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Connecticut's Energy Vision for a Cleaner, Greener State is focused on lowering prices for consumers, the state becoming less reliant on foreign energy, fostering the use of environmentally sound technology, and making this state a center for economic development and technological innovation in the energy sector. ”

~Connecticut Governor M. Jodi Rell



## COURSE DESCRIPTION

### Welcome to Biotechnology Research & Development!

The Center for 21<sup>st</sup> Century Skills @ EDUCATION CONNECTION, in collaboration with Connecticut Career Choices (CCC) is pleased to announce the 2008–2009 CCC Biotechnology Research & Development (BTRD) course, designed to prepare students for success in 21<sup>st</sup> century careers. The BTRD course is a major component of the Connecticut Office for Workforce Competitiveness/CCC initiative. This workforce-development project demonstrates how students improve academic performance and science inquiry skills through the use of technology in a context that promotes diversity, collaboration, and 21<sup>st</sup> century skills.

The BTRD program develops academic skills and 21<sup>st</sup> century career skills through the completion of the *Biotech Global Solutions Challenge*. Each school team, consisting of at least one teacher and four to six students, is challenged to develop a creative, yet feasible, biotechnology-based plan that proposes a solution to a pressing global health problem. The solution requires a project plan and proposal, the creation of a Web site to educate the public about the selected global issue, and the formation of an advisory committee that works to guide students in the development of the plan. Throughout the school year, student teams learn about current methods in biotechnology as they develop their project plans. Each student documents the work in an ePortfolio that demonstrates the variety of skills developed and artifacts produced during the program. Participants compete for awards and recognition as they present their ideas and projects to a panel of business professionals and higher-education faculty, online and at the Connecticut Student Innovation Expo. The Expo will be held May 8–9, 2009, at the Connecticut Convention Center in Hartford, CT.

All BTRD participating students and teachers have access to a password-protected online learning environment available via the Connecticut Education Network. The CCC Web site (<http://ctcconline.org>) supports BTRD participants and facilitates the completion of the Biotech Global Solutions Challenge. BTRD is sponsored by CCC and the Connecticut Office for Workforce Competitiveness. CCC engages Connecticut middle and high school students in a variety of stimulating courses in order to promote interest in 21<sup>st</sup> century careers.



### CCC Course Web Site

The CCC course Web site is the online learning environment for all Biotechnology students:

<http://ctcconline.org>

# THE BIOTECH GLOBAL SOLUTIONS CHALLENGE

*"Why did I convene this consultation? I have mentioned the stalled progress, the increased focus on health systems, and the many challenges that need to be addressed...I challenge you to be ambitious in your thinking and in your proposals for the future...I ask you to think outside the box."*

~Dr. Margaret Chan, Director-General, World Health Organization\*



<p><b>accept the challenge</b></p>	<p>This year's project challenges Biotechnology Research &amp; Development students to develop a Biotech solution to a global health challenge.</p>
<p><b>research</b></p>	<p>Students investigate case studies currently addressed by researchers worldwide. Using their growing biotechnology knowledge, student teams brainstorm ideas to formulate real solutions to the identified list of global concerns. (See page 3.)</p>
<p><b>develop</b></p>	<p>To meet this challenge, student teams work to create a mitigation plan that proposes a solution to a pressing global health problem. Teams identify an advisory committee/scientific partnership to assist and support them as they develop the project. Advisory committees should be diverse and be comprised of professionals from a variety of disciplines in science, government, technology, and/or public health.</p>
<p><b>design</b></p>	<p>After developing and refining their solutions, teams generate interest in their solutions via the World Wide Web (WWW) through the development of a Web site that includes use of animations and computer simulations. Web sites should have global impact maps, timelines, information on project progress, and project milestones. There should also be evidence that the solution is environmentally sensitive or "green" and addresses social, ethical, and/or cultural concerns.</p>
<p><b>present</b></p>	<p>Each team presents its solution to the Biotech Global Solutions Challenge in three different venues for evaluation by a panel of science professionals, researchers, and higher-education faculty. First, they post a project Web site on our Internet server for online evaluation. Second, they create an interactive exhibition booth at the Connecticut Student Innovation Expo, May 8–9, 2009, at the Connecticut Convention Center. Finally, they deliver a 5-minute oral presentation to demonstrate their innovative solutions.</p>

\*Chan, Margaret. "Scaling Up Research and Learning for Better Health." World Health Organization: Opening remarks at the High-level Consultation, Divonne les Bains, France, June 2, 2008 <<http://www.who.int/dg/speeches/2008/20080602b/en>>.

## REQUIRED ELEMENTS



Each team's project must focus on at least one global issue and solution and be environmentally sensitive. Suggestions include, but are not limited to, the following topics.

Improving Public Health	Measuring Public Health
Limiting Disease	Preserving Biodiversity
Limiting Disease Spread	Preserving Environmental Health
Limiting Bacterial Drug Resistance	Restoring Environmental Health

**Project Proposal:** Each team develops a plan to solve or ease a global issue. The plan should include the following elements.

