at various heights with some birds more difficult to see than others.
Procedure:

- Show students one of the models out in the schoolyard. Ask the students to identify the distinctive characteristics of the bird (color, shape, size, beak, etc.). Explain that they are acting just like real birdwatchers by looking for clues on a bird to help them identify it.
- Tell the students to walk around the schoolyard and locate as many hidden birds as possible. Ask them to record what they notice about each bird, the special characteristics that really stand out as they look at the bird. Stress that they do not need to identify the bird and that they should not touch any of the bird models.
- After the students have spotted all the hidden birds, show them how to use binoculars by looking at an object and then raising the glasses to their eyes to see it magnified. Point out the different parts of the binoculars, demonstrating how to adjust the eyepieces and how to focus. Have them focus in on the birdfeeders and try to spot real birds. Remind them that they will be observing the birdfeeders for the next couple of months at least (see Focus Activity 3, Schoolyard Unit).
- Conclude with a discussion about their observations during the activity. Ask them what they noticed about the different birds and explain that these special characteristics are used by birdwatchers to narrow in on the identity of the bird.

OUTDOOR ACTIVITY EXTENSIONS

1. Bird Charts: Using the model of the Bird Observation Data Sheet, have students keep records of the birds they observe in the schoolyard on a daily basis. Keep a large chart on the wall of the classroom and assign a different student each week the responsibility of charting bird activity. Encourage students to be specific in their observations. Also, make sure to regularly fill the birdfeeders in the schoolyard in order to increase bird activity. At regular quarterly intervals in the fall, winter and spring, tally up the data that has been collected and do a graphing assignment that communicates the results of the study.

2. Schoolyard wildlife enhancements: Give students the assignment of coming up with creative ways to improve the number and kind of wildlife that are using the schoolyard. Ask students to first answer the question, "What attracts wildlife to a place?" After they have brainstormed a variety of ideas, have students draw up a plan for the implementation of these ideas, including where resources may come from, how much they might cost, and the who they might call on for assistance in their projects. Have students work in groups or individually.

SCHOOLYARD UNIT:
FOCUS ACTIVITIES

FOCUS ACTIVITY ONE

Title: Birding By Ear

Objectives: Students will learn why birds sing and call and will recognize differences among common bird songs.

Time: 25 minutes

Materials: Bird song audiotapes, blank cassette tape, scissors, index cards, bird pictures, tape, paper, pen, cassette player and Bird Song handout (Handout 1.2).

Preparation: Record ten common bird songs, identifying each bird before it sings. Create flashcards with a picture and the name of each bird. Include what it sounds like using mnemonics (Poor Sam Peabody, Peabody, Peabody or Teacher, Teacher, Teacher, etc.). List the birds on an answer sheet in order of their appearance on the tape. Rerecord the same bird songs but mix up the order. List the birds on a second answer sheet in their mixed up order. Repeat with ten additional birds for an added challenge.

Procedure:

- Begin by discussing why birds communicate. Explain that in the spring, many birds (usually the males) sing to attract mates and to establish and defend territories. Birds also call to warn of danger, to show aggression, to identify food sources, to keep a flock together at migration time or as a sign of distress. Baby birds make noise when they are hungry and want to be fed. Different species of birds communicate in distinctive ways. Experienced birdwatchers can identify birds by sound without even seeing them.
- Pair up students and give each group a flashcard.
- Play one bird song at a time (pausing the tape as needed), repeating the song in words. Point to the pair of students with the picture of the bird that is singing the song. Tell them to listen carefully so they can recognize their bird's song when it is played again.
- Play the mixed up tape one bird song at a time, waiting for students to raise their hands when their flashcard matches the song. Give them a hint by saying what the song sounds like.
- Repeat with ten additional birds *depending* on the interest of the students.

Adapted from Nature With Children of All Ages, p. 84

FOCUS ACTIVITY TWO

Title: Birds On A String
Objectives: Students will learn about the field identification of birds.
Time: 35 minutes
Materials: Colored cardboard bird models, plastic straws, scissors, tape, dental floss, embroidery needles, metal washers, pictures of birds and stepladder
Preparation: Construct realistic cardboard models of ten to twenty different birds. Tape a small section of a plastic straw to each cardboard bird. Birds should glide easily down a sloped line of dental floss. If needed, add a metal washer to the model for additional weight.
Procedure:

- Ask students what makes a bird a bird. Explain that not all birds can fly but that all birds have feathers.
- Ask them what time of day and which weather conditions are best for bird watching. Explain that most birdwatchers wake up very early and often have the most success spotting birds when it is clear and dry. Note that not all birds are active during the day. Discuss animal activity patterns, defining crepuscular (dusk and dawn), diurnal (day) and nocturnal (night).
- Tell the children that they will be very lazy birdwatchers in the next activity. They do not even need to leave the classroom!
- Remind them of the special characteristics that birdwatchers use to identify birds. Discuss size, shape, wings, crest, beak, tail, behavior, flight, climbing, swimming, wading and habitat. Use bird pictures to show them different features and flap arms to demonstrate flight patterns. Introduce the term field mark (tail pattern, rump patch, eye stripe, eye ring, wing bar and wing pattern). Explain how field marks are "trademarks of nature" that birdwatchers refer to when they use their field guides to identify birds. Show them pictures of birds with distinctive field marks. The pictures should include birds that they will see during the activity.
- Line up students in two long lines facing each other four feet apart. Ask them to sit down on the floor. Place a chair at one end and a ladder at the other.
- Tie a piece of dental floss to the chair and run it between the two lines of students all the way up to the ladder. Attach the dental floss to the needle.
- Stand at the top of the stepladder. One at a time, send the birds down the dental floss by pushing the needle through the straw segment on each bird. Ask the students to note the special characteristics of each bird and help them identify the birds. Give them hints about field marks, habitat and flight. The goal is to have students feel like accomplished birdwatchers by the end of the activity. Allow the birds to pile up near the chair and stress that the students should never touch the bird models.
- Have fun with the activity by adding a speed competition or sending a bat down at the end to fool the students. The children tend to get enthusiastic and quite loud. Quiet them down by explaining that birdwatchers cannot be noisy or they will scare away the birds.

Adapted from a Connecticut Audubon Workshop

FOCUS ACTIVITY THREE

Title: Bird Records
Objectives: Students will learn how to collect birdfeeder data.
Time: 30 minutes
Materials: Bird Study worksheets (Worksheet 1.3), clipboards, pencils, binoculars and a bird model
Preparation: Fasten a bird model to one of the birdfeeders.
Procedure:

- Separate students into small groups and give each group a clipboard with a Bird Study worksheet and a pencil. Explain the categories on the data sheet and show the students how to keep consistent records.
- Walk out to the birdfeeder with the model attached to it. Ask the students to pretend the bird model is real and fill in the data sheet as if they were making a bird observation. Check the other birdfeeders while outside and give students a chance to look for any real birds.
- Back in the classroom, announce to the students that they now have all the skills to monitor the birdfeeders in their schoolyard. Tell them results will be compiled weekly so it is very important to keep a regular observation schedule.

At the end of this lesson the teacher may choose to assign the Schoolyard Review Sheet.

FOCUS ACTIVITY EXTENSIONS

1. Mystery Bird Description: Give students photographs of a variety of birds they might see at some time during the year around New Haven. (Make sure to give each student a different bird, not repeating any if possible.) Assign students the task of describing the characteristics of the bird and then ask them to draw the bird in detail. Once the initial observation is done, ask students to do research in order to find out what type of bird they were given. Encourage them to use birding field guides found at the library. Once students have found their bird (make sure that they have found the correct one), ask them to write a report on the bird's habitat, eating habits, migration patterns, reproduction and other interesting qualities. Have students present the written report to their classmates.

2. Make your own birdfeeder: Have students make birdfeeders and take them home or to a relative's house where there is some green open space. Encourage students to carry on their charting and observation outside of school in order to see if they notice a variation in the birds of their neighborhoods. Remind students to be proud of the great bird life in New Haven and the amazing watersheds that provide habitat for migrating birds.

2. Excursion! Take children to the Peabody Museum to visit the *Birds of Connecticut* exhibit and see some of the 722 mounted bird specimens in the collection. Call the Peabody at (203) 432-5050 for more information and ticket prices.

SCHOOLYARD UNIT:
NATURE JOURNAL

INTRODUCTORY ACTIVITY

Title: Keeping A Nature Journal
Objectives: A nature journal with open and assigned entries will encourage a deeper understanding of the urban environment.
Time: 15 minutes
Materials: Composition books
Preparation: None
Procedure:

- Distribute composition books to all the students. Explain that the book will be their nature journal. They need to write their name on the cover of their book because they will be completing assignments and handing in their journal at the end of each unit.
- Introduce the nature journal by describing how it will be used. Ask them to choose a tree near their home that they can visit regularly. This tree will be their special tree. They will study it very closely, getting to know it very well. They will watch for changes. They will use their journal to write or sketch details about their tree. They will be assigned entries but they should feel free to add ideas of their own – thoughts, poems and drawings. They need to be sure to write down the date when they make an entry. The journal is about each student and his or her tree.

