

**STORMWATER MANAGEMENT PLAN
ANNUAL REPORT**

**TOWN OF PROSPECT
Prospect, Connecticut**

October 2005

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1.0 INTRODUCTION

On December 8, 1999, the U.S. Environmental Protection Agency (USEPA) promulgated Phase II of its National Pollution Discharge Elimination System (NPDES) stormwater regulations.

Phase I of the USEPA stormwater program established regulations for stormwater discharges from municipal separate storm sewer systems (MS4s) in municipalities with populations of 100,000 or greater, construction activities disturbing five or more acres of land, and ten categories of industrial facilities. The Phase II Final Rule expands the Phase I program by requiring smaller communities with MS4s in urbanized areas to implement programs and practices to control polluted stormwater runoff through the use of NPDES permits.

The Town of Prospect is one of 130 municipalities in Connecticut that are located either completely or partially within an urbanized area. These communities were mandated to seek permit coverage with the Connecticut Department of Environmental Protection's (CT DEP) Phase II Stormwater Program. CT DEP issued the final *General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems* on January 9, 2004.

Compliance with the MS4 permit was a two-part process. The first part (Part A – General Permit Registration) was the submission of a registration form including primarily administrative information and basic mapping. The CT DEP issued the Town of Prospect a General Permit for Stormwater – Small Municipal Separate Storm Sewer Systems (#GSM000110) on August 24, 2004.

A copy of the permit is included as Appendix A. The second part of the process is the submission of a Stormwater Management Plan (SWMP) which was received by the CT DEP in July 2004. Although the Town of Prospect currently implements many of the elements of a successful Stormwater Management Program, to be fully compliant, the Town must implement additional measures. The SWMP addresses how the Town will comply with the six minimum control measures required by the NPDES permit. These six minimum measures include:

- Public Education and Outreach
- Public Participation/Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post-Construction Runoff Control
- Good Housekeeping/Pollution Prevention

As required by the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems, this first Annual Report outlines the Town's compliance with the general permit, provides an assessment of the appropriateness of the identified best management practices and the Town's progress towards achieving the implementation of each minimum control measure, provides copies of all monitoring data which may have been collected and analyzed, summarizes stormwater activities the Town plans to undertake during the next reporting cycle, and outlines any change in identified measurable goals, implementation dates, or other changes.

2.0 PUBLIC EDUCATION AND OUTREACH

2.1 Education to the Public

The Town of Prospect is in the process of developing program-specific education material. The Town in partnership with other governmental agencies, businesses, concerned citizens, and community organizations (such as the Quinnipiac River Watershed Association) has contributed the following public education and outreach efforts:

1. Brochures on environmental topics protecting stormwater such as;
 - Bristol Resource Recovery Facility Operating Committee and Tunxis Recycling Operating Committee, *Household Hazardous Product Disposal Information*.
 - Bristol Resource Recovery Facility Operating Committee and Tunxis Recycling Operating Committee, *Recycling Guide*.
 - Town of Prospect, Recycling Notification. Sent annually to notify residents of the Town's recycling schedule.
2. The Regional School District which serves the Town of Prospect received the recently published Connecticut Department of Education (CTDOE) *Core Science Curriculum Framework*. This curriculum includes educational units discussing "Land and Water Interactions," "Water Quality," the shaping effects of water, how water moving across and through the earth carries with it the products of human activities, how humans can improve water quality, and the accumulation of mercury, phosphates and nitrates in river, lakes, and oceans and its effects on water quality. The Regional School District has begun to integrate items not already addressed in its current school curriculum.
3. The Town's Stormwater Management Plan has been available for review at Town Hall throughout 2004.
4. The Quinnipiac River Watershed Association has a multitude of educational publications available to Prospect residents on their webpage (www.qrwa.org) such as the following:
 - *Residential Pesticides: Properties and Risks to Humans and the Environment*.
 - *Muddy Waters*, which discusses the dangers of excessive sediments in streams and the sources of those sediments (i.e., soil erosion from stormwater runoff)
 - The current Quinnipiac River Watershed Association Newsletter describing the organizations latest activities and news.

Copies of selected materials including distributed brochures, newsletters, and the CTDOE curriculum available in 2004 are included in Appendix A.

2.2

Education Materials Distributed

The brochures outlined in Section 2.1 are available to the citizens of Prospect at the Town Hall. The Town's webpage also contains additional information regarding a variety of environmental items such as the Town's recycling program and household hazardous waste collection.

2.3 Workshops/Meetings Held

The Town of Prospect Conservation Commission holds one to two meetings per year, which are open to the public. These meetings are held, primarily to discuss actions of the Commission. One of the recent topics has been the revision of the Conservation Plan for the Town.

2.4 Miscellaneous

The Town is a member of the Quinnipiac River Watershed Association.

Per a Connecticut mandate and Town regulation, all businesses in Town are required to participate in a recycling program.

2.5 Modifications to Plan

There are no modifications to the public education component of the Stormwater Management Plan under consideration at this time.

2.6 Activities Scheduled for Next Year

- The Town will continue to integrate topics in the recently published *Core Science Curriculum Framework*, including those related to water quality, into its school curriculum.
- The Town will consider meeting with the Quinnipiac River Watershed Association to determine if the organization has or is willing to assist in the development of a brochure regarding stormwater preservation. This brochure would then be printed for distribution to Town residents and businesses.
- The Town will consider contacting the local newspaper to gauge interest for drafting an article (or series of articles) regarding stormwater and/or environmental preservation.
- In Year 2, the Town will provide links to the Stormwater Management Plan, annual reports (upon completion), and other water quality related information on the Town's website. Other links that could be included on the Town's website are those to the Quinnipiac River Watershed Association, CT DEP and/or USEPA's stormwater page.

3.0 PUBLIC PARTICIPATION

3.1 Notices Published

Public Notice was published in the local newspaper inviting the public to view the draft version of the Town's Phase II Stormwater Management Plan in 2004. This Annual Report was also public noticed in accordance with the general permit requirements.

3.2 Public Events

The following activities were conducted in Prospect in Year 1:

- Community Clean ups – The Woodland Regional High School participated in a litter clean-up day. During the event the group cleaned approximately five (5) miles of road located in Prospect and within the CT Water and City of Waterbury public drinking water watersheds. The students collected 32 cubic yards (4-dump truck loads) of material. The Town, specifically the DPW, provided bags, gloves, shirts, reflective vests, trash pick up and disposal for the event. Police escorts were also provided by the Town for protection of the volunteers during the event.

3.3 Workshops/Meetings Held

The Town of Prospect Conservation Commission holds one to two meetings per year, which are open to the public. These meetings are held, primarily to discuss actions of the Commission. One of the recent topics has been the revision of the Conservation Plan for the Town. There are currently seven to eight members of the Town's Conservation Commission.

3.4 Web Site

The Town of Prospect's web site is currently set up to include links to other webpages as well as to Town documents (such as the Stormwater Management Plan and Annual Reports).

3.5 Modifications to Plan

There are no modifications to the public participation component of the Stormwater Management Plan under consideration at this time.

3.6 Activities Planned for Next Year

- The Town will continue to work with the partnership of governmental agencies, businesses, concerned citizens, and community groups such as the Quinnipiac River Watershed Association and Regional School District to participate in their environmental work as well as to sponsor and support clean up projects and environmental events.
- In Year 2, the Town will provide links to the Stormwater Management Plan, annual reports (upon completion), and other water quality related information on the Town's website. Other links that could be included on the Town's website are those to the Quinnipiac River Watershed Association, CT DEP and/or USEPA's stormwater page.

- Meet with the Regional Education Department to explore developing a program to educate both Prospect's children and parents about the Town's ongoing Phase II program.

4.0 ILLICIT DISCHARGE DETECTION/ELIMINATION

4.1 Illicit Discharge Investigation Activities

The Town of Prospect is in the process of formalizing the procedures for logging and responding to complaints associated with illicit discharges. The Town has incorporated procedures that include information received from the local Health Department and other government and citizen groups and agencies.

Illicit discharges will be documented by the DPW as they are detected and reported. The documentation (i.e., log, file, or other appropriate format) will include but is not limited to the following information:

- Location
- Type
- Date Identified
- Identified By
- Estimated Flow
- Scheduled for Repair/Action

The documentation will be kept at the Town Hall located at 36 Center Street, Prospect, Connecticut. The information will be accessible to the public during normal business hours Monday through Friday. The Town's clerical staff will be responsible for accepting and recording any public written or telephone complaints for potential illicit discharges. These complaints will be referred through the Department of Public Works to field personnel for proper assessment and correction (as necessary). The Town's clerical staff will also receive and record illicit discharge detection information received from other Town Departments including the Mayor's Office and Inland-Wetlands Commission and Water Pollution Control.

4.2 Illicit Discharge Removal Activities

During any storm sewer repair or replacement projects unknown or suspicious connections are removed. New storm sewer hook ups are required to obtain a Town permit. In addition to the permit, the connection is noted in Town land records.

Once an illicit discharge has been detected and documented, the Department of Public Works, in conjunction with the local Health Department or other governmental agencies, as appropriate, will take necessary actions to determine the source and eliminate the discharge as necessary. The actions taken to correct and/or eliminate the illicit discharges will then be documented in a log, file, or other appropriate format including but is not limited to the following information:

- Location
- Type
- Date Removed
- Removed By
- Cost

4.3 Storm Sewer Mapping

The Town has hired a Geographic Information System (GIS) consultant to complete a mapping needs assessment for the Town. The Town owns a handheld Global Positioning System (GPS) unit to assist in the locating of structures including outfalls.

The Town's Department of Public Works and Planning and Zoning Department have been working to complete the Phase II requirement to initially map all storm sewer pipes greater than 15 inches in diameter. An initial outfall map that meets the general permit requirements will be completed by December 2005, in accordance with the general permit.

4.4 Modifications to Plan

There are no modifications to the illicit discharge component of the Stormwater Management Plan under consideration at this time.

4.5 Activities Planned for Next Year

- The Town will continue to work with the partnership of governmental agencies, businesses, concerned citizens and citizen groups to develop programs to detect and eliminate illicit discharges.
- The Prospect Department of Public Works will continue its efforts with the local Health Department and other Town agencies to develop and implement the process and procedures for documenting and responding to complaints associated with illicit discharges.
- Pipe outfalls (greater than 15" in diameter) and any illicit discharges found will be logged. All outfalls will be mapped on existing mapping. In addition to mapping the outfalls, the Outfall Inventory Form found in Appendix C will be used to document the condition and characteristics of the outfall.
- The Town's Code and associated land use and health regulations will be reviewed to ensure illicit detection and elimination requirements are being met, that the Town has the ability to identify and remove illicit discharges, and for necessary changes to comply with the SWMP and the CT DEP Phase II general permit.

5.0 CONSTRUCTION SITE RUNOFF CONTROLS

5.1 Construction Plans Reviewed

The Planning and Zoning Department and the Inland Wetlands Agency (when necessary) review construction plans for new construction, redevelopment projects, and/or alterations to ensure compliance with the Town's Soil Erosion and Sediment Control Ordinance. This review, including the review of soil erosion and sediment controls, occurs for all projects, regardless of size.

One third of the Town is located within a public drinking water supply watershed (3 watersheds within the political boundaries). All projects proposed within those areas must also undergo review by the applicable public drinking water provider (i.e., Connecticut Water, City of Waterbury). Project reviews focus on the preservation of water quality and protection of drinking water supplies, including review of soil erosion and sediment controls. The Town ensures that the comments provided by the public drinking water provider are noted and changes to the project design are made by the developer.

5.2 Construction Activities Commenced

In Year 1, approximately 200 permits were granted in the Town of Prospect. This number includes all permits granted, even those for small projects with little to no land disturbance such as curb cuts.

5.3 Construction Site Inspection

On-site inspections are made by the DPW and Planning and Zoning Department staff throughout the construction process (as frequent as two to three times per week for large projects such as major subdivisions) to ensure compliance with the Town's Soil Erosion and Sediment Control Ordinance and approved construction plans. There are multiple inspectors available to complete construction site inspections. Overall, the Planning and Zoning Official alone completes approximately 10 to 15 inspections per week. The Planning and Zoning Official can act as the Town's enforcement agents. The inspectors refer to the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* as necessary.

There were approximately 25 construction related complaints submitted to the Town in 2004 by residents. All valid complains were addressed by the Town and corrected by the site contractors or developers.

Enforcement actions were taken when necessary and most items/concerns were addressed by the site contractors or developers. In two instances the Town had to issue a cease and desist order against the site contractor or developer. After this action, the responsible party(ies) corrected document problems.

5.4 Modifications to Plans

There are no modifications to the Construction Site Runoff component of the Stormwater Management Plan under consideration at this time.

5.5 Activities Planned for Next Year

- Continue inspections and enforcement of all current regulations. Review regulations to consider including provisions for controlling construction wastes such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes at the construction site that may cause adverse impacts to water quality.
- Construction site inspection activity will be documented, including but not limited to the following information:
 - Name
 - Site
 - Type
 - Date Reviewed
 - Date Commences
 - Date Inspected
- The Town's regulations will be reviewed relative to soil erosion and sedimentation control requirements, and to ensure that construction projects resulting in land disturbance of greater than 1 acre will be tracked for compliance. The Town's regulations will be reviewed for necessary changes to comply with the SWMP and the CT DEP Phase II general permit.

6.0 POST CONSTRUCTION STORMWATER MANAGEMENT

6.1 Plan Review

The Planning and Zoning Department and the Inland Wetlands Agency (when necessary) review all construction plans for post-construction stormwater management considerations as well as general water quality issues. The Town reviewers also check for adequate open space in subdivision projects. For complex engineering, the Town utilizes their on-call consulting engineering firm to review and comment on the project plans. Review of stormwater structures are based on guidance contained in the *2004 Connecticut Stormwater Quality Manual*, as amended.

One third of the Town is located within a public drinking water supply watershed (3 watersheds within the political boundaries). All projects proposed within those areas must also undergo review by the applicable public drinking water provider (i.e., Connecticut Water, City of Waterbury). Project reviews focus on the preservation of water quality and protection of drinking water supplies, including review of stormwater controls. The Town ensures that the comments provided by the public drinking water provider are noted and changes to the project design are made by the developer.

6.2 Structures Installed

The Town prefers to take ownership of all installed stormwater structures to ensure that operation and maintenance activities are controlled and recorded.

The Town is considering using swales instead of curbing in some areas. Officials are also evaluating the use of other structural stormwater treatment practices in accordance with the *2004 Connecticut Stormwater Quality Manual*, as amended.

6.3 Structures Inspected

The structural control measures installed in Year 1 were inspected during construction for compliance with the approved plans.

All major stormwater structures in the Town that are maintained by the DPW are inspected approximately three times per year and maintenance as necessary. The *2004 Connecticut Stormwater Quality Manual*, as amended, is used as a guide for all operation and maintenance activities on stormwater structures. Maintenance records are retained by the DPW.