- Innovative Biotechnology Approach
- Research, Complete and Cited
- Execution Plan
- Timelines and Expenditures
- Sustainable and Replicable Solution
- Consideration for Cultural, Social, and/or Ethical Impact
- Environmentally Sensitive/Green Solution

Suggestions for showing environmental sensitivity can include: Biofuel vs. Petroleum Fuel; Clean Air; Clean Water; Climate Change; Effect on Ecosystems; Energy Conservation; Local Environmental Action; Redevelopment of Brownfields; Renewable/Sustainable Energy; Waste and Recycling.

**Advisory Committee:** Each team needs an advisory committee that helps guide students as they develop a plan. It is the responsibility of each student team to ensure that committee members collaborate as scientific partners. Students should consider the following pieces when forming the committee.

- Diverse Group from Several Disciplines
- Identification of Collaborative Efforts
- Impact of Committee on the Plan

**Web Site:** Each team Web site educates the public and science research community about the proposed plan. Each site graphically describes a solution using Web-based simulations and animations, and clearly conveys the group's developed mitigation plan. Team Web sites should include the following components.

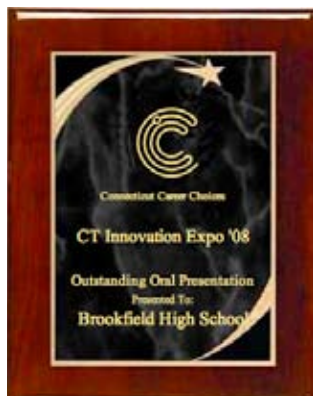
- Updates and Milestones
- Reports of Advisory Committee Collaboration
- Global Impact Map
- Evidence of Environmental Sensitivity
- Updated Meeting Dates, Minutes, and Attendees
- Posted on the WWW on ctepo.org Server

**ePortfolio:** Each student's ePortfolio documents the research, problem-solving activities, and multimedia development used for the design and mitigation of the plan. Each ePortfolio documents the student's individual activities during the project and should contain digital files, digital photographs, research citations, digital video, and personal reflection about the work.

## AWARDS/EVALUATION CRITERIA

### Awards and Recognition

Biotechnology students are recognized for outstanding performance in a variety of categories.



- Outstanding Team Player**
- Outstanding Team Leader**
- Outstanding Web Site Design**
- Outstanding Exhibition Booth**
- Outstanding Project Proposal**
- Outstanding ePortfolio**
- Outstanding Scientific Partnership**
- Outstanding Oral Presentation**
- CCC Biotechnology Internship Award**

**Evaluation Criteria:** A panel of distinguished science research professionals and higher-education faculty will use the following criteria to evaluate participants at the Connecticut Student Innovation Expo.

Elements	Extraordinary	Above Average
<b>Project Plan</b>	abundance of relevant material; material is properly cited and clearly relates to the Biotech Global Solutions Challenge; innovative and feasible	sufficient information; material is properly cited and relates to the Biotech Global Solutions Challenge; sufficiently innovative and feasible
<b>Coherence and Organization</b>	exhibition and presentation are organized and well-developed; specific materials illuminate a unique solution; presentation content flows together with a good variety of relevant material	exhibition and information are presented in logical order; generally well-connected, but not captivating to the viewer; content presented with some variety in format of material
<b>Advisory Committee/ Scientific Partnership</b>	high level of advisory committee participation; students recruited highly qualified committee members and utilized committee effectively throughout the project	some advisory committee participation; students recruited highly qualified committee members, but did not utilize committee effectively throughout the project
<b>Web Site Effectiveness</b>	engaging materials create an effective educational tool; materials are accessible on the WWW (both online and downloadable) and include all the required elements	materials create a helpful educational tool; materials are accessible on the WWW (online only) and include all the required elements
<b>Booth and Oral Presentations</b>	business casual dress; engaging presentation uses a wide variety of multimedia content; poised; clear articulation; proper volume; steady speaking rate; proper posture and eye contact; confident and enthusiastic presentation with team participation and support	business casual dress; many good elements, but an uneven balance; presentation uses some multimedia content; acceptable articulation and presentation, but not polished or enthusiastic; some fumbling and minor distractions; some team participation and support

# STUDENT EXPECTATIONS

## ***Student Behavior and Performance Expectations***

### '08-'09 Biotechnology Research & Development

Biotechnology Research & Development students are expected to achieve a high level of success in *Academic Performance, Behavior, Project Participation/Performance, and Technology Use.*

**Academic:** Students must maintain a C average or above at school and have a minimum 90% attendance record. Successful performance in school and in the Biotechnology Research & Development (BTRD) course is a major goal for students.

**Behavior:** Students must demonstrate acceptable behavior at school and at course meeting sites. Appropriate and exemplary behavior in school and in this course is a major goal for all BTRD students.

**Performance:** Students are expected to perform to the best of their abilities at all times. One of the most important goals is to prepare students for the world of work. Therefore, all BTRD students will be held to the same standards of performance as employees in a workplace.

**Technology:** Students are expected to adhere to the Acceptable Use Policy of their schools during all course activities. Any equipment provided to BTRD students and teachers is for the expressed purpose of completing course activities and projects. Any breach in the Acceptable Use Policy may result in suspension or termination from the course.