Adapted from Nature Journaling—Learning To Observe And Connect With The World Around You

ASSIGNMENT ONE

Title: Get To Know Your Tree
Objectives: Students will see nature in greater detail by observing with all their senses.
Time: Conducted between last day of Schoolyard Unit and first day of Greenspace Unit.
Materials: Nature journal and pencil or colored pencils (discourage use of markers as they bleed through the thin pages).
Preparation: Students should select a tree near their home.
Procedure:

Instruct the students to use their senses (seeing, hearing, touching, smelling but probably best to avoid tasting) while observing their tree. Students should:

(1) Make a list of everything they notice about their tree using their senses.
(2) Try to write down more observations than anyone else in class.

*Note: Facilitator/Teacher should have students write assignment in notebooks on the last day of the Schoolyard Unit. Assignments should be collected, corrected, and a classroom discussion should be held before the start of the next Unit. Make sure to clearly discuss this process with the classroom teacher in order to encourage student completion of assignments.

Adapted from Sense Of Place, p. 83

SCHOOLYARD UNIT:
HANDOUTS, WORKSHEETS & REVIEW SHEETS

SCHOOLYARD HANDOUT 1.1 History of New Haven

1638–1700

In 1638, English settlers come to the area that will be New Haven full of dreams. The location seems perfect with three rivers and a harbor, protected by rocky ridges and Long Island Sound. The harbor appears wonderful for trade, the salt marshes along the rivers look great for farming, and the scattered woods beyond seem perfect for trapping fur-bearing animals.

The settlers make treaties with the Quinnipiac Indians to obtain land for their new colony. The town is laid out in a rectangle separated into nine squares. The center square is the marketplace or the Green. Most homes are built along the nine squares within walking distance to the Green. Outside the squares are farms, gardens and some smaller homes. A few dirt roads lead from the nine-square area to fields and the harbor.

Activity centers around the Green and the harbor. The Green is an uneven, rocky, wooded area which is quite swampy in places. Settlers clear the Green, plant grass and build a meetinghouse, church and school. A section of the Green is used as a cemetery.

Two creeks, the West and the East, connect the center of New Haven to the harbor. The settlement is a huge disappointment. The soil is too sandy and rocky for planting crops and there are few fur-bearing animals. More importantly, the harbor is so shallow that large ships cannot reach the port. Settlers, struggling to survive, turn away from trade to concentrate on livestock and oystering.

ADD TO MAP:

Nine Squares with the Green in the center

Several houses within the Nine Squares

A few homes outside of the Nine Squares

Some dirt roads leading to fields and the harbor

Two creeks connecting the Nine Squares to the harbor

SCHOOLYARD HANDOUT 1.1 History of New Haven (cont.)

1700–1800

New Haven's population grows tremendously and families start to spread out from the nine-square area. Homes are built mostly to the south and east along the shore.

There are scattered farms in all directions and two small villages, the oystering village of Fair Haven on the Quinnipiac River and the farming village of Westville near the West River. More roads and even some turnpikes are built. The nine squares, including the Green, are bisected by streets to create smaller, more practical blocks. The settlers start to beautify New Haven, especially the Green. Elm trees and sycamores are planted on the Green and along streets. The Green is no longer used as a burial area as land is purchased for a public graveyard on Grove Street. The Green is fenced in to keep out grazing livestock.

New Haven's economy shifts from farming to trade. Roadways and rivers allow materials to be transported from distant farms. The addition of small factories enables settlers to manufacture new products. The biggest boost to trade takes place with the construction of Long Wharf, a huge pier extending out into the harbor's deeper channel. Now even large ships have access to New Haven's port.

ADD TO MAP:

Homes along the shore, especially to the east

Two small villages, Fair Haven on the Quinnipiac River and Westville on the West River

Scattered farms

Streets cutting through the Nine Squares

Roads connecting homes and farms to the center of New Haven

Bigger turnpikes leading to distant towns

Long Wharf

A few factories

SCHOOLYARD HANDOUT 1.1 History of New Haven (cont.)

1800–1865

New Haven becomes an important manufacturing city. Many factories are built to make guns, carriages, hardware, clocks, rubber goods, shirts, organs and cigars. The population explodes as people move to New Haven from other countries and towns to work in the factories. Industry and population growth cause the City to become crowded and dirty. The West and the East Creeks fill in and waterways become polluted with factory waste and human sewage.