The Town inspects the oil/water separator unit at the Town Garage weekly. The structure is cleaned as necessary by a certified hazardous waste hauler.

6.4 Modifications to Plan

There are no modifications to the Post Construction component of the Stormwater Management Plan under consideration at this time.

6.5 Activities Planned for Next Year

- The Town of Prospect will continue to develop procedures for addressing post construction BMPs for all residential and commercial projects. Construction site inspection activity will be documented including but not limited to the following information:
 - Project
 - Site
 - Type Structure
 - Date Installed
 - Date Inspected

- The Town's regulations will be reviewed relative to post construction stormwater management requirements, and to ensure that construction projects resulting in land disturbance of greater than one acre will be tracked for compliance. The Town's regulations will be reviewed for necessary changes to comply with the SWMP and the CT DEP Phase II general permit.

7.0 POLLUTION PREVENTION/GOOD HOUSEKEEPING

7.1 Employee Training Conducted

The garage employees received training and are equipped to address incidental oil or petroleum spills with on-site spill response resources. In Year 1, all eight (8) DPW employees were provided education regarding spill response, containment, clean up, hazard assessment, hazardous conditions and stormwater awareness. Department personnel will utilize the training and resources to address incidental on- and off-site spills.

Town DPW employees also receive training and State certification as landfill and recycling attendants.

7.2 Street Sweeping

The Town hires a contractor to sweep Town roadways on an annual basis. All streets are swept at a minimum frequency of once each year beginning in the spring to remove winter road sand and other debris. There is a large effort in the early spring to sweep all roads in the Town. After the initial sweep, the process is repeated for focus areas including downtown and low-lying areas (high sediment accumulation).

During Year 1, 118 curb miles were swept at least once, representing 100% of Town roadways. Approximately 2,800 cubic yards of material was removed from Town streets during this process. Given that the Town deposited approximately 3,500 cubic yards of sand during the winter leading into Year 1, street sweeping alone prevented 80% of the winter sand from reaching waters of the State.

During Year 1, street sweepings were disposed of at the Town landfill. The sweepings are currently used as fill and mixed into the top course of the landfill.

7.3 Snow Removal

The Town continues to use environmentally responsible sand/salt application practices. As stated above, the Town of Prospect applied 3,500 cubic yards of sand during the winter leading into Year 1. The Town has and continues to use a salt shed for covered storage of all of their deicing materials.

7.4 Catch Basin Cleaning

The Town hires a contractor to clean Town catch basins on an annual basis. The Town currently maintains a cleaning rotation in which $\frac{1}{4}$ of all municipal catch basins are cleaned annually (approximately 400 catch basins per year). In addition the DPW will respond to nuisance flooding and other catch basin-related complaints. The catch basin cleaning effort primarily occurred in the spring (lasting 2 to 3 weeks), resulting in the collection of winter debris.

Chronic problem storm sewer lines may be TV inspected as necessary to determine their current condition and provide information about any problems. The DPW retains copies of all completed TV investigations.

In addition to general cleaning, approximately 15 catch basins were rebuilt or replaced by the Town in Year 1. In some cases, an entirely new catch basin structure was inserted to replace the existing basin. New catch basins include sumps in locations where they currently do not exist.

During Year 1, 390 cubic yards of material was removed from the approximately 400 catch basins cleaned (1/4 of the Town system). In combination with street sweeping, over 90% of the sand applied to Town roadways during the 2004-2005 winter season was prevented from reaching waters of the State. The collected sediment was stored at the Town landfill. The sediments are currently used as fill and mixed into the top course of the landfill.

7.5 Construction Activities

The Highway Department conducts some construction projects that require soil erosion and sediment controls (i.e., hay bales, filter fabric sediment bags in catch basins). Appropriate controls were installed and maintained throughout the duration of these projects. The *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* are used as a guide by Town staff.

Appendix D contains the necessary permits that the Town received for work either completed in Year 1 or permitted in Year 1.

7.6 System Upgrades/Repairs

The Town routinely completes upgrades to the municipal storm drainage system. Approximately 2,000 feet of storm sewer piping was replaced in 2004.

7.7 Complaint Responses

Complaints to the Town regarding the general housekeeping of municipal facilities are directed to the appropriate department for investigation and response. Requests from the public are typically received in the early spring for prompt sweeping of winter road sand and cleaning of catch basins.

7.8 Spill Response Activities

Significant spills are handled by the Prospect Fire Department. CT DEP is notified of all spill situations as they occur. The Fire Department is prepared to respond to hazardous spills within the Town. Town staff (excluding fire fighters) did not participate in any significant spill response activities during Year 1.

The DPW facility maintain spill containment supplies including speedi-dry, absorbent pads, and containment booms at the DPW headquarters.

7.9 Transfer Station

Managerial oversight of the Town's Transfer Station falls under the jurisdiction of the DPW. Freon is removed from bulk waste items by a certified company prior to final disposal at a certified facility. As stated above, DPW employees receive training and State certification as landfill and recycling attendants.

The Transfer Station has a CTDEP permit for the Discharge of Stormwater Associated with Industrial Activities (DEP-PERD-GP-014) (see [Appendix D](#) for a copy of the permit certificate). This permit required the Town to develop and implement a site specific Stormwater Pollution Prevention Plan including employee training and regular site inspections. The permit also requires the Town to collect annual water samples from the site.

7.10 Household Hazardous Waste Collection

Prospect residents are directed to bring hazardous wastes to Tunxis Recycling in Bristol for free disposal. A wide range of materials are accepted including cleaners, batteries, fertilizers, and pesticides. Tunxis Recycling also sponsors local Collection Days when residents can dispose of hazardous wastes at a more convenient, local location. In Prospect, the Public Works Garage serves as the collection location. See [Appendix E](#) for a detailed spreadsheet of garbage and recycling amounts and associated tipping fees.

7.11 Municipal Facility Inspection

The Town performs routine inspections of its facilities to maintain them in a neat and orderly condition. The DPW performs weekly (minimum) inspections and cleaning of their facilities. The DPW Director and various foremen conduct these inspections.

Silt sacks are maintained in all three of the DPW Garage's catch basins. These controls minimize the amount of sediment and floatables that are discharged from the system's outfall. The controls are maintained and replaced as necessary.

The Town Public Works Garage has a CTDEP permit for the Discharge of Stormwater Associated with Industrial Activities (DEP-PERD-GP-014) (see [Appendix D](#) for a copy of the permit certificate). This permit required the Town to develop and implement a site specific Stormwater Pollution Prevention Plan including employee training and regular site inspections. The permit also requires the Town to collect annual water samples from the site.

7.12 Modification to Plan

There are no modifications to the Pollution Prevention/Good Housekeeping component of the Stormwater Management Plan under consideration at this time.

7.13 Activities Planned for Next Year

- DPW will consider documenting all pertinent maintenance/cleaning operations.
- The DPW will continue to conducting employee training on stormwater awareness.
- The Town will locate and map outfalls and other components of stormwater drainage system by the permit required deadlines.
- The Town will continue their permit required sampling program.

- The Town will follow up on any problems identified through the discharge sampling program.

8.0 ANNUAL STORMWATER MONITORING

The CT DEP Phase II General Permit requires annual stormwater monitoring of at least two outfalls from each of three land uses (industrial, commercial, and residential) for a total of six (6) outfall locations. Monitoring parameters, procedures, and storm event criteria are described in the General Permit.

The Town has selected sampling outfalls based on the land use(s) within the drainage areas of the outfalls as well as practical considerations including accessibility and proximity to other sampling locations. A field sampling plan describing the sampling objectives, outfall locations, sampling parameters, and monitoring procedures for the annual monitoring program is included as Appendix F. The 2004 stormwater samples were collected and the results are included in Appendix G.

APPENDIX A

**GENERAL PERMIT FOR STORMWATER – SMALL
MUNICIPAL SEPARATE STORM SEWER SYSTEMS
(#GSM000110) – TOWN OF PROSPECT**

APPENDIX B
EDUCATION MATERIALS



Core Science Curriculum Framework

An Invitation for Students and Teachers
to Explore Science and Its Role in Society

Approved October 2004 (edited January 2005)

INTRODUCTION

I. A Vision for Connecticut Science Education in the 21st Century

To articulate a vision to guide 21st century science education in Connecticut, the Connecticut State Department of Education engaged in discussions with science educators, school administrators, and university and corporate scientists. The consensus drawn from these discussions was that school science education should support the development of scientific literacy in all students, as well as motivate more students to pursue careers in science, technology and engineering. Science literacy, in the view of Connecticut science educators, is a combination of understanding major science concepts and theories, using scientific reasoning, and recognizing the complex interactions between science, technology and society.

Based on this vision, the department developed a new **Core Science Curriculum Framework**. This framework articulates the main conceptual themes and content standards that **all** students are expected to learn in their elementary, middle and high school science classes. Further, the framework describes the specific performances that will be assessed on the statewide science assessments.

What Is Meant By A “Core” Curriculum?

Since the current body of scientific knowledge represents the cumulative work of scientists over hundreds of years, it is unreasonable to expect K-12 students to learn it all. Therefore, Connecticut’s Core Science Curriculum Framework describes *some* of the major science concepts that all students in Connecticut schools can reasonably be expected to learn in order to develop and expand their scientific literacy. This framework does not attempt to spell out all of the science, mathematics and technology goals that can be included in a school science curriculum. Rather, it describes a baseline for what all Connecticut students should know by the end of Grade 10.

Decisions regarding the main science themes and the sequencing of the content standards were guided by the *National Science Education Standards* (National Research Council, 1996), *Project 2061 Benchmarks for Science Literacy* (American Association for the Advancement of Science, 1993), and Connecticut science educators. School districts may choose to go beyond the scope of these core concepts, but **all** students should have opportunities to learn the content expressed in this framework.

How Does The Framework Promote Scientific Literacy?

Being scientifically literate requires that a person have an essential understanding of key science ideas, along with a fluency in the language and terms used to describe them. The core curriculum articulated through the framework identifies the key ideas and levels of understanding that all students are expected to reach. Throughout the PreK-Grade10 core framework, fundamental concepts from the life, physical and earth sciences are woven together in order to support the holistic understanding required of a scientifically literate individual.

Scientific literacy requires the ability to apply critical thinking skills when dealing with science-related issues. The framework was designed to target the age-appropriate critical thinking – or inquiry – skills that should be infused in the learning of each of the content standards. Further, in limiting the number of content standards required to be taught, the framework allows for the implementation of a hands-on/minds-on science program in which students and teachers have time for in-depth explorations that build an understanding of the way in which scientific knowledge is created, validated and communicated.

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A scientifically literate person is able to transfer knowledge of the academic theories and principles of science to practical applications in the real world. To support this concept, Connecticut's Core Science Curriculum Framework is structured around these key real-world issues and technologies, rather than around the subdisciplines of the life, physical and earth sciences.

Scientific literacy also implies having the capacity to pose and evaluate arguments based on evidence and to apply logical conclusions from such arguments. Language arts and mathematics are the communication vehicles that people use to convey, critique and evaluate science-related ideas. Therefore, language arts and mathematics learning expectations are included in the framework as integral components of science learning.

In short, a foundation in scientific literacy prepares students to be confident and capable lifelong learners who are equipped with the skills needed to access, understand, evaluate and apply information in various contexts. Regardless of their academic standing, **all** students should have access to a rich and challenging science curriculum that will promote scientific literacy, while inspiring and supporting advanced study and science-related careers.

II. Role of the Connecticut Core Science Curriculum Framework

The science framework has three main roles:

1. **To articulate the core science ideas, knowledge and skills that all Connecticut students should learn.** Based upon significant science understandings and abilities defined in the *National Science Education Standards* and the *Project 2061 Benchmarks for Science Literacy*, this framework describes a conceptual scope and sequence to guide school districts and science educators in the development of their own science programs. The content standards for each grade level are based on conceptual connections among ideas in the life, physical and earth sciences, and related social and technological applications. District curriculum developers have flexibility to reorganize the content standards by grade level, so long as all students have opportunities to learn the content standards prior to taking the *Connecticut Mastery Test (CMT)* in Grades 5 and 8, and the *Connecticut Academic Performance Test (CAPT)* in Grade 10. Districts may include more content in their science programs, but the framework content standards express the *minimum* that should be learned by all students in Grades PreK to 10.

In addition to the life, physical and earth science standards, the Core Science Curriculum Framework includes standards and expected performances for inquiry and for science and technology in society. Inquiry performances include the abilities to apply science process skills, as well as the abilities to read and write science-related texts, search scientific databases and use mathematics to make sense out of data. The science and technology in society standards deal with applications of science to everyday and global issues, and reflect content and issues described in *Standards for Technological Literacy* (International Technology Education Association, 2000).

2. **To define the knowledge, abilities and understandings that students are expected to demonstrate on the statewide science assessments.** Whereas content standards provide broad guidelines for the development of the core curriculum, expected performances identify the specific knowledge and skills selected from the core curriculum for which students will be accountable on statewide science assessments. Expected performances express the *maximum* that all students will be expected to demonstrate on the CMT and CAPT science assessments.

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3. **To influence the way science is taught and assessed.** Among the factors guiding the selection and organization of the framework's content were its potential to attract and hold the interest of students and inspire them to continue learning about science. While the framework defines key science concepts and skills, it does not dictate how to help students achieve these learning goals. The ways in which districts develop learning units and specific lesson plans will have a significant influence on students' attitudes toward science learning. Given opportunities for meaningful and authentic science experiences that incorporate the expected performances included in the framework, it is hoped that many students will develop the enthusiasm, interest and confidence to continue their science studies and pursue science-related careers. An enrichment science program designed to meet the needs of these advanced students, with suggested content standards for courses in biology, chemistry, physics and earth science, is found in the Appendix to this framework. Enrichment standards that are not included in high school Strands I through V will not be measured on the CAPT.

**DEVELOPMENTAL ORGANIZATION
OF CORE SCIENCE CURRICULUM FRAMEWORK**

- PreK-2:** Development of *wonder* about the natural world and the ability to observe, describe and apply basic process skills
- Grades 3-5:** Development of *descriptions* of basic natural phenomena and the ability to perform simple experiments and record accurate data
- Grades 6-8:** Development of basic *explanations* for natural phenomena, and the ability to ask good questions and apply experimental procedures to collect and analyze data
- Grades 9-10:** Development of *interest* in global issues and the ability to collect, analyze and use data to explore and explain related science concepts

ENRICHMENT CURRICULUM

Development of *deep understanding* of science concepts and principles; preparation for future studies and/or careers

CONCEPTUAL STRUCTURE OF FRAMEWORK

The science framework is organized around 11 conceptual themes and guiding questions in the earth, life and physical sciences, with suggested explorations of science-related questions and issues. Each theme is addressed by several content standards and related concepts that spiral through the grades, each time being treated with greater depth and breadth, in accordance with developmental appropriateness for the students. The content standards for Grades 9 and 10 are further organized around five topical strands. Strands I, II and III are related to the physical sciences, while Strands IV and V are related to the life science.

Listed below are the conceptual themes and guiding questions, together with the content standards in each of the grade levels, that contribute to students' eventual abilities to respond to the guiding questions.

I. Inquiry – How is scientific knowledge created and communicated?

- Scientific Inquiry (PK-2, 3-5, 6-8 and 9-10)
- Scientific Literacy (PK-2, 3-5, 6-8 and 9-10)
- Scientific Numeracy (PK-2, 3-5, 6-8 and 9-10)

II. Properties of Matter – How does the structure of matter affect the properties and uses of materials?

- Properties of Objects (K.1)
- Properties of Materials (2.1)
- States of Matter (3.1)
- Elements, Compounds and Mixtures (6.1)
- Chemical Reactions (9.4)
- Carbon Compounds (9.5)

III. Energy Transfer and Transformations – What is the role of energy in our world?

- Electricity and Magnetism (4.4)
- Sound and Light (5.1)
- Energy and Work (7.1)
- Energy Conservation and Transformation (9.1)
- Electrical Forces (9.2)

IV. Forces and Motion – What makes objects move the way they do?

- Position and Motion of Objects (1.1)
- Forces and Motion (4.1)
- Forces and Motion (8.1)

V. Matter and Energy in Ecosystems – How do matter and energy flow through ecosystems?

- Food Chains (4.2)
- Ecosystems (6.2)

- VI. Structure and Function – How are organisms structured to ensure efficiency and survival?**
- Needs of Living Things (1.2)
 - Life Cycles of Animals (1.3)
 - Life Cycles of Plants (2.2)
 - Responses to Stimuli (5.2)
 - Human Body Systems (7.2)
 - Cell Structure and Function (10.1)
- VII. Heredity and Evolution – What processes are responsible for life’s unity and diversity?**
- Characteristics of Living Things (K.2)
 - Adaptations (3.2)
 - Reproduction and Heredity (8.2)
 - Genetics (10.4)
 - Evolution (10.5)
- VIII. The Changing Earth – How do materials cycle through the Earth’s systems?**
- Properties of Soils (2.3)
 - Properties of Rocks and Minerals (3.3)
 - Cycles of Matter in Earth’s Systems (9.7)
- IX. Energy in the Earth’s Systems – How do external and internal sources of energy affect the Earth’s systems?**
- Weather Patterns (K.3)
 - Land and Water Interactions (4.3)
 - Weather and Seasons (6.3)
 - The Changing Earth (7.3)
- X. Earth in the Solar System – How does the position of Earth in the solar system affect conditions on our planet?**
- Earth, Moon and Sun (5.3)
 - The Solar System (8.3)
- XI. Science and Technology in Society – How do science and technology affect the quality of our lives?**
- Shelters (K.4)
 - Measuring Tools (1.4)
 - Food Resources (2.4)
 - Conservation of Materials (3.4)
 - Batteries, Bulbs and Magnets (4.4)
 - Optical Technologies (5.4)
 - Water Quality (6.4)
 - Food Technology (7.4)
 - Building Bridges (8.4)
 - Energy and Power Technologies (9.3)
 - Polymers (9.6)
 - Human Environmental Impacts (9.8, 9.9)
 - Living with Microorganisms (10.2)
 - Biotechnology (10.3)
 - Human Population Growth (10.6)

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USERS' GUIDE TO CORE SCIENCE CURRICULUM FRAMEWORK

The intent of this framework is to describe a core body of science knowledge that all students are expected to learn; knowledge that is assessed at the elementary, middle and high school levels. Although the framework introduces concepts from the life, physical and earth sciences at each grade level, schools may choose to design yearly courses that focus on one science discipline at a time, based on the needs of students and available instructional resources.

The framework is structured with the following components:

- **CONTENT STANDARDS** (the left-hand column of each page) are narrative statements of science concepts that guide the development of a rich and rigorous curriculum. They are marked with an identification code indicating the grade level and standard number (e.g., 3.2) and appear in bold type.

Content standards include the following:

- A **conceptual theme**, followed by an overarching **guiding question** (e.g., *Properties of Matter – How does the structure of matter affect the properties and uses of materials?*)
 - The **content standard**, a broad conceptual statement, identified with a numerical code that serves as a general learning goal for a unit of study.
 - One or two **supportive concepts**, identified with bullets, that provide more specific information about the focus of the learning unit.
- **EXPECTED PERFORMANCES** (the right-hand column of each page) identify the specific knowledge and abilities from the broader curriculum that will be assessed on the statewide tests given at Grades 5, 8 and 10.
 - **SCIENTIFIC INQUIRY, LITERACY AND NUMERACY** standards, although described separately for Grades PK-2, 3-5, 6-8 and 9-10, are intended to be learned, practiced and assessed within the context of learning the science content described for each grade level.
 - **UNDERSTANDING THE IDENTIFICATION CODES**
 - Each content standard is identified by a two-digit code (e.g., 2.3): The first digit refers to the grade level (second grade in the example), and the second digit identifies one of the four content standards for each grade level (standard 3 in the example).
 - Expected performances are identified by a letter (A, B, C or D) and a sequenced numeral (1 through 45) that indicates the number of expected performances within each gradespan:

A = Grades PK-2 (includes 24 expected performances)

B = Grades 3-5 (includes 25 expected performances)

C = Grades 6-8 (includes 30 expected performances)

D = Grades 9-10 (includes 45 expected performances)

Content Standards and Expected Performances

Core Science for Grades PreK-2



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THE STANDARDS FOR SCIENTIFIC INQUIRY, LITERACY AND NUMERACY ARE INTEGRAL PARTS OF THE CONTENT STANDARDS FOR EACH GRADE LEVEL IN THIS CLUSTER.

Grades PreK-2 Core Scientific Inquiry, Literacy and Numeracy

How is scientific knowledge created and communicated?

Content Standards	Expected Performances
<p>SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas. 	<p>A INQ.1 Make observations and ask questions about objects, organisms and the environment.</p> <p>A INQ.2 Use senses and simple measuring tools to collect data.</p> <p>A INQ.3 Make predictions based on observed patterns.</p> <p>A INQ.4 Read, write, listen and speak about observations of the natural world.</p> <p>A INQ.5 Seek information in books, magazines and pictures.</p> <p>A INQ.6 Present information in words and drawings.</p> <p>A INQ.7 Use standard tools to measure and describe physical properties such as weight, length and temperature.</p> <p>A INQ.8 Use nonstandard measures to estimate and compare the sizes of objects.</p> <p>A INQ.9 Count, order and sort objects by their properties.</p> <p>A INQ.10 Represent information in bar graphs.</p>

PreK-Kindergarten

Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Properties of Matter – How does the structure of matter affect the properties and uses of materials?</i></p> <p>K.1 - Objects have properties that can be observed and used to describe similarities and differences.</p> <ul style="list-style-type: none"> ◆ Some properties can be observed with the senses, and others can be discovered by using simple tools or tests. 	<p>A 1. Use the senses and simple measuring tools, such as rulers and equal-arm balances, to observe common objects and sort them into groups based on size, weight, shape or color.</p> <p>A 2. Sort objects made of materials such as wood, paper and metal into groups based on properties such as flexibility, attraction to magnets, and whether they float or sink in water.</p> <p>A 3. Count objects in a group and use mathematical terms to describe quantitative relationships such as: same as, more than, less than, equal, etc.</p>
<p><i>Heredity and Evolution – What processes are responsible for life’s unity and diversity?</i></p> <p>K.2 - Many different kinds of living things inhabit the Earth.</p> <ul style="list-style-type: none"> ◆ Living things have certain characteristics that distinguish them from nonliving things, including growth, movement, reproduction and response to stimuli. 	<p>A 4. Describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects and mammals (including humans).</p> <p>A 5. Describe the similarities and differences in the appearance and behaviors of adults and their offspring.</p> <p>A 6. Describe characteristics that distinguish living from nonliving things.</p>
<p><i>Energy in the Earth’s Systems – How do external and internal sources of energy affect the Earth’s systems?</i></p> <p>K.3 - Weather conditions vary daily and seasonally.</p> <ul style="list-style-type: none"> ◆ Daily and seasonal weather conditions affect what we do, what we wear and how we feel. 	<p>A 7. Describe and record daily weather conditions.</p> <p>A 8. Relate seasonal weather patterns to appropriate choices of clothing and activities.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>K.4 - Some objects are natural, while others have been designed and made by people to improve the quality of life.</p> <ul style="list-style-type: none"> ◆ Humans select both natural and man-made materials to build shelters based on local climate conditions, properties of the materials and their availability in the environment. 	<p>A 9. Describe the types of materials used by people to build houses, and the properties that make the materials useful.</p>

Grade 1

Core Themes, Content Standards and Expected Performances

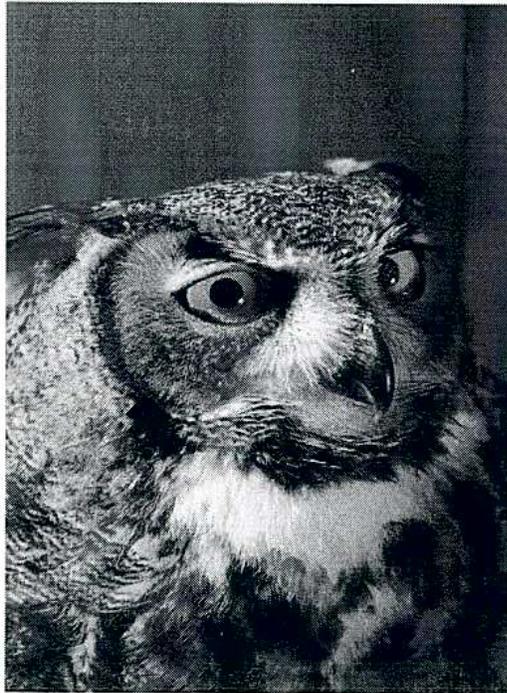
Content Standards	Expected Performances
<p><i>Forces and Motion – What makes objects move the way they do?</i></p> <p>1.1 - The sun appears to move across the sky in the same way every day, but its path changes gradually over the seasons.</p> <ul style="list-style-type: none"> ◆ An object’s position can be described by locating it relative to another object or the background. ◆ An object’s motion can be described by tracing and measuring its position over time. 	<p>A 10. Describe how the motion of objects can be changed by pushing and pulling.</p> <p>A 11. Describe the apparent movement of the sun across the sky and the changes in the length and direction of shadows during the day.</p>
<p><i>Structure and Function – How are organisms structured to ensure efficiency and survival?</i></p> <p>1.2 - Living things have different structures and behaviors that allow them to meet their basic needs.</p> <ul style="list-style-type: none"> ◆ Animals need air, water and food to survive. ◆ Plants need air, water and sunlight to survive. 	<p>A 12. Describe the different ways that animals, including humans, obtain water and food.</p> <p>A 13. Describe the different structures plants have for obtaining water and sunlight.</p> <p>A 14. Describe the structures that animals, including humans, use to move around.</p>
<p><i>Structure and Function – How are organisms structured to ensure efficiency and survival?</i></p> <p>1.3 - Organisms change in form and behavior as part of their life cycles.</p> <ul style="list-style-type: none"> ◆ Some organisms undergo metamorphosis during their life cycles; other organisms grow and change, but their basic form stays essentially the same. 	<p>A 15. Describe the changes in organisms, such as frogs and butterflies, as they undergo metamorphosis.</p> <p>A 16. Describe the life cycles of organisms that grow but do not metamorphose.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>1.4 - The properties of materials and organisms can be described more accurately through the use of standard measuring units.</p> <ul style="list-style-type: none"> ◆ Various tools can be used to measure, describe and compare different objects and organisms. 	<p>A 17. Estimate, measure and compare the sizes and weights of different objects and organisms using standard and nonstandard measuring tools.</p>

Grade 2
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Properties of Matter – How does the structure of matter affect the properties and uses of materials?</i></p> <p>2.1 - Materials can be classified as solid, liquid or gas based on their observable properties.</p> <ul style="list-style-type: none"> ◆ Solids tend to maintain their own shapes, while liquids tend to assume the shapes of their containers, and gases fill their containers fully. 	<p>A 18. Describe differences in the physical properties of solids and liquids.</p>
<p><i>Structure and Function – How are organisms structured to ensure efficiency and survival?</i></p> <p>2.2 - Plants change their forms as part of their life cycles.</p> <ul style="list-style-type: none"> ◆ The life cycles of flowering plants include seed germination, growth, flowering, pollination and seed dispersal. 	<p>A 19. Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds.</p> <p>A 20. Explore and describe the effects of light and water on seed germination and plant growth.</p>
<p><i>The Changing Earth – How do materials cycle through the Earth's systems?</i></p> <p>2.3 - Earth materials have varied physical properties which make them useful in different ways.</p> <ul style="list-style-type: none"> ◆ Soils can be described by their color, texture and capacity to retain water. ◆ Soils support the growth of many kinds of plants, including those in our food supply. 	<p>A 21. Sort different soils by properties, such as particle size, color and composition.</p> <p>A 22. Relate the properties of different soils to their capacity to retain water and support the growth of certain plants.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>2.4 - Human beings, like all other living things, have special nutritional needs for survival.</p> <ul style="list-style-type: none"> ◆ The essential components of balanced nutrition can be obtained from plant and animal sources. ◆ People eat different foods in order to satisfy nutritional needs for carbohydrates, proteins and fats. 	<p>A 23. Identify the sources of common foods and classify them by their basic food groups.</p> <p>A 24. Describe how people in different cultures use different food sources to meet their nutritional needs.</p>

Content Standards and Expected Performances

Core Science for Grades 3-5



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THE STANDARDS FOR SCIENTIFIC INQUIRY, LITERACY AND NUMERACY ARE INTEGRAL PARTS OF THE CONTENT STANDARDS FOR EACH GRADE LEVEL IN THIS CLUSTER.

Grades 3-5 Core Scientific Inquiry, Literacy and Numeracy

How is scientific knowledge created and communicated?