New Haven is forced to expand outward. Homes continue to be built to the south and the east, creating a second city center around Wooster Square. New Haven spreads to the north and west as well, with Fair Haven and Oyster Point becoming important oystering communities.

Transportation improves greatly, connecting the center of New Haven to far away areas. Roadways expand, bridges are built and a horse-drawn railroad is established. The construction of the Farmington Canal, stretching from Massachusetts to New Haven, causes huge changes. Manufacturing plants and homes for factory workers are built along its banks. The canal line connects the harbor to inland areas but it is expensive to maintain. The canal is soon filled in and replaced by the steam engine railroad. Trains offer a much easier form of transportation and start to overshadow sea trade as well. Despite extensions being added to Long Wharf for better access, New Haven harbor becomes less important as the railroad takes over.

ADD TO MAP:

Lots of factories

More roads

Extensions to Long Wharf

Farmington Canal

Railroad lines

Lots of houses within the center and in all directions around the city

Communities—Wooster Square, Fair Haven and Oyster Point

SCHOOLYARD HANDOUT 1.1 History of New Haven (cont.)

1865–1945

Manufacturing reaches its peak with more than 200 factories in New Haven. Conditions continue to deteriorate as the population bursts and the City becomes more developed. Wealthy residents start to move out and their large homes are replaced by housing complexes.

The nine-square area remains a center of activity and the Green a symbol of pride. New Haven's elm trees are slowly dying due to storms, pests and disease. To make up for the loss, ten thousand trees including maples, sycamores, lindens and elms are planted throughout the City.

New Haven residents begin to worry about the loss of natural areas in the City and start to preserve land as public parks. The first parks, located on the edge of the City, are designed mostly for wealthy residents with horse-drawn carriages. Later, smaller neighborhood parks are added to meet the needs all New Haven residents, especially the factory workers.

ADD TO MAP:

Many factories

Lots of houses, especially near factories

Parks—larger parks around the city (East Rock, West Rock, West River Memorial and East Shore parks) and smaller parks within the neighborhoods

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SCHOOLYARD HANDOUT 1.1 History of New Haven (cont.)

1945–PRESENT

Industry begins to shut down in New Haven and residents start to move out of the City. The population continues to go down as transportation improves, allowing people to live in the suburbs and commute into the City. Times are tough as conditions worsen and jobs are scarce.

As industry fails, sea trade takes hold once again. The harbor which keeps silting up is dredged, allowing big ships use of New Haven's new port east of Long Wharf. Trade is specialized with petroleum as the main import and scrap metals exported. The oyster industry, once so important, is threatened by polluted conditions in the harbor. Stricter regulations for industry and sewage treatment help to improve water quality.

A movement to restore New Haven to its former glory leads to massive construction of interstate highways. Landfilling of the harbor is needed for I-95 which now cuts off the City from the waterfront. Redevelopment efforts also include improvements to the downtown business district including large buildings and department stores built to attract people to the City. The stores fail and eventually shut down leaving much of the downtown area abandoned.

Recent renewal projects by the City and Yale University continue to focus on downtown New Haven. New businesses come in and open space increases as vacant lots are turned into pocket parks or community gardens, nature preserves are established and parks are protected. As New Haven continues to change with the times, the Green remains the heart of the City.

ADD TO MAP:

Interstate highways (I-91 and I-95)

Large buildings in the downtown area

Pocket parks, gardens and preserves

Sources:

Leemey, Robert. (2002)
Shumway, Floyd and Hegel Richard (ed.). (1987)
Shumway, Floyd and Hegel Richard. (1988)
Withgott, Jay. (1990)

SCHOOLYARD HANDOUT 1.2 Bird Song Challenge

GROUP #1
MIX UP

Barred Owl
"WHO COOKS FOR YOU WHO COOKS FOR YOU ALL"

White-Breasted Nuthatch
"YANK-YANK"

Mourning Dove
"WHO-A-WHO-WHO-WHO"

Tufted Titmouse
"PETER PETER PETER"

Red-Bellied Woodpecker
"QUERR-QUERR"

Black-Capped Chickadee
"CHICK-A-DEE-DEE-DEE" OR "FEE-BEE"

Eastern Phoebe
"FIBY-FIBY"

Blue Jay
"JAY-JAY"

Eastern Wood-Pewee
"PEE-A-WEE"

American Crow
"CAW-CAW"

SCHOOLYARD HANDOUT 1.2 Bird Song Challenge (cont.)

GROUP #2
MIX UP

American Robin
"CHEERIO CHEERY ME CHEERY ME"

White-Throated Sparrow
"POOR SAM PEABODY-PEABODY-PEABODY"

Red-Eyed Vireo
"GOING UP-COMING DOWN"

American Goldfinch
"PERCHICKORY-PERCHICKORY"

Chestnut-Sided Warbler
"PLEASED-PLEASED-PLEASED TO MEET YOU"

Eastern Meadowlark
"SWEET SPRING IS HERE"

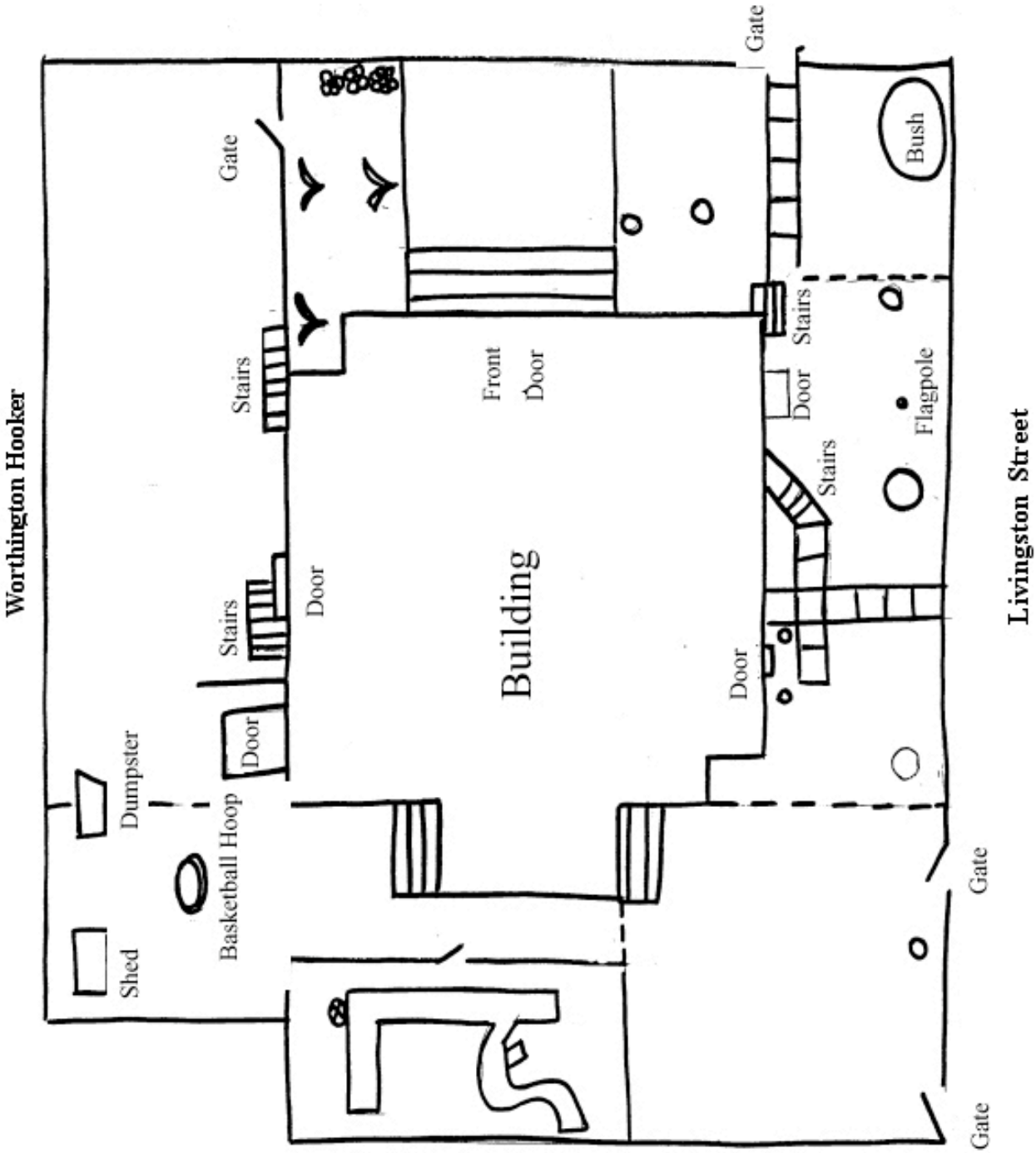
Yellow Warbler
"SWEET-SWEET-SWEET I'M SO SWEET"

Red-Winged Blackbird
"KONK-LA-REE"