Content Standards	Expected Performances
<p>SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas. 	<p>B INQ.1 Make observations and ask questions about objects, organisms and the environment.</p> <p>B INQ.2 Seek relevant information in books, magazines and electronic media.</p> <p>B INQ.3 Design and conduct simple investigations.</p> <p>B INQ.4 Employ simple equipment and measuring tools to gather data and extend the senses.</p> <p>B INQ.5 Use data to construct reasonable explanations.</p> <p>B INQ.6 Analyze, critique and communicate investigations using words, graphs and drawings.</p> <p>B INQ.7 Read and write a variety of science-related fiction and nonfiction texts.</p> <p>B INQ.8 Search the Web and locate relevant science information.</p> <p>B INQ.9 Use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.</p> <p>B INQ.10 Use mathematics to analyze, interpret and present data.</p>

Grade 3
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Properties of Matter – How does the structure of matter affect the properties and uses of materials?</i></p> <p>3.1 - Materials have properties that can be identified and described through the use of simple tests.</p> <ul style="list-style-type: none"> ◆ Heating and cooling cause changes in some of the properties of materials. 	<p>B 1. Sort and classify materials based on properties such as dissolving in water, sinking and floating, conducting heat, and attracting to magnets.</p> <p>B 2. Describe the effect of heating on the melting, evaporation, condensation and freezing of water.</p>
<p><i>Heredity and Evolution – What processes are responsible for life's unity and diversity?</i></p> <p>3.2 - Organisms can survive and reproduce only in environments that meet their basic needs.</p> <ul style="list-style-type: none"> ◆ Plants and animals have structures and behaviors that help them survive in different environments. 	<p>B 3. Describe how different plants and animals are adapted to obtain air, water, food and protection in specific land habitats.</p> <p>B 4. Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.</p>
<p><i>The Changing Earth – How do materials cycle through the Earth's systems?</i></p> <p>3.3 - Earth materials have different physical and chemical properties.</p> <ul style="list-style-type: none"> ◆ Rocks and minerals have properties that may be identified through observation and testing; these properties determine how earth materials are used. 	<p>B 5. Describe the physical properties of rocks and relate them to their potential uses.</p> <p>B 6. Relate the properties of rocks to the possible environmental conditions during their formation.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>3.4 - Earth materials provide resources for all living things, but these resources are limited and should be conserved.</p> <ul style="list-style-type: none"> ◆ Decisions made by individuals can impact the global supply of many resources. 	<p>B 7. Describe how earth materials can be conserved by reducing the quantities used, and by reusing and recycling materials rather than discarding them.</p>

Grade 4
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Forces and Motion – What makes objects move the way they do?</i></p> <p>4.1 - The position and motion of objects can be changed by pushing or pulling.</p> <ul style="list-style-type: none"> ◆ The size of the change in an object’s motion is related to the strength of the push or pull. ◆ The more massive an object is, the less effect a given force will have on its motion. 	<p>B 8. Describe the effects of the strengths of pushes and pulls on the motion of objects.</p> <p>B 9. Describe the effect of the mass of an object on its motion.</p>
<p><i>Matter and Energy in Ecosystems – How do matter and energy flow through ecosystems?</i></p> <p>4.2 - All organisms depend on the living and non-living features of the environment for survival.</p> <ul style="list-style-type: none"> ◆ When the environment changes, some organisms survive and reproduce, and others die or move to new locations. 	<p>B 10. Describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive.</p> <p>B 11. Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.</p>
<p><i>Energy in the Earth’s Systems – How do external and internal sources of energy affect the Earth’s systems?</i></p> <p>4.3 - Water has a major role in shaping the Earth’s surface.</p> <ul style="list-style-type: none"> ◆ Water circulates through the Earth’s crust, oceans and atmosphere. 	<p>B 12. Describe how the sun’s energy impacts the water cycle.</p> <p>B 13. Describe the role of water in erosion and river formation.</p>
<p><i>Energy Transfer and Transformations – What is the role of energy in our world?</i></p> <p>4.4 - Electrical and magnetic energy can be transferred and transformed.</p> <ul style="list-style-type: none"> ◆ Electricity in circuits can be transformed into light, heat, sound and magnetic effects. ◆ Magnets can make objects move without direct contact between the object and the magnet. 	<p>B 14. Describe how batteries and wires can transfer energy to light a light bulb.</p> <p>B 15. Explain how simple electrical circuits can be used to determine which materials conduct electricity.</p> <p>B 16. Describe the properties of magnets, and how they can be used to identify and separate mixtures of solid materials.</p>

Grade 5
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Energy Transfer and Transformations – What is the role of energy in our world?</i></p> <p>5.1 - Sound and light are forms of energy.</p> <ul style="list-style-type: none"> ◆ Sound is a form of energy that is produced by the vibration of objects and is transmitted by the vibration of air and objects. ◆ Light is a form of energy that travels in a straight line and can be reflected by a mirror, refracted by a lens, or absorbed by objects. 	<p>B 17. Describe the factors that affect the pitch and loudness of sound produced by vibrating objects.</p> <p>B 18. Describe how sound is transmitted, reflected and/or absorbed by different materials.</p> <p>B 19. Describe how light is absorbed and/or reflected by different surfaces.</p>
<p><i>Structure and Function – How are organisms structured to ensure efficiency and survival?</i></p> <p>5.2 - Perceiving and responding to information about the environment is critical to the survival of organisms.</p> <ul style="list-style-type: none"> ◆ The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system. 	<p>B 20. Describe how light absorption and reflection allow one to see the shapes and colors of objects.</p> <p>B 21. Describe the structure and function of the human senses and the signals they perceive.</p>
<p><i>Earth in the Solar System – How does the position of Earth in the solar system affect conditions on our planet?</i></p> <p>5.3 - Most objects in the solar system are in a regular and predictable motion.</p> <ul style="list-style-type: none"> ◆ The positions of the Earth and moon relative to the sun explain the cycles of day and night, and the monthly moon phases. 	<p>B 22. Explain the cause of day and night based on the rotation of Earth on its axis.</p> <p>B 23. Describe the monthly changes in the appearance of the moon, based on the moon's orbit around the Earth.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>5.4 - Humans have the capacity to build and use tools to advance the quality of their lives.</p> <ul style="list-style-type: none"> ◆ Advances in technology allow individuals to acquire new information about the world. 	<p>B 24. Compare and contrast the structures of the human eye with those of the camera.</p> <p>B 25. Describe the uses of different instruments, such as eye glasses, magnifiers, periscopes and telescopes, to enhance our vision.</p>

Content Standards and Expected Performances

Core Science for Grades 6-8



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THE STANDARDS FOR SCIENTIFIC INQUIRY, LITERACY AND NUMERACY ARE INTEGRAL PARTS OF THE CONTENT STANDARDS FOR EACH GRADE LEVEL IN THIS CLUSTER.

Grades 6-8 Core Scientific Inquiry, Literacy and Numeracy	
<i>How is scientific knowledge created and communicated?</i>	
Content Standards	Expected Performances
<p>SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. ◆ Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. ◆ Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. ◆ Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas. 	<p>C INQ.1 Identify questions that can be answered through scientific investigation.</p> <p>C INQ.2 Read, interpret and examine the credibility of scientific claims in different sources of information.</p> <p>C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p>C INQ.4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.</p> <p>C INQ.5 Use appropriate tools and techniques to make observations and gather data.</p> <p>C INQ.6 Use mathematical operations to analyze and interpret data.</p> <p>C INQ.7 Identify and present relationships between variables in appropriate graphs.</p> <p>C INQ.8 Draw conclusions and identify sources of error.</p> <p>C INQ.9 Provide explanations to investigated problems or questions.</p> <p>C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p>

Grade 6
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Properties of Matter – How does the structure of matter affect the properties and uses of materials?</i></p> <p>6.1 - Materials can be classified as pure substances or mixtures, depending on their chemical and physical properties.</p> <ul style="list-style-type: none"> ◆ Mixtures are made of combinations of elements and/or compounds, and they can be separated by using a variety of physical means. ◆ Pure substances can be either elements or compounds, and they cannot be broken down by physical means. 	<p>C 1. Describe the properties of common elements, such as oxygen, hydrogen, carbon, iron and aluminum.</p> <p>C 2. Describe how the properties of simple compounds, such as water and table salt, are different from the properties of the elements of which they are made.</p> <p>C 3. Explain how mixtures can be separated by using the properties of the substances from which they are made, such as particle size, density, solubility and boiling point.</p>
<p><i>Matter and Energy in Ecosystems – How do matter and energy flow through ecosystems?</i></p> <p>6.2 - An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.</p> <ul style="list-style-type: none"> ◆ Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply. ◆ Populations in ecosystems can be categorized as producers, consumers and decomposers of organic matter. 	<p>C 4. Describe how abiotic factors, such as temperature, water and sunlight, affect the ability of plants to create their own food through photosynthesis.</p> <p>C 5. Explain how populations are affected by predator-prey relationships.</p> <p>C 6. Describe common food webs in different Connecticut ecosystems.</p>
<p><i>Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems?</i></p> <p>6.3 - Variations in the amount of the sun's energy hitting the Earth's surface affect daily and seasonal weather patterns.</p> <ul style="list-style-type: none"> ◆ Local and regional weather are affected by the amount of solar energy these areas receive and by their proximity to a large body of water. 	<p>C 7. Describe the effect of heating on the movement of molecules in solids, liquids and gases.</p> <p>C 8. Explain how local weather conditions are related to the temperature, pressure and water content of the atmosphere and the proximity to a large body of water.</p> <p>C 9. Explain how the uneven heating of the Earth's surface causes winds.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>6.4 - Water moving across and through earth materials carries with it the products of human activities.</p> <ul style="list-style-type: none"> ◆ Most precipitation that falls on Connecticut eventually reaches Long Island Sound. 	<p>C 10. Explain the role of septic and sewage systems on the quality of surface and ground water.</p> <p>C 11. Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem.</p>

Grade 7
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Energy Transfer and Transformations – What is the role of energy in our world?</i></p> <p>7.1 - Energy provides the ability to do work and can exist in many forms.</p> <ul style="list-style-type: none"> ◆ Work is the process of making objects move through the application of force. ◆ Energy can be stored in many forms and can be transformed into the energy of motion. 	<p>C 12. Explain the relationship among force, distance and work, and use the relationship ($W=F \times D$) to calculate work done in lifting heavy objects.</p> <p>C 13. Explain how simple machines, such as inclined planes, pulleys and levers, are used to create mechanical advantage.</p> <p>C 14. Describe how different types of stored (potential) energy can be used to make objects move.</p>
<p><i>Structure and Function – How are organisms structured to ensure efficiency and survival?</i></p> <p>7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.</p> <ul style="list-style-type: none"> ◆ All organisms are composed of one or more cells; each cell carries on life-sustaining functions. ◆ Multicellular organisms need specialized structures and systems to perform basic life functions. 	<p>C 15. Describe the basic structures of an animal cell, including nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.</p> <p>C 16. Describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.</p> <p>C 17. Explain how the human musculo-skeletal system supports the body and allows movement.</p>
<p><i>Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems?</i></p> <p>7.3 - Landforms are the result of the interaction of constructive and destructive forces over time.</p> <ul style="list-style-type: none"> ◆ Volcanic activity and the folding and faulting of rock layers during the shifting of the Earth's crust affect the formation of mountains, ridges and valleys. ◆ Glaciation, weathering and erosion change the Earth's surface by moving earth materials from place to place. 	<p>C 18. Describe how folded and faulted rock layers provide evidence of the gradual up and down motion of the Earth's crust.</p> <p>C 19. Explain how glaciation, weathering and erosion create and shape valleys and floodplains.</p> <p>C 20. Explain how the boundaries of tectonic plates can be inferred from the location of earthquakes and volcanoes.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>7.4 - Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.</p> <ul style="list-style-type: none"> ◆ Various microbes compete with humans for the same sources of food. 	<p>C 21. Describe how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes.</p>

Grade 8
Core Themes, Content Standards and Expected Performances

Content Standards	Expected Performances
<p><i>Forces and Motion – What makes objects move the way they do?</i></p> <p>8.1 - An object’s inertia causes it to continue moving the way it is moving unless it is acted upon by a force to change its motion.</p> <ul style="list-style-type: none"> ◆ The motion of an object can be described by its position, direction of motion and speed. ◆ An unbalanced force acting on an object changes its speed and/or direction of motion. ◆ Objects moving in circles must experience force acting toward the center. 	<p>C 22. Calculate the average speed of a moving object and illustrate the motion of objects in graphs of distance over time.</p> <p>C 23. Describe the qualitative relationships among force, mass and changes in motion.</p> <p>C 24. Describe the forces acting on an object moving in a circular path.</p>
<p><i>Heredity and Evolution – What processes are responsible for life’s unity and diversity?</i></p> <p>8.2 - Reproduction is a characteristic of living systems and it is essential for the continuation of every species.</p> <ul style="list-style-type: none"> ◆ Heredity is the passage of genetic information from one generation to another. ◆ Some of the characteristics of an organism are inherited and some result from interactions with the environment. 	<p>C 25. Explain the similarities and differences in cell division in somatic and germ cells.</p> <p>C 26. Describe the structure and function of the male and female human reproductive systems, including the process of egg and sperm production.</p> <p>C 27. Describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans.</p>
<p><i>Earth in the Solar System – How does the position of Earth in the solar system affect conditions on our planet?</i></p> <p>8.3 - The solar system is composed of planets and other objects that orbit the sun.</p> <ul style="list-style-type: none"> ◆ Gravity is the force that governs the motions of objects in the solar system. ◆ The motion of the Earth and moon relative to the sun causes daily, monthly and yearly cycles on Earth. 	<p>C 28. Explain the effect of gravity on the orbital movement of planets in the solar system.</p> <p>C 29. Explain how the regular motion and relative position of the sun, Earth and moon affect the seasons, phases of the moon and eclipses.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>8.4 - In the design of structures there is a need to consider factors such as function, materials, safety, cost and appearance.</p> <ul style="list-style-type: none"> ◆ Bridges can be designed in different ways to withstand certain loads and potentially destructive 	<p>C 30. Explain how beam, truss and suspension bridges are designed to withstand the forces that act on them.</p>

Content Standards and Expected Performances

Core Science for Grades 9-10



THE STANDARDS FOR SCIENTIFIC INQUIRY, LITERACY AND NUMERACY ARE INTEGRAL PARTS OF THE CONTENT STANDARDS FOR EACH GRADE LEVEL IN THIS CLUSTER.

Grades 9-10 Core Scientific Inquiry, Literacy and Numeracy

How is scientific knowledge created and communicated?

Content Standards	Expected Performances
<p>SCIENTIFIC INQUIRY</p> <ul style="list-style-type: none"> ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. ◆ Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. ◆ Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> ◆ Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. ◆ Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. <p>SCIENTIFIC NUMERACY</p> <ul style="list-style-type: none"> ◆ Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas. 	<p>D INQ.1 Identify questions that can be answered through scientific investigation.</p> <p>D INQ.2 Read, interpret and examine the credibility and validity of scientific claims in different sources of information.</p> <p>D INQ.3 Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.</p> <p>D INQ.4 Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p>D INQ.5 Identify independent and dependent variables, including those that are kept constant and those used as controls.</p> <p>D INQ.6 Use appropriate tools and techniques to make observations and gather data.</p> <p>D INQ.7 Assess the reliability of the data that was generated in the investigation.</p> <p>D INQ.8 Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.</p> <p>D INQ.9 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.</p> <p>D INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p>

Grade 9

Core Themes, Content Standards and Expected Performances

Strand I: Energy Transformations

Content Standards	Expected Performances
<p><i>Energy Transfer and Transformations – What is the role of energy in our world?</i></p> <p>9.1 - Energy cannot be created or destroyed; however, energy can be converted from one form to another.</p> <ul style="list-style-type: none">◆ Energy enters the Earth system primarily as solar radiation, is captured by materials and photosynthetic processes, and eventually is transformed into heat.	<p>D 1. Describe the effects of adding energy to matter in terms of the motion of atoms and molecules, and the resulting phase changes.</p> <p>D 2. Explain how energy is transferred by conduction, convection and radiation.</p> <p>D 3. Describe energy transformations among heat, light, electricity and motion.</p>
<p><i>Energy Transfer and Transformations – What is the role of energy in our world?</i></p> <p>9.2 - The electrical force is a universal force that exists between any two charged objects.</p> <ul style="list-style-type: none">◆ Moving electrical charges produce magnetic forces, and moving magnets can produce electrical force.◆ Electrical current can be transformed into light through the excitation of electrons.	<p>D 4. Explain the relationship among voltage, current and resistance in a simple series circuit.</p> <p>D 5. Explain how electricity is used to produce heat and light in incandescent bulbs and heating elements.</p> <p>D 6. Describe the relationship between current and magnetism.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>9.3 - Various sources of energy are used by humans and all have advantages and disadvantages.</p> <ul style="list-style-type: none">◆ During the burning of fossil fuels, stored chemical energy is converted to electrical energy through heat transfer processes.◆ In nuclear fission, matter is transformed directly into energy in a process that is several million times as energetic as chemical burning.◆ Alternative energy sources are being explored and used to address the disadvantages of using fossil and nuclear fuels.	<p>D 7. Explain how heat is used to generate electricity.</p> <p>D 8. Describe the availability, current uses and environmental issues related to the use of fossil and nuclear fuels to produce electricity.</p> <p>D 9. Describe the availability, current uses and environmental issues related to the use of hydrogen fuel cells, wind and solar energy to produce electricity.</p>

Grade 9

Core Themes, Content Standards and Expected Performances

Strand II: Chemical Structures and Properties

Content Standards	Expected Performances
<p><i>Properties of Matter – How does the structure of matter affect the properties and uses of materials?</i></p> <p>9.4 - Atoms react with one another to form new molecules.</p> <ul style="list-style-type: none">◆ Atoms have a positively charged nucleus surrounded by negatively charged electrons.◆ The configuration of atoms and molecules determines the properties of the materials.	<p>D 10. Describe the general structure of the atom, and explain how the properties of the first 20 elements in the Periodic Table are related to their atomic structures.</p> <p>D 11. Describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding).</p> <p>D 12. Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.</p>
<p><i>Properties of Matter – How does the structure of matter affect the properties and uses of materials?</i></p> <p>9.5 – Due to its unique chemical structure, carbon forms many organic and inorganic compounds.</p> <ul style="list-style-type: none">◆ Carbon atoms can bond to one another in chains, rings and branching networks to form a variety of structures, including fossil fuels, synthetic polymers and the large molecules of life.	<p>D 13. Explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.</p> <p>D 14. Describe combustion reactions of hydrocarbons and their resulting by-products.</p> <p>D 15. Explain the general formation and structure of carbon-based polymers, including synthetic polymers, such as polyethylene, and biopolymers, such as carbohydrate.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>9.6 - Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.</p> <ul style="list-style-type: none">◆ Materials produced from the cracking of petroleum are the starting points for the production of many synthetic compounds.◆ The products of chemical technologies include synthetic fibers, pharmaceuticals, plastics and fuels.	<p>D 16. Explain how simple chemical monomers can be combined to create linear, branched and/or cross-linked polymers.</p> <p>D 17. Explain how the chemical structure of polymers affects their physical properties.</p> <p>D 18. Explain the short- and long-term impacts of landfills and incineration of waste materials on the quality of the environment.</p>

Grade 9

Core Themes, Content Standards and Expected Performances

Strand III: Global Interdependence

Content Standards	Expected Performances
<p><i>The Changing Earth – How do materials cycle through the Earth's systems?</i></p> <p>9.7 - Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles.</p> <ul style="list-style-type: none"> ◆ Elements on Earth exist in essentially fixed amounts and are located in various chemical reservoirs. ◆ The cyclical movement of matter between reservoirs is driven by the Earth's internal and external sources of energy. 	<p>D 19. Explain how chemical and physical processes cause carbon to cycle through the major earth reservoirs.</p> <p>D 20. Explain how solar energy causes water to cycle through the major earth reservoirs.</p> <p>D 21. Explain how internal energy of the Earth causes matter to cycle through the magma and the solid earth.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>9.8 - The use of resources by human populations may affect the quality of the environment.</p> <ul style="list-style-type: none"> ◆ Emission of combustion by-products, such as SO₂, CO₂ and NO_x by industries and vehicles is a major source of air pollution. ◆ Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution. 	<p>D 22. Explain how the release of sulfur dioxide (SO₂) into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D 23. Explain how the accumulation of carbon dioxide (CO₂) in the atmosphere increases Earth's "greenhouse" effect and may cause climate changes.</p> <p>D 24. Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>9.9 - Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.</p> <ul style="list-style-type: none"> ◆ New technologies and changes in lifestyle can have positive and/or negative effects on the environment. 	<p>D 25. Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D 26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Grade 10

Core Themes, Content Standards and Expected Performances

Strand IV: Cell Chemistry and Biotechnology

Content Standards	Expected Performances
<p><i>Structure and Function – How are organisms structured to ensure efficiency and survival?</i></p> <p>10.1 - Fundamental life processes depend on the physical structure and the chemical activities of the cell.</p> <ul style="list-style-type: none"> ◆ Most of the chemical activities of the cell are catalyzed by enzymes that function only in a narrow range of temperature and acidity conditions. ◆ The cellular processes of photosynthesis and respiration involve transformation of matter and energy. 	<p>D 27. Describe significant similarities and differences in the basic structure of plant and animal cells.</p> <p>D 28. Describe the general role of DNA and RNA in protein synthesis.</p> <p>D 29. Describe the general role of enzymes in metabolic cell processes.</p> <p>D 30. Explain the role of the cell membrane in supporting cell functions.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>10.2 - Microorganisms have an essential role in life processes and cycles on Earth.</p> <ul style="list-style-type: none"> ◆ Understanding the growth and spread patterns of viruses and bacteria enables the development of methods to prevent and treat infectious diseases. 	<p>D 31. Describe the similarities and differences between bacteria and viruses.</p> <p>D 32. Describe how bacterial and viral infectious diseases are transmitted, and explain the roles of sanitation, vaccination and antibiotic medications in the prevention and treatment of infectious diseases.</p> <p>D 33. Explain how bacteria and yeasts are used to produce foods for human consumption.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>10.3 - Similarities in the chemical and structural properties of DNA in all living organisms allow the transfer of genes from one organism to another.</p> <ul style="list-style-type: none"> ◆ The principles of genetics and cellular chemistry can be used to produce new foods and medicines in biotechnological processes. 	<p>D 34. Describe, in general terms, how the genetic information of organisms can be altered to make them produce new materials.</p> <p>D 35. Explain the risks and benefits of altering the genetic composition and cell products of existing organisms.</p>

Grade 10

Core Themes, Content Standards and Expected Performances

Strand V: Genetics, Evolution and Biodiversity

Content Standards	Expected Performances
<p><i>Heredity and Evolution – What processes are responsible for life’s unity and diversity?</i></p> <p>10.4. - In sexually reproducing organisms, each offspring contains a mix of characteristics inherited from both parents.</p> <ul style="list-style-type: none"> ◆ Genetic information is stored in genes that are located on chromosomes inside the cell nucleus. ◆ Most organisms have two genes for each trait, one on each of the homologous chromosomes in the cell nucleus. 	<p>D 36. Explain how meiosis contributes to the genetic variability of organisms.</p> <p>D 37. Use the Punnet Square technique to predict the distribution of traits in mono- and di-hybrid crossings.</p> <p>D 38. Deduce the probable mode of inheritance of traits (e.g., recessive/dominant, sex-linked) from pedigree diagrams showing phenotypes.</p> <p>D 39. Describe the difference between genetic disorders and infectious diseases.</p>
<p><i>Heredity and Evolution – What processes are responsible for life’s unity and diversity?</i></p> <p>10.5 - Evolution and biodiversity are the result of genetic changes that occur over time in constantly changing environments.</p> <ul style="list-style-type: none"> ◆ Mutations and recombination of genes create genetic variability in populations. ◆ Changes in the environment may result in the selection of organisms that are better able to survive and reproduce. 	<p>D 40. Explain how the processes of genetic mutation and natural selection are related to the evolution of species.</p> <p>D 41. Explain how the current theory of evolution provides a scientific explanation for fossil records of ancient life forms.</p> <p>D 42. Describe how structural and behavioral adaptations increase the chances for organisms to survive in their environments.</p>
<p><i>Science and Technology in Society – How do science and technology affect the quality of our lives?</i></p> <p>10.6 - Living organisms have the capability of producing populations of unlimited size, but the environment can support only a limited number of individuals from each species.</p> <ul style="list-style-type: none"> ◆ Human populations grow due to advances in agriculture, medicine, construction and the use of energy. ◆ Humans modify ecosystems as a result of rapid population growth, use of technology and consumption of resources. 	<p>D 43. Describe the factors that affect the carrying capacity of the environment.</p> <p>D 44. Explain how change in population density is affected by emigration, immigration, birth rate and death rate, and relate these factors to the exponential growth of human populations.</p> <p>D 45. Explain how technological advances have affected the size and growth rate of human populations throughout history.</p>

Collection Days

Residents of Berlin, Bristol, Burlington, Meriden, New Britain, Plainville, Plymouth Prospect, Southington and Wolcott may attend any of the following collections:

All collections: 9:00am-2:00pm

2005

April 16 Burlington

Town Highway Garage
Belden Rd. (off Route 4)

May 7 Plainville

Roadways Garage
Granger Lane (off Route 177)

September 17 Southington

Town Highway Garage
Della Bitta Dr. (off Mulberry St.)

September 24 Prospect

Public Works Garage
221 Cheshire Rd.

October 1 Bristol

Town Public Works Yard
Vincent P. Kelly Rd. (Off Route 229)

October 22 New Britain/Berlin

Willow Brook Park/Beehive Stadium
South Main St. Entrance (Route 71)

Plymouth

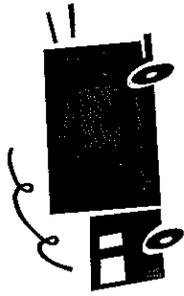
For more information, call 860-585-0419
or visit www.brrfoc.org/news_events.htm

Resident I.D. is required.

Why Household Hazardous Waste Collection Days?

Bringing your hazardous household products to a collection day is a great way to:

- Reduce the chances of accidental poisoning
- Prevent damage to sewage systems
- Help protect surface and ground water
- Reduce the risk of harmful fumes or fires



Moving??

If you are moving before a collection day try to get a neighbor, friend or family member to bring your hazardous products to a collection day for you.



How to dispose of Latex Paints

- Add kitty litter or speedi-dry or waste paint hardener. When completely dry dispose of paint with regular garbage leaving the cover off the paint can.

For more information call your town's recycling contact or Tunxis Recycling at: 860-585-0419 or 860-225-9811

or visit www.brrfoc.org



Tunxis Recycling

43 Enterprise Drive
Bristol, CT 06010
www.brrfoc.org

Printed on recycled paper.

healthy homes



Household Hazardous Product Disposal Information



www.brrfoc.org

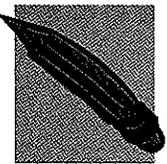
860-585-0419 or 860-225-9811

Helping to Make Homes Healthier in Berlin, Bristol, Burlington, Meriden, Morris, New Britain, Plainville, Plymouth, Prospect, Southington, Warren, Washington and Wolcott.

Do You Have Hazardous Waste Hiding in Your Home?

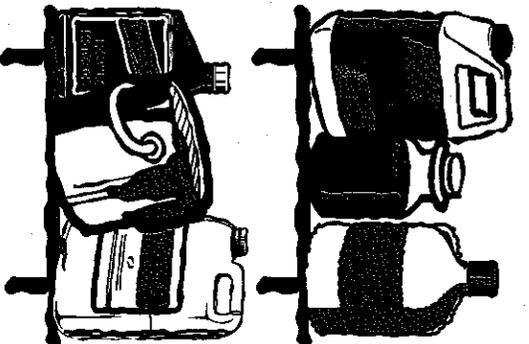
Get Rid of It!

Household hazardous products can pose serious risks to your family's health and the health of our environment. Luckily, getting rid of them safely can be easy. Just bring unused portions of the hazardous products in the checklist below to one of the Household Hazardous Waste Collection Days listed in this brochure. Be sure to keep products in their original containers and don't mix them. And always keep materials in a safe place away from children, pets and heat.



Household Hazardous Products Checklist

These items should be brought to Hazardous Waste Collection Days. Be careful! Make sure products are sealed. Pack them in a sturdy crate or cardboard box. Leave in your car only as long as necessary, and never smoke while handling.



In the Kitchen and Bathroom:

- Non-empty aerosol cans
- Household batteries
- Furniture, floor & metal polishes
- Laundry products like bleach & spot removers
- Oven, drain & household cleaners
- Bug sprays
- Disinfectants & mildew removers

In the Garage and Garden:

- Oil-based paint, varnishes, shellac, stains, thinners & paint strippers
- Pool and photographic chemicals
- Lawn care chemicals such as pesticides & fertilizers
- Auto fluids such as motor oil, & antifreeze
- Car waxes and cleaners

Miscellaneous:

- Mercury (including thermometers and thermostats), waste fuel, moth balls, cosmetics, hobby supplies

DO NOT bring:

- Latex paint
- Empty aerosol cans
- Ammunition & other explosives
- Smoke detectors & radioactive materials
- Propane tanks
- Medicines
- Commercial or industrial waste
- Tires
- Appliances such as air conditioners, television sets, and computers

Electronics:

- Electronics are not collected at TROC Household Hazardous Waste collections. Watch for local notice of an upcoming "electronics only" collection day, or visit our web site at www.brrfoc.org

◆ When Using Household Hazardous Products...

Check the label.

If the product you are using is toxic, corrosive, reactive, explosive or flammable it can be hazardous to you and our environment.

- NEVER throw leftover chemicals down the drain, in stormdrains, on the ground or in the trash.
- Give leftover or extra product to someone who can use it or bring it to a HHW collection day.
- Recycle used motor oil at your town's designated collection site.
- Recycle lead-acid car batteries by bringing them to a scrap metal dealer or battery retailer.
- Buy only what you need - use all of what you buy.
- Use non-toxic or less toxic substitutes for hazardous products.



Residents of Washington and Warren may attend the following collection day.