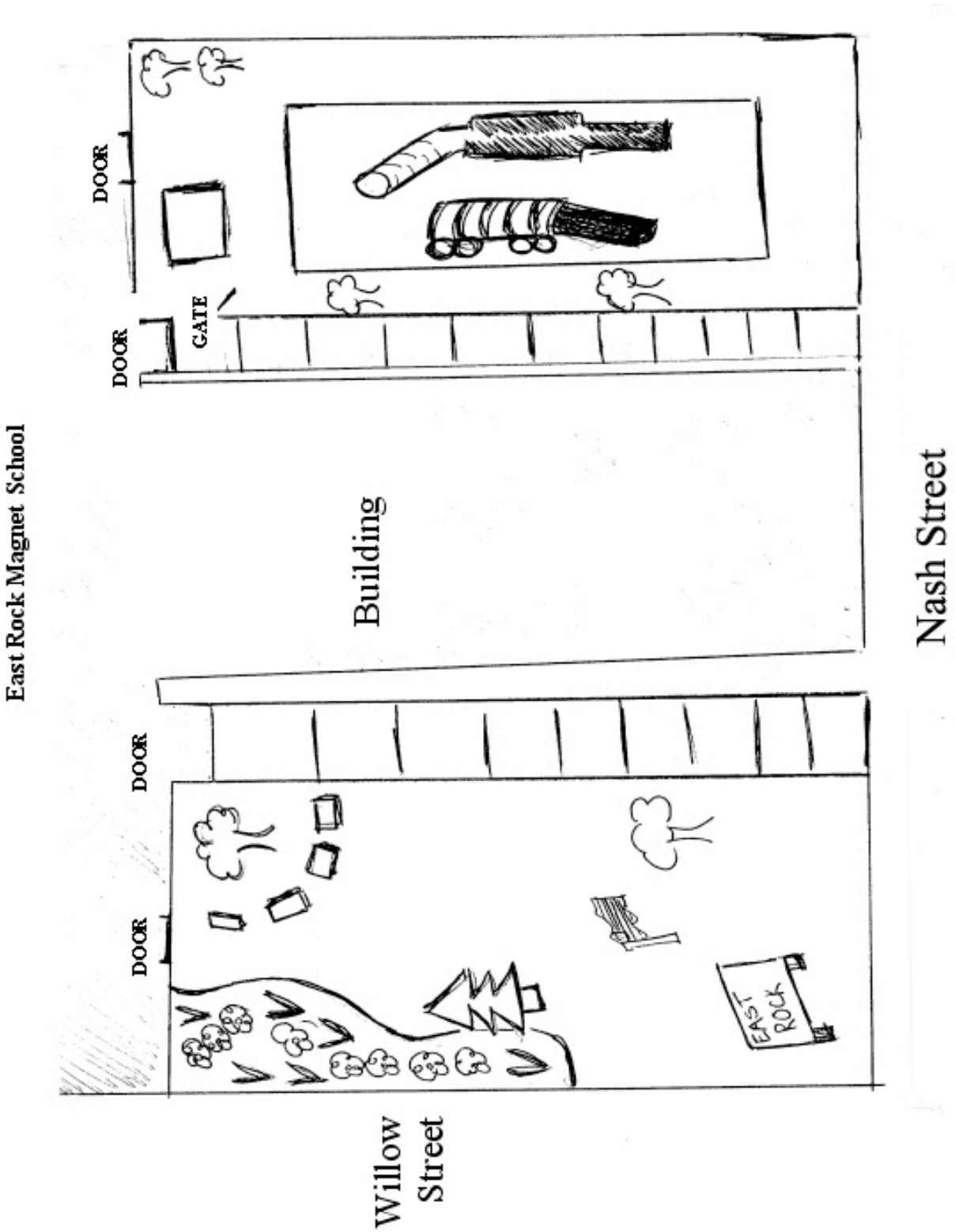
Common Yellowthroat
"WITCHITY-WITCHITY-WITCHITY"

Ovenbird
"TEACHER-TEACHER-TEACHER"

SCHOOLYARD WORKSHEET 1.1 Schoolyard Sleuth



SCHOOLYARD WORKSHEET 1.1 Schoolyard Sleuth (cont.)



SCHOOLYARD WORKSHEET 1.2 Schoolyard Change
Bird Study Data Sheet

Write down your *hypothesis* (guess!) for what type of bird you think will come to each of the feeders. You can draw a picture of each feeder in the boxes to help remember what each one looks like.

House

We put _____seed in the house feeder.