Fall 2005* in New Milford
Water Pollution Control Facility

Residents of Morris may attend the following collection day:

October 2005*
Torrington Water Pollution Control Facility

* Look for local notice in Fall 2005

See back panel for more collection days in your area

NO WASTE FROM BUSINESSES
5 Gallon per person limit.





MUDDY WATERS

Quinnipiac River Watershed Association, River Resources Education Series

HOW DOES ORDINARY DIRT DEGRADE STREAMS?

Wherever the land is bare, erosion occurs. Without protective vegetation, leaf litter, and a stabilizing root network, pelting raindrops and flowing stormwater erode exposed soil particles. Muddy water reaches streams, ponds, and rivers, carrying a load of sediment.

Deposited sediment *buries aquatic habitat. It covers and clogs gravel spawning beds, increasing fish egg mortality, and it smothers stream bottom invertebrates, an important food supply for fish.* Stream invertebrates like stoneflies and mayflies live among rocks and cobbles, hiding in crevices. Water penny beetles and various kinds of caddisflies are attached to hard surfaces of stones and sticks.

Sediment buries them along with the microscopic plants (diatoms) which also grow on these hard surfaces, and are eaten by aquatic “scraper insects”. Sediment also covers the dead leaves eaten by “shredder insects.” With less invertebrate food, there are also fewer fish, turtles, kingfishers, and herons in a sediment-choked stream or river.



Sediment deposits also make streams *shallower* so that they *heat up more quickly* and are able to *hold less oxygen*; they become less suitable for creatures like brook trout and stoneflies, which need cool, oxygen-rich water. (Some forms of aquatic life, like suckers and carp, midge larvae and aquatic sowbugs can tolerate low oxygen conditions.) With less space in the stream channel, over-bank flooding also happens more often, and bank erosion may increase, generating still more sediment.

Suspended sediment (muddy water) *impairs gill function* of fish and invertebrates. *Suspended sediment also blocks light and interferes with photosynthesis by underwater plants*, both macrophytes (larger plants) and microscopic plants like diatoms. *Muddy water reduces the hunting efficiency of fish* that locate prey by sight. However, some kinds of fish tolerate fairly high levels of turbidity. Suckers can seek food by smell and carp by using whisker-like feelers, more than by sight.

WHY WORRY? MUD ISN'T TOXIC AFTER ALL.

Although not toxic in itself, *eroding soil is rich in nutrients, such as nitrogen and phosphorus*, which in excessive amounts, have serious negative impacts on watercourses, ponds, and Long Island Sound. Nutrient rich water stimulates excessive growth of algae and aquatic vegetation. When the plants die and decompose, oxygen is consumed, sometimes leading to levels of oxygen too low to support most forms of aquatic life, a condition known as *hypoxia*. Excessive algal growth in streams - like actual sediment deposits - also smothers spawning areas and rocky habitat for stream invertebrates.

Many types of toxic pollutants adsorb readily onto soil particles. Air-pollution fall-out, dust from road and tire-wear, engine fluids, and chemicals in lawn run-off are sources of pollutants which attach to sediment particles. Very small quantities of metals occur naturally in soil, and in fact plants need them as trace nutrients. However, these metals and other compounds are harmful to aquatic life when present at too high concentrations. Deep sumps in roadside catch basins trap road sand. Unfortunately, sumps are often not regularly cleaned out, and sumps are not efficient traps for small-sized particles. Most toxic pollutants are attached to tiny particles, which settle out much more slowly than sand. Shallow, vegetated roadside drainageways (swales) and properly sized and designed wet-bottom detention basins are more effective at intercepting this form of pollution.

HOW DOES INCREASED RUNOFF AFFECT TURBIDITY?

All stream beds and banks naturally experience some erosion, and some sediment deposition. The outside of stream bends erode most, and deposition is greatest on the insides of curves, where water velocity is lower. This is related to centrifugal force, which draws water to the outside of a curve. But *accelerated bank and streambed erosion* result from higher volumes of runoff from impervious (non-absorbent) surfaces. This is a significant source of excessive turbidity and sediment deposition, as well as shifting, unstable stream channels, in an urbanizing watershed. Stream erosion and downstream flooding are reduced if runoff is held in detention basins and slowly released.

DOES SEDIMENT ALWAYS HARM WETLANDS AND WATERWAYS?

A marsh or shallow pond with enough circulation, may be able to tolerate some sediment deposition and intermittent high turbidity better than a flowing stream. Marsh plants can take up many excess nutrients. Emergent wetlands are often "created" (excavated and planted) to help remove pollutants from urban storm water. They need an easy-to-clean forebay to trap sand, since too much sediment harms any wetland system.

HOW DO WE MEASURE SEDIMENT IN WATER?

It is easy to see when water is muddy and brown, but one can determine the severity of turbidity with a turbidimeter, which measures the amount of refraction by a light beam, giving results in "nephelometric turbidity units" or NTU's. Dirt in water is also often referred to as TSS, which stands for Total Suspended Solids, measured in milligrams per liter (mg/l).

QRWA volunteer monitors collect water samples during and after heavy rains, and turbidities are measured to document and identify erosion sources in the watershed. Samples are collected during a narrow window of time so that data from different stream sections is comparable, and the sampling station location, time and date are recorded. Any clean container may be used. It is important not to disturb the stream bottom while collecting, and to keep samples cool. Volunteers bring samples to a central location in each town for pick-up, and they are processed within 48 hours.

If elevated turbidity or sediment deposits are documented in a stream section, upstream watershed scouting can identify sediment sources.



QRWA volunteers on illegally placed fill by the Muddy River, a Quinnipiac River tributary.

HOW CAN WE MINIMIZE MUDDY RUNOFF?

Best Management Practices (BMP's) help protect aquatic habitat from muddy water. Look for them along streets, on farms, and at construction sites? * Regular *catch-basin cleaning* and *street sweeping* help keep winter road sand out of streams. * *Contour plowing, not plowing steep fields*, and leaving a vegetated *buffer strip next to streams and ponds* reduces farm erosion. * *Exposed soils* should be *stabilized promptly* with hay or fast-germinating grass. *Erosion-control matting* helps if slopes are steep. * Truck tires and construction equipment track mud onto roads. This is reduced by "*anti-tracking pads*", beds of crushed stone at construction site entrances. * *Protecting catch-basins next to construction sites*, preferably with filter fabric silt sacks, reduces the amount of sediment reaching streams via storm sewers. * *Silt fences and hay bale rows* should be *properly installed and maintained* - no gaps, securely staked, trenched in at the bottom, and curved uphill at the ends so muddy water won't just flow around them; these barriers, alone, *can't handle runoff from large areas* of exposed soil. * For large construction projects, additional BMP's are needed. It helps to excavate one section at a time - an approach known as "*phased construction*". *Check dams* (hay bale or stone barriers in drainage swales) reduce the velocity of runoff. *Detention ponds, catch basin sumps, and specially designed swirl separators* are also used to settle out sediment, to reduce the amount reaching waterways. But all too often, they are not well-maintained, are too small, or have other design problems. Small sediment particles - which are the most harmful - settle out very slowly, taking as long as 36 hours. Runoff may in fact stir up previously settled mud in a detention basin and release it into streams.

Finally, wise *land use planning* helps prevent sedimentation, erosion, and turbidity from happening in the first place: 1) Protection of steep slopes and highly erodible soils as open space, 2) Development plans that include wide enough naturally vegetated buffers next to watercourses, and 3) Permits that stipulate state-of-the-art Best Management Practices. Citizen participation at public hearings helps encourage conscientious use of measures to reduce sediment discharges into waterways and keep our aquatic ecosystems healthy .

Report erosion & turbidity concerns to wetlands enforcement officers, who work in town Planning Departments. These officers report to Inland Wetlands and Watercourses Commissions. It is helpful to document observations with photographs and accurate notes. For help with follow-up, contact the QRWA.

Written by Sigrun N. Gadwa. Produced by the Quinnipiac River Watershed Association at 99 Colony St, Meriden, Connecticut 06451 and by the Habitat Workgroup of the Quinnipiac River Watershed Partnership in September 2000, with funding from the Hughes Foundation and from the Community Foundation for Greater New Haven.

Town of Prospect Recycling 2005

<u>Your Street</u>	<u>Pick-up Day/Date</u>	<u>Your Street</u>	<u>Pick-up Day/Date</u>
Amber Ct.	Tues., Jan. 11, 2005	Alison Ct.	Tues., Jan. 04, 2005
Apple Hill Dr.	Tues., Jan. 25, 2005	Bayberry Rd.	Wed., Jan. 19, 2005
Beach Dr.	Tues., Feb. 08, 2005	Blue Trail Dr.	Tues., Feb. 01, 2005
Candee Rd.	Wed., Feb. 23, 2005	Boardman Dr.	Tues., Feb. 15, 2005
Canfield Ct.	Tues., Mar. 08, 2005	Brighton Rd.	Tues., Mar. 01, 2005
Center St.	Tues., Mar. 22, 2005	Brookshire Dr.	Tues., Mar. 15, 2005
Christine Dr.	Tues., Apr. 05, 2005	Chatfield Rd.	Tues., Mar. 29, 2005
Church St.	Tues., Apr. 19, 2005	Cornwall Ave.	Tues., Apr. 12, 2005
Coer Rd.	Tues., May 03, 2005	Country Brook Rd.	Tues., Apr. 26, 2005
Cook Rd.	Tues., May 17, 2005	Farnwood Dr.	Tues., May 10, 2005
Dogwood Dr.	Wed., June 01, 2005	Forestridge Rd.	Tues., May 24, 2005
Elaine Ct.	Tues., June 14, 2005	Holley Ln.	Tues., June 07, 2005
George St.	Tues., June 28, 2005	Juggernaut Rd.	Tues., June 21, 2005
Hemlock Rd.	Tues., July 12, 2005	Laurel Ln.	Wed., July 06, 2005
Heritage Dr.	Tues., July 26, 2005	Luke St.	Tues., July 19, 2005
Horizon View	Tues., Aug. 09, 2005	Matthew St.	Tues., Aug. 02, 2005
Klein Dr.	Tues., Aug. 23, 2005	Melissa Ln.	Tues., Aug. 16, 2005
Kluge Rd.	Wed., Sept. 07, 2005	Merriman Ln.	Tues., Aug. 30, 2005
Lee Rd.	Tues., Sept. 20, 2005	Mixville Rd.	Tues., Sept. 13, 2005
Lombard Dr.	Tues., Oct. 04, 2005	Old Schoolhouse Rd.	Tues., Sept. 27, 2005
Meadow Ln.	Tues., Oct. 18, 2005	Overlook Ct.	Wed., Oct. 12, 2005
Mountain Rd.	Tues., Nov. 01, 2005	Peter Gilkey Rd.	Tues., Oct. 25, 2005
Nancy Mae Ave.	Tues., Nov. 15, 2005	Plank Rd.	Tues., Nov. 08, 2005
Radio Tower Rd.	Tues., Nov. 29, 2005	Robindale Dr.	Tues., Nov. 22, 2005
Roaring Brook Rd.	Tues., Dec. 13, 2005	Rolling Ridge Ct.	Tues., Dec. 06, 2005
Robumark Rd.	Tues., Dec. 27, 2005	Royal Crest Dr.	Tues., Dec. 20, 2005
Rt. 68 (Jct. 69 to Cook Rd.)		Rt. 68 (Coer Rd. to Cheshire Linc)	
Rt. 69 (Jct. 69 to Bethany Line)		Summit Rd.	
Skyline Dr.		Sunrise Dr.	
Spruce Dr.		Tress Rd.	
Stephen Ct.		Tyler Dr.	
Stonefield Dr.		Wihbey Dr.	
Talmadge Hill Rd.			
Trotter's Way			
Woodcrest Dr.			

Dear Residents:

This is the Recycling schedule for the Town of Prospect for 2005. The list is divided into FOUR sections. Find your street in the appropriate section and you will see your pick-up dates in the column to the right. The recycling is picked-up every two weeks for the entire year. Replacement bins can be picked up in the Mayor's Office. Please place your recyclables out the night before your scheduled pick-up.

Please recycle magazines as well as orange juice cartons, milk cartons, and juice box containers, plastic bottles #1 & 2, along with the glass and cans. The magazines and newspapers must be put in brown paper bags. Cardboard may also be put at curbside. The cardboard must be cut into a 2X3 square and tied. It is no longer necessary to separate glass and cans. If you have any questions regarding these requirements, please feel free to call 758-4461.

Thank you for your cooperation in the town's recycling program and best wishes to you for a healthy, happy and prosperous 2005!

Mayor Bob

Town of Prospect Recycling 2005

<u>Your Street</u>	<u>Pick-up Day/Date</u>	<u>Your Street</u>	<u>Pick-up Day/Date</u>
Adella St.	Mon., Jan. 10, 2005	Anthony Rd.	Mon., Jan. 03, 2005
Arbor Meadow Dr.	Mon., Jan. 24, 2005	Barry Ln.	Tues., Jan. 18, 2005
Bronson Rd.	Mon., Feb. 07, 2005	Birchwood Terr.	Mon., Jan. 31, 2005
Brookwood Ct.	Tues., Feb. 22, 2005	Catherine Dr.	Mon., Feb. 14, 2005
Buckley Ln.	Mon., Mar. 07, 2005	Chandler Dr.	Mon., Feb. 28, 2005
Cambridge Dr.	Mon., Mar. 21, 2005	Cheryl Ln.	Mon., Mar. 14, 2005
Carmel Dr.	Mon., Apr. 04, 2005	Colonial Dr.	Mon., Mar. 28, 2005
Cedar Hill Dr.	Mon., Apr. 18, 2005	Corrine Dr.	Mon., Apr. 11, 2005
Clark Hill Rd.	Mon., May 02, 2005	Damase St.	Mon., Apr. 25, 2005
Coachlight Cir.	Mon., May 16, 2005	Dupreay Rd.	Mon., May 09, 2005
Cobblestone Ct.	Tues., May 31, 2005	Evergreen Ln.	Mon., May 23, 2005
Dorothy Ave.	Mon., June 13, 2005	Genest Ave.	Mon., June 06, 2005
Fieldstone Dr.	Mon., June 27, 2005	Greenwood Dr.	Mon., June 20, 2005
Florence Dr.	Mon., July 11, 2005	Highland Dr.	Tues., July 05, 2005
Gramar Ave.	Mon., July 25, 2005	Hughes Ct.	Mon., July 18, 2005
Hydelor Ave.	Mon., Aug. 08, 2005	Karyl Ln.	Mon., Aug. 01, 2005
Industrial Rd.	Mon., Aug. 22, 2005	Knapp Dr.	Mon., Aug. 15, 2005
Ivy Terr.	Tues., Sept. 06, 2005	Laura Ave.	Mon., Aug. 29, 2005
Jolie Rd.	Mon., Sept. 19, 2005	Maria Hotchkiss Rd.	Mon., Sept. 12, 2005
Lakeview Rd.	Mon., Oct. 03, 2005	Morris Rd.	Mon., Sept. 26, 2005
Maple Dr.	Mon., Oct. 17, 2005	Murphy Rd.	Tues., Oct. 11, 2005
Old Logtown Rd.	Mon., Oct. 31, 2005	Nicholas Ct.	Mon., Oct. 24, 2005
Olivia Ln.	Mon., Nov. 14, 2005	Oak Ct.	Mon., Nov. 07, 2005
Peach Orchard Rd.	Mon., Nov. 28, 2005	Oak Ln.	Mon., Nov. 21, 2005
Platt Dr.	Mon., Dec. 12, 2005	Orchard Dr.	Mon., Dec. 05, 2005
Pondview Dr.	Mon., Dec. 26, 2005	Pinecrest Dr.	Mon., Dec. 19, 2005
Porter Hill Rd.		Pine Meadow Ln.	
Putting Green Ln.		Richard Ln.	
Rachel Ann Ct.		Rodney Terr.	
Rek Ln.		Rosewood Dr.	
Rockridge Terr.		Rowland Dr.	
Rt. 68 (Jct. 69 to Naug Line)		Rozum Cir.	
Salem Rd.		Rt. 69 (Jct. 68 to Wtby. Line)	
Smoke Rise Cir.		Saunders Ln.	
Southridge Rd.		Scott Dr.	
Spring Rd.		Scott Rd.	
Stratistville Rd.		Sherwood Dr.	
Vaillan Ct.		Sterling Woods	
Wagon Wheel Dr.		Terry Ln.	
Woodland Terr.		Terry Rd.	
Yale Farms Ln.		Timber Hill Ln.	
		Wilkins Ln.	
		Williams Dr.	

Prospect Town Hall
36 Center Street
06712-0100

Postal Patron ECRWSS

PRSR STD
ECRWSS

U.S. Postage Paid
Waterbury, CT
Permit No. 250

RECYCLING GUIDE

Keep this information handy so that you'll know what your town accepts as recyclable items. If you have any questions about your town's program, please call your town's number shown below. Remember, curbside recycling saves money, helps the environment ... and, IT'S THE LAW.

NOTE: Not all towns recycle all of these items. Additional items may also be collected at drop-off locations. For more specific instructions check with your town's recycling coordinator.

- Berlin: (860) 828-7022
- Brantford: (203) 488-8394
- Bristol: (860) 584-6124
- Burlington: (860) 673-2439
- Hartland: (860) 653-8800
- Meriden: (203) 630-4254
- Morris: (860) 567-7438
- New Britain: (860) 826-3350
- Plainville: (860) 793-0221 x210
- Plymouth: (860) 585-4030
- Prospect: (203) 758-4481
- Seymour: (203) 888-2511
- Southington: (860) 278-8200
- Warren: (860) 879-3030
- Washington: (860) 888-2259
- Wolcott: (203) 879-8100

Or call the Tunxis Recycling Operating Committee at 860-585-0419 or 860-225-9811.

www.brrfoc.org



TUNXIS RECYCLING OPERATING COMMITTEE

CURBSIDE RECYCLING

CAUTION: Do not recycle any plastic or glass that contained prescription drugs. And absolutely NO syringe needles.

When in doubt, leave it out!



Mixed Paper: Office paper, Stationary and Envelopes including those with plastic windows. Direct Mail pieces - shiny coated paper ok. Place in brown paper bag next to bin.
No: Brown manila envelopes, Overnite envelopes or Tyvek™.
No: Giveaway items (Product samples/CD's)
No: Greeting cards or Wrapping paper
No: Boxboard, 6-pack Cartons or Cardboard.
No: Tape, Post-it-notes or Mail with Pressure sensitive labels.

Newspapers and Magazines:

Include all paper inserts, place in brown paper bag next to bin. Catalogs & phone books also accepted.
No: Tape, Packaging materials, Egg cartons, Cereal, Shoe and Pizza boxes. **No:** String or Plastic bags.

In the Tunxis Recycling region, one rectangular bin is used to collect all clean food and beverage containers made of glass, metal or plastic #1 or #2. These items may also be placed in either the red or blue round pails for those residents still using pails.

- Rinse all containers
- Put newspaper, magazines, and mixed paper in brown paper bags next to pail or bin
- Flatten corrugated boxes to about 2'x3', place next to pail or bin
- Bring to curbside

Corrugated Cardboard:

Folded flat. Clean.
No: Yellow-tinted cardboard.

Glass & Juice Cartons:

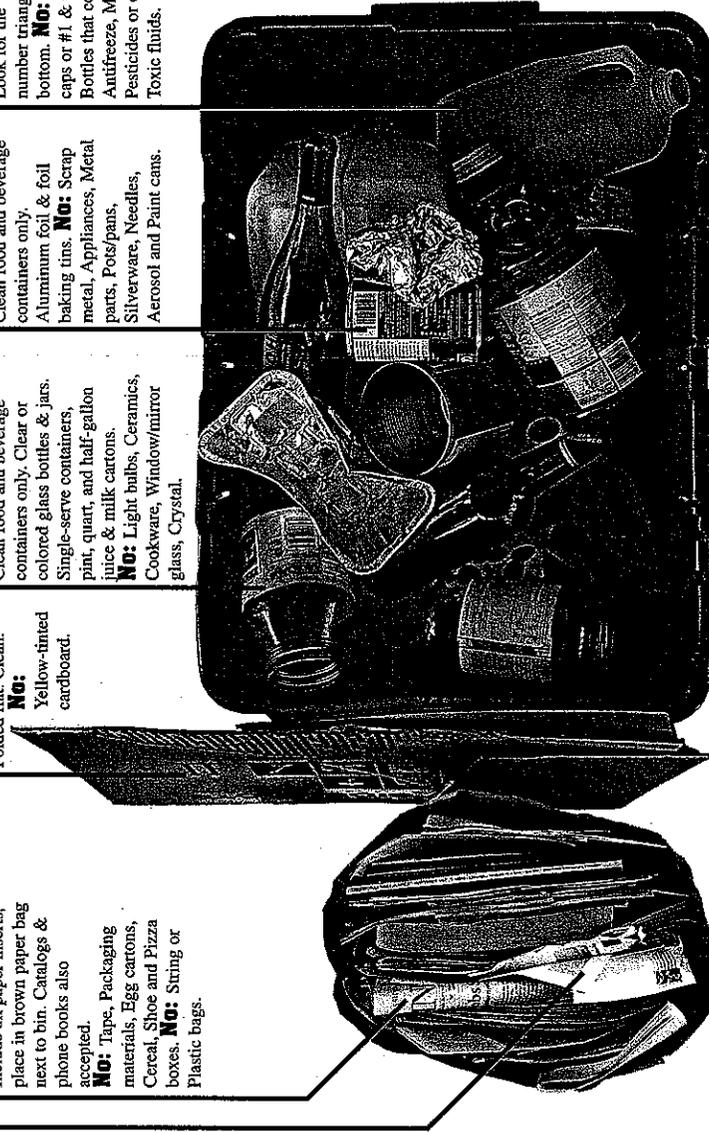
Clean food and beverage containers only. Clear or colored glass bottles & jars. Single-serve containers, pint, quart, and half-gallon juice & milk cartons.
No: Light bulbs, Ceramics, Cookware, Window/mirror glass, Crystal.

Metal Cans and Foil:

Clean food and beverage containers only.
 Aluminum foil & foil baking tins. **No:** Scrap metal, Appliances, Metal parts, Pots/pans, Silverware, Needles, Aerosol and Paint cans.

Plastics: Δ and Δ

Look for the number triangle on bottom. **No:** Bottle caps or #1 & #2. Bottles that contained Antifreeze, Motor oil, Pesticides or other Toxic fluids.



Place your recycling container at the curb the night before your recycling collection day. Paper/cardboard may be wet with rain or snow. Do not leave at the curb for more than one day.

APPENDIX C
IDDE OUTFALL INVENTORY FORM

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.):	Last 24 hours:	Last 48 hours:
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	
Land Use in Drainage Area (Check all that apply):			
<input type="checkbox"/> Industrial		<input type="checkbox"/> Open Space	
<input type="checkbox"/> Ultra-Urban Residential		<input type="checkbox"/> Institutional	
<input type="checkbox"/> Suburban Residential		Other: _____	
<input type="checkbox"/> Commercial		Known Industries: _____	
Notes (e.g., origin of outfall, if known):			

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
<input type="checkbox"/> Closed Pipe	<input type="checkbox"/> RCP <input type="checkbox"/> CMP <input type="checkbox"/> PVC <input type="checkbox"/> HDPE <input type="checkbox"/> Steel <input type="checkbox"/> Other: _____	<input type="checkbox"/> Circular <input type="checkbox"/> Single <input type="checkbox"/> Elliptical <input type="checkbox"/> Double <input type="checkbox"/> Box <input type="checkbox"/> Triple <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	Diameter/Dimensions: _____	In Water: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully With Sediment: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully
<input type="checkbox"/> Open drainage	<input type="checkbox"/> Concrete <input type="checkbox"/> Earthen <input type="checkbox"/> rip-rap <input type="checkbox"/> Other: _____	<input type="checkbox"/> Trapezoid <input type="checkbox"/> Parabolic <input type="checkbox"/> Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____	
<input type="checkbox"/> In-Stream	(applicable when collecting samples)			
Flow Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <i>If No, Skip to Section 5</i>			
Flow Description (If present)	<input type="checkbox"/> Trickle <input type="checkbox"/> Moderate <input type="checkbox"/> Substantial			

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER	RESULT	UNIT	EQUIPMENT	
<input type="checkbox"/> Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
<input type="checkbox"/> Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		°F	Thermometer	
pH		pH Units	Test strip/Probe	
Ammonia		mg/L	Test strip	

Outfall Reconnaissance Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? Yes No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	<input type="checkbox"/>	<input type="checkbox"/> Sewage <input type="checkbox"/> Rancid/sour <input type="checkbox"/> Petroleum/gas <input type="checkbox"/> Sulfide <input type="checkbox"/> Other:	<input type="checkbox"/> 1 – Faint	<input type="checkbox"/> 2 – Easily detected	<input type="checkbox"/> 3 – Noticeable from a distance
Color	<input type="checkbox"/>	<input type="checkbox"/> Clear <input type="checkbox"/> Brown <input type="checkbox"/> Gray <input type="checkbox"/> Yellow <input type="checkbox"/> Green <input type="checkbox"/> Orange <input type="checkbox"/> Red <input type="checkbox"/> Other:	<input type="checkbox"/> 1 – Faint colors in sample bottle	<input type="checkbox"/> 2 – Clearly visible in sample bottle	<input type="checkbox"/> 3 – Clearly visible in outfall flow
Turbidity	<input type="checkbox"/>	See severity	<input type="checkbox"/> 1 – Slight cloudiness	<input type="checkbox"/> 2 – Cloudy	<input type="checkbox"/> 3 – Opaque
Floatables -Does Not Include Trash!!	<input type="checkbox"/>	<input type="checkbox"/> Sewage (Toilet Paper, etc.) <input type="checkbox"/> Suds <input type="checkbox"/> Petroleum (oil sheen) <input type="checkbox"/> Other:	<input type="checkbox"/> 1 – Few/slight; origin not obvious	<input type="checkbox"/> 2 – Some; indications of origin (e.g., possible suds or oil sheen)	<input type="checkbox"/> 3 – Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? Yes No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	<input type="checkbox"/>	<input type="checkbox"/> Spalling, Cracking or Chipping <input type="checkbox"/> Peeling Paint <input type="checkbox"/> Corrosion	
Deposits/Stains	<input type="checkbox"/>	<input type="checkbox"/> Oily <input type="checkbox"/> Flow Line <input type="checkbox"/> Paint <input type="checkbox"/> Other:	
Abnormal Vegetation	<input type="checkbox"/>	<input type="checkbox"/> Excessive <input type="checkbox"/> Inhibited	
Poor pool quality	<input type="checkbox"/>	<input type="checkbox"/> Odors <input type="checkbox"/> Colors <input type="checkbox"/> Floatables <input type="checkbox"/> Oil Sheen <input type="checkbox"/> Suds <input type="checkbox"/> Excessive Algae <input type="checkbox"/> Other:	
Pipe benthic growth	<input type="checkbox"/>	<input type="checkbox"/> Brown <input type="checkbox"/> Orange <input type="checkbox"/> Green <input type="checkbox"/> Other:	

Section 6: Overall Outfall Characterization

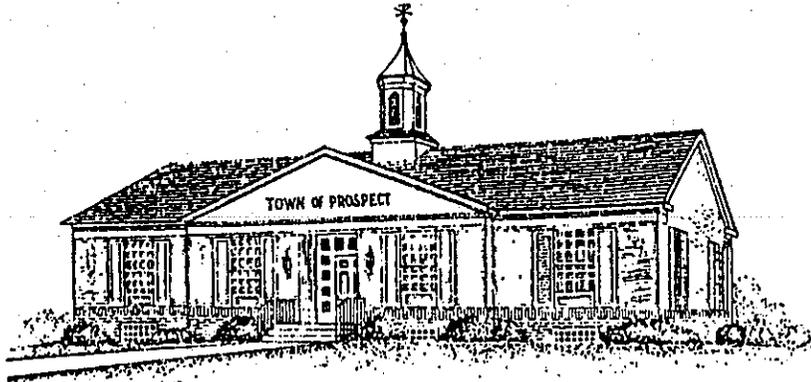
<input type="checkbox"/> Unlikely <input type="checkbox"/> Potential (presence of two or more indicators) <input type="checkbox"/> Suspect (one or more indicators with a severity of 3) <input type="checkbox"/> Obvious

Section 7: Data Collection

1. Sample for the lab?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2. If yes, collected from:	<input type="checkbox"/> Flow	<input type="checkbox"/> Pool	
3. Intermittent flow trap set?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If Yes, type: <input type="checkbox"/> OBM <input type="checkbox"/> Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

APPENDIX D
TOWN OF PROSPECT PERMITS



INLAND WETLANDS COMMISSION

36 CENTER STREET
PROSPECT, CONNECTICUT 06712-1699

NOTICE OF APPROVAL

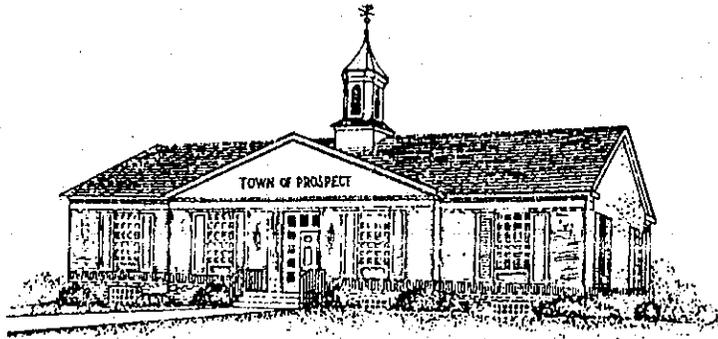
Date of Notice: September 18, 1998
Location of Property: Caplan Park, 91 New Haven Road
Hotchkiss Field, 61 Waterbury Road
Owner of Property: Town of Prospect
Date of Approval: September 14, 1998

On Monday, September 14, 1998, the Inland Wetlands Commission for the Town of Prospect voted unanimously to approve application 02-98 from the Town of Prospect for a Town Park at Caplan Park, 91 New Haven Road (Rt. 69) and nature trails at Hotchkiss Field and cleaning of brook on the southerly border of Hotchkiss Field, 61 Waterbury Road (Rt. 69).