My hypothesis is that _____
will come to the house shaped feeder.

Big Tube

We put _____seed in the big tube.

My hypothesis is that _____
will come to the big tube feeder.

Little Tube

We put _____seed in the little tube.

My hypothesis is that _____
will come to the little tube feeder.

Soda Bottle

We put _____seed in the soda bottle.

My hypothesis is that _____
will come to the soda bottle feeder.

Tray

We put _____seed in the tray.

My hypothesis is that _____
will come to the tray feeder.

6. Suet

We put _____in the suet feeder.

My hypothesis is that _____
will come to the tray feeder.

SCHOOLYARD WORKSHEET 1.3 Bird Study

Bird Observation Data Sheet Name_____

Date	Time	Type of Feeder (House, Big Tube, Little Tube, Tray, Seed Cake or Soda Bottle?)	Size (small e.g. sparrow, medium e.g. robin, large e.g. crow)	Color and Markings	Name or type bird

REVIEW SHEET 1.1 Map Review

The map of New Haven on the other side of this page shows what our city looked like when the first colonists lived here in the 1600's.

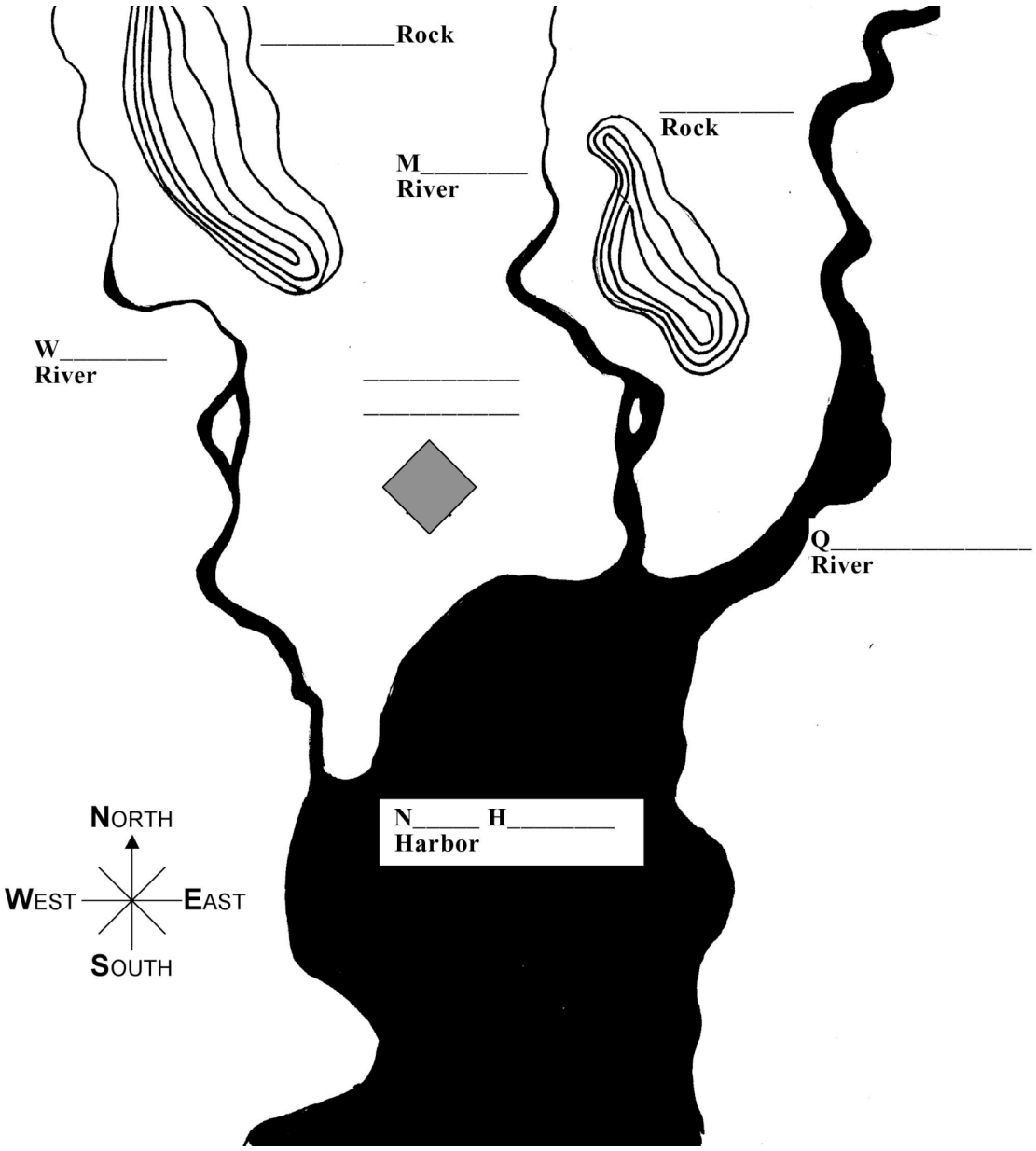
Try to label this map by filling in the blanks with the names of the open spaces that are still part of New Haven today.