See attached: Schedule "A": Land Record Volume 70 Page 561
Schedule "B": Land Record Volume 65 Page 656
Schedule "C": Land Record Volume 65 Page 657

Arnold Koehler
Arnold Koehler (CK)
Chairman

02-98



OFFICE OF THE MAYOR • TOWN OF PROSPECT, CT 06712-1699
ROBERT J. CHATFIELD, MAYOR
758-4461

May 13, 2002

WWW.TOWNOFPROSPECT.COM

Mr. Arnold Koehler, Chair
Prospect Inland-Wetlands Commission
36 Center Street
Prospect, CT 06712

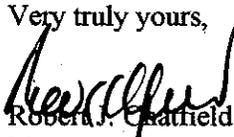
Dear Mr. Koehler:

I respectfully request an extension of the following Inland-Wetland Permits:

12-98	Approved May 10, 1999		
	Beach Drive	-	On Going
	Wilkins Lane	-	Complete
	Kluge Road	-	Complete
	Morris Road	-	Complete
12-97	Approved June 8, 1998		
	Clark Hill & Peach Orchard Road	-	Complete
	Richard & Karyl Lane	-	Complete
	Merriman Lane	-	On Going
	Highland Drive	-	Complete
	Putting Green Lane, Brookwood Court, Lakeview Road	-	On Going
	Radio Tower Road, Candee Road, Old Log Town Road, Pondview Rd.	-	Complete
	Tress Road	-	On Going
	Carmel Drive	-	On Going
	Salem Road	-	Complete
	Coer Road	-	On Going
2-98	Approved Sept. 14, 1998		
	Caplan Park	-	On Going
	Hotchkiss Field	-	On Going

Thank you in advance for your attention to this matter.

Very truly yours,


ROBERT J. CHATFIELD
Mayor





STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certificate of Registration

Issued To:

TOWN OF PROSPECT

For The

STORMWATER - INDUSTRIAL ACTIVITIES

General Permit

Permit No. GSI000929

Arthur J. Rocque, Jr.

Facility Information
PROSPECT TRANSFER STATION
157 PLANK ROAD
PROSPECT CT 06712

Application No.: 200401394

Issue Date: 07-MAY-04

Exp. Date: 01-OCT-07

Site No.: 115-024

Commissioner



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certificate of Registration

Issued To:

TOWN OF PROSPECT

For The

STORMWATER - INDUSTRIAL ACTIVITIES

General Permit

Permit No. GSI000930

Facility Information
PROSPECT PUBLIC WORKS GARAGE
221 CHESHIRE ROAD
PROSPECT CT 06712

Arthur J. Rocque, Jr.

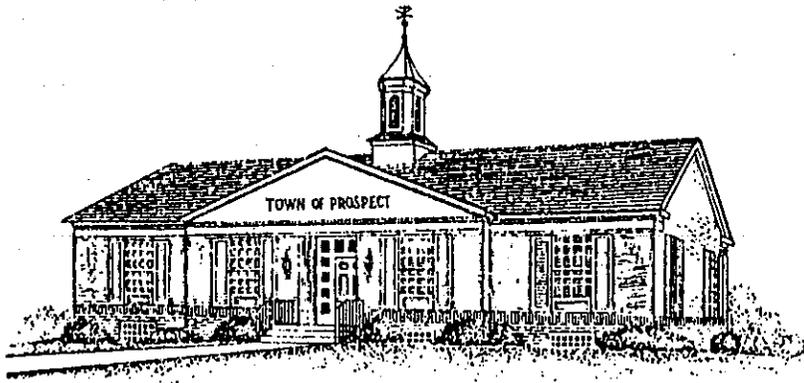
Commissioner

Application No.: 200401395

Issue Date: 07-MAY-04

Exp. Date: 01-OCT-07

Site No.: 115-031



INLAND WETLANDS COMMISSION

36 CENTER STREET
PROSPECT, CONNECTICUT 06712-1699

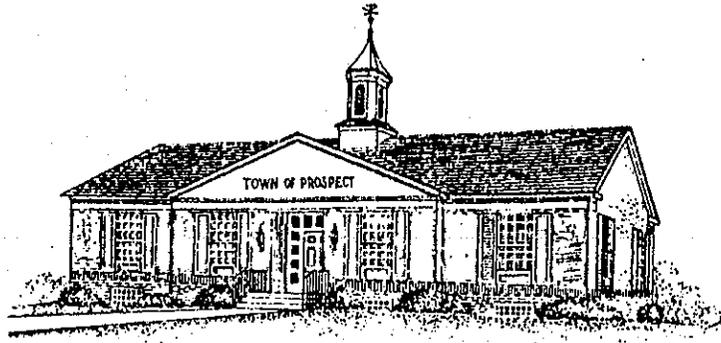
November 4, 2004

NOTICE OF GRANTING PERMIT

On October 25, 2004 the Prospect Inland Wetlands Commission approved Application #06-04 of The Town of Prospect, 36 Center Street to conduct regulated activities for storm water improvements on Birchwood Terrace. This permit is valid for five years from date of approval and expires October 25, 2009 in accordance with Chapter 440, Section 22a-42d(2) of the CT Statutes unless renewal is requested prior to expiration.

Arnold Koehler

Arnold Koehler
Chairman

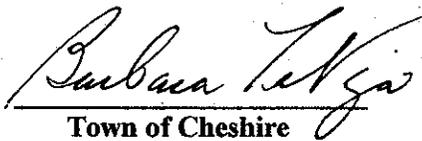


OFFICE OF THE MAYOR • TOWN OF PROSPECT, CT 06712-1699
ROBERT J. CHATFIELD, MAYOR
758-4461
WWW.TOWNOFPROSPECT.COM

Received from the Town of Prospect two Town of Prospect Inland Wetlands Applications

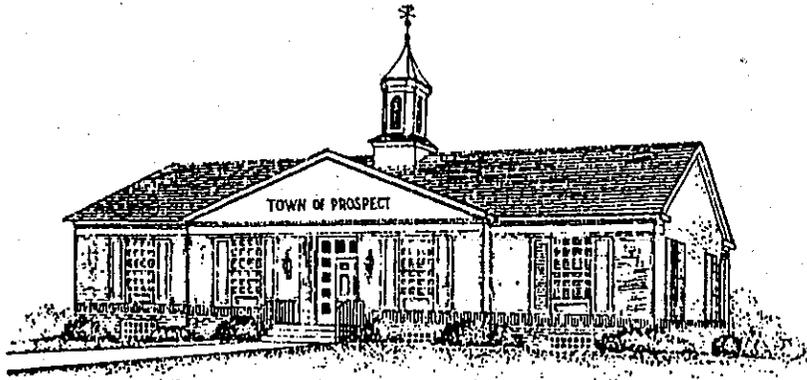
Tress Road Assessor's Plate 119 - Install 11 Catch Basins and 900 Ft. of 15" Pipe at various points from 40 Tress Road to 8 Tress Road

49 Tress Road Assessor's Plate 119 - Clean and Rid-Rap a Seasonal Water Course at 49 Tress Road


Town of Cheshire

7-14-04
Date





INLAND WETLANDS COMMISSION

36 CENTER STREET
PROSPECT, CONNECTICUT 06712-1699

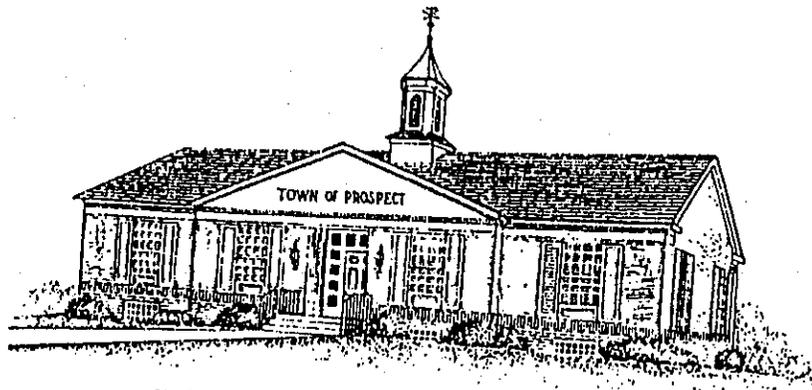
NOTICE OF GRANTING PERMIT

On May 9, 2005 the Prospect Inland Wetlands Commission approved Application #16-04 of the Town of Prospect for regulated activities consisting of the installation of a public water supply water main on Cambridge Drive southeasterly of the intersection with Straitsville Road. The water main is to be installed within the public right of way and will not be placed in a wetlands or watercourse. This permit is valid for five years from the date of approval and expires May 9, 2010 in accordance with Chapter 440, Section 22a-42d(2) of the CT Statutes unless renewal is requested prior to expiration.

The map location for this water utility installation can be found in Map Book 12, Page 53 of the Prospect Land Records on the map entitled "Subdivision Plan of 'College Farms' Phase I"

Arnold Koehler
Arnold Koehler
Chairman

Records 6-21-05



INLAND WETLANDS COMMISSION

36 CENTER STREET
PROSPECT, CONNECTICUT 06712-1699

May 12, 2003

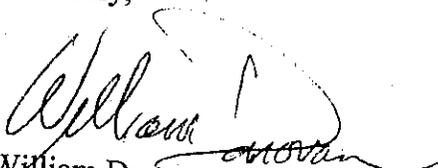
Mayor Robert Chatfield
36 Center Street
Prospect, CT 06712

Re: *Notice of Granting Permit for Regulated Activities on Putting Green Lane and Straitsville Road*

Dear Mayor Chatfield:

I am enclosing the original and a copy of your "Notice of Granting Permit" for regulated activities associated with water main installations on Putting Green Lane and Straitsville Road approved by the Inland Wetlands Commission on April 14, 2003. I am including a copy of the "Town of Prospect Zoning Map" as the Schedule "A" property description highlighting the location of your proposed water main installation project. Please record the original *Notice of Granting Permit* and Schedule "A" with the Prospect Town Clerk within 15 days of receipt of this notice.

Sincerely,


William Donovan
Land Use Inspector
Clerk, Inland Wetlands Commission
Enc.

APPENDIX E

**SOLID WASTE AND RECYCLABLES COLLECTION AND
DISPOSAL INFORMATION**

TOWN	POPULATION 2000	BRRFOC Member	Solid Waste		TROC Member	Recycling	
			Tons Solid Waste Delivered	Tipping Fees		Tons Recyclables Delivered	Tipping Fees
Berlin	18,215	Yes	7,760	\$453,960	Yes	1,709	\$51,263
Branford	28,683	Yes	13,632	\$797,472			
Bristol	60,062	Yes	41,364	\$2,419,794	Yes	3,862	\$115,875
Burlington	8,190	Yes	3,741	\$218,849	Yes	578	\$17,340
Hartland	2,012	Yes	792	\$46,332			
Meriden	58,244				Yes	2,317	\$69,396
Morris	2,301				Yes	196	\$5,870
New Britain	71,538	Yes	50,268	\$2,940,678	Yes	3,232	\$96,950
Plainville	17,328	Yes	14,329	\$838,247	Yes	1,424	\$42,729
Plymouth	11,634	Yes	6,372	\$372,762	Yes	541	\$16,231
Prospect	8,707	Yes	5,078	\$297,063	Yes	545	\$16,348
Seymour	15,454	Yes	8,625	\$504,563			
Southington	39,728	Yes	35,300	\$2,065,050	Yes	2,759	\$82,763
Warren	1,254	Yes	621	\$36,329	Yes	120	\$3,586
Washington	3,596	Yes	2,683	\$156,956	Yes	454	\$13,635
Wolcott	<u>15,215</u>	Yes	<u>7,054</u>	<u>\$412,659</u>	Yes	863	<u>\$25,883</u>
Total	362,161		14	197,619	\$11,560,714	13	\$557,869
CT Population	3,405,565						
16 Town %	10.6%						

APPENDIX F
FIELD SAMPLING PLAN

FIELD SAMPLING PLAN

Town of Prospect
Phase II Stormwater General Permit

Sampling Event Description: 2004 and 2005 Annual Phase II Stormwater Sampling

Projected Sampling Date: Fall 2005

Sampling Objective:

To comply with the monitoring requirements of the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems.

Samples will be collected consistent with the General Permit; at least two outfalls apiece shall be monitored from areas of primarily industrial development, commercial development and residential development, respectively, for a total of six (6) outfalls monitored.

Sampling Locations:

Residential Land Use

- **Outfall 1:** Talmadge Hill Road
- **Outfall 2:** Cook Road

Commercial Land Use

- **Outfall 3:** Hotchkiss Field
- **Outfall 4:** Knapp Drive

Industrial Land Use

- **Outfall 5:** Buckley Lane
- **Outfall 6:** New Haven Road @ Foam Plastics

Parameters:

Parameters to be monitored shall be tested according to methods prescribed in Title 40, CFR, Part 136 (1990) and shall include:

- pH (SU) – of both sample and uncontaminated rainfall
- Hardness (mg/L)
- Conductivity (umhos)
- Oil and Grease (mg/L)
- Chemical Oxygen Demand (mg/L)
- Turbidity (NTU)
- Total Suspended Solids (mg/L)
- Total Phosphorous (mg/L)
- Ammonia (mg/L)
- Total Kjeldahl Nitrogen (mg/L)
- Nitrate plus Nitrite Nitrogen (mg/L)
- E. Coli (col/100 mL)

Stormwater Monitoring Procedures:

Samples shall be collected from discharges resulting from a storm event that is greater than 0.1 inch in magnitude and that occurs at least 72 hours after any previous storm event of 0.1 inch or greater.

Runoff events resulting from snow or ice melt cannot be used to meet the minimum annual monitoring requirements. Grab samples shall be used for all monitoring. Grab samples shall be collected during the first 6 hours of a storm event discharge. The uncontaminated rainfall pH measurement shall also be taken at this time. Samples for all discharges shall be taken during the same storm event.

Storm event information including the date, temperature, time of start of the discharge, time of sampling, and magnitude (in inches) of the storm event sampled shall be collected for the storm events monitored.

APPENDIX G
STORMWATER MONITORING RESULTS