The gray square on the map is a green open space created by the first colonists. They used to bury people around the churches there. Now we go there to catch busses, to hear concerts in the summer, or to see lots of pigeons! Write the name of this place next to the black square on the map.

Throughout our history, people have had different ways to travel in and around New Haven. On the map, draw something that people built to help us travel to and from our city.

Over the years, people have changed the way New Haven looks. On the map, draw and label an example of something else done by people that changed our environment.

REVIEW SHEET 1.1 Map Review (cont.) Name_____



REVIEW SHEET 1.1 Map Review (cont.)

ANSWER SHEET

The map of New Haven on the other side of this page shows what our city looked like when the first colonists lived here in the 1600's.

1. Try to label this map by filling in the blanks with the names of the open spaces that are still part of New Haven today.

   Answers:
   W***est*** River
   West Rock
   M***ill*** River
   East Rock
   Q***uinnipiac*** River
   N***ew*** H***aven*** Harbor

2. The gray square on the map is a green open space created by the first colonists. They used to bury people around the churches there. Now we go there to catch busses, to hear concerts in the summer, or to see lots of pigeons! Write the name of this place next to the black square on the map.

   Answer:
   The New Haven Green

3. Throughout our history, people have had different ways to travel in and around New Haven. On the map, draw something that people built to help us travel to and from our city.

   Answer:
   Students may draw I-95 or I-91.

4. Over the years, people have changed the way New Haven looks. On the map, draw and label an example of something else done by people that changed our environment.

   Answer:
   Students may draw a variety of features in response to this question including, tide gates on the Mill or West Rivers, streets, houses, factories, or parks.

REVIEW SHEET 1.2 Schoolyard Review

1. Label these Open Spaces! Are they GREEN, BROWN, or BLUE?

_____Park _____River

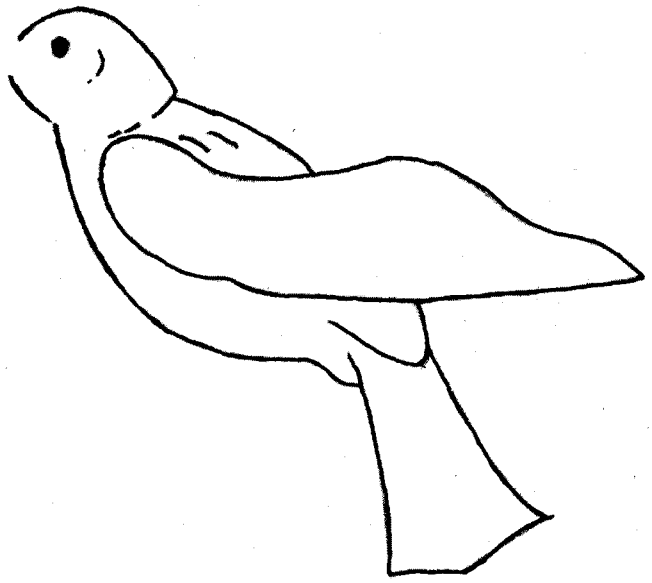
_____Lake _____Golf Course

_____Beach _____Ocean

_____Garden _____Pond

2. You are a Birdwatcher! On this bird, draw some things you would use to identify a bird. Use what you saw on birds earlier this week! Draw a:

A. Beak
B. Tail Pattern
C. Eye Ring
D. Wing Pattern



REVIEW SHEET 1.2 Schoolyard Review (cont.)

ANSWER SHEET

1. Label these Open Spaces! Are they GREEN, BROWN, or BLUE?

(GREEN)	Park	***(BLUE)***	River
(BLUE)	Lake	***(GREEN)***	Golf Course
(BROWN)	Beach	***(BLUE)***	Ocean
(GREEN)	Garden	***(BLUE)***	Pond

2. You are a Birdwatcher! On this bird, draw some things you would use to identify a bird. Use what you saw on birds earlier this week! Draw a:

A. Beak
B. Tail Pattern
C. Eye Ring
D. Wing Pattern