**DRESS CODE:** Biotechnology students are expected to dress in *business casual attire* appropriate for a business or medical environment. Students are expected to follow the dress code as detailed in the Business Casual Article during all program activities and meetings. Specifically:

- All students are expected to present a neat and clean appearance during program activities and meetings.
- No hats or inappropriate t-shirts may be worn during program activities or meetings.

**EXPECTED CONDUCT:** Appropriate conduct is expected of all Biotechnology students. Mutual respect for all program participants ensures an atmosphere that fosters creativity, collaboration, and participation.



Student responsibilities include, but are not limited to

- attending all scheduled classes and scheduled meetings;
- performing duties to the best of one's ability at all times;
- observing all fire and safety rules; and
- refraining from any and all acts of intimidation or violence against property and/or people.

**DISCIPLINE:** Teachers and the Course Director will closely monitor the attendance and performance of all Biotechnology students. If it is determined that a student is displaying problems in any of the above areas, disciplinary actions may result, including a verbal warning, a written warning, and/or suspension or termination from the program.

The student, parent, and teacher have read, understand, and agree to adhere to the Student Behavior and Performance Expectations of the Biotechnology Research & Development course. Your signature\* indicates acceptance of these terms.

\*Each student will receive a copy of this agreement to be signed and returned.

# EXPO 2009 DISPLAY GUIDELINES



## CT Student Innovation Expo Display Guidelines

To insure a safe and enjoyable experience and public exposition for all participants, student projects and displays must adhere to the following guidelines. If the CT Student Innovation Expo or CT Convention Center management considers the presence or operation of any equipment or material to be dangerous or unsafe, it shall have the right to prohibit or remove such equipment or material from the exposition.

1. An 8' x 10' x 8' exhibition booth will be provided with a 3' x 6' table and 2 chairs. All displays must fit within the 8' x 8' x 8' display space of the booth. No aspect of the display will be permitted outside or above the boundaries of the booth.
2. Projects, presentations, or exhibition booths may not display or involve the following at any time:
  - Blood products, fresh tissue, teeth, or bodily fluids
  - Nonhuman vertebrate animals or their parts
  - Pathogenic agents
  - Recombinant DNA
  - Carcinogenic or mutagenic chemicals
  - Compressed gas (including, but not limited to, CO<sub>2</sub>)
  - Controlled substances
  - Explosive chemicals
  - Hazardous substances or devices (including, but not limited to, BB guns, paint ball guns, potato cannons, air cannons, knives or other sharp objects)
  - High-voltage equipment
  - Toxic chemicals
  - Lasers (any strength)
  - Ionizing radiation X-rays or nuclear energy
  - Radioactive materials
3. Glass bottles and lab ware, either empty or containing any substance, are prohibited from all displays and must be replaced by break-resistant containers.
4. Mercury thermometers are prohibited from displays.
5. Drugs, over-the-counter medications, antibiotics, and vitamins are prohibited from displays.
6. The operation of high-pressure vessels and pressurized systems is not permitted.
7. No open flame, torch, or burner is permitted in the display area.
8. No food or candy of any kind may be displayed or distributed.

# EXPO 2009 PROGRAM SCHEDULE

## The Connecticut Student Innovation Expo www.ctexpo.org

Throughout the Expo you will see exciting demonstrations of innovative, technology-driven activities that include creative problem solving, digital media, science research, Web site design, and imaginative, interactive project displays. The energetic student presenters will explain and present their work to distinguished representatives from our business-sector and higher-education partners. Projects will be judged and awards given in several categories as detailed on page 4 of this guide.



### Friday, May 8<sup>th</sup>

	9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	4:00 p.m.	5:00 p.m.
	<b>TSA</b> Opening Ceremony	<b>TSA: Ongoing Competitions</b>				<b>TSA Awards Ceremony</b>			
							<b>CCC Exhibition Booth Set-up</b>		

### Saturday, May 9<sup>th</sup>

	8:00 a.m.	9:30 a.m.	10:00 a.m.	10:30 a.m.	11:00 a.m.	11:30 p.m.	12:00 p.m.	12:30 p.m.	1:00 p.m.	1:30 p.m.	2:00 p.m.	2:30 p.m.	3:00 p.m.
			<b>CCC: Exhibitions</b>										
			<i>Student Lunch Cyber Cafe</i>										<b>CCC Awards Ceremony</b>
			<b>CCC: Ongoing Competitions</b> for CTIA, E-Commerce, Biotechnology, CTASR, and Foundations of Health Science and Technology										
	<b>CT EXPO Business Breakfast</b>	<b>CT EXPO Opening Ceremony</b>	<b>CPEP: Ongoing Competitions</b>								<b>CPEP Awards Ceremony</b>		
			<i>Student Lunch Cyber Cafe</i>										
			<b>PLTW: Capstone Presentations</b>				<i>Student Lunch Cyber Cafe</i>		<b>PLTW Awards Ceremony</b>				

## QUARTERLY MEETING SCHEDULE

Over the course of the year, BTRD students and teachers from across the state will meet at Central Connecticut State University in New Britain, CT. During these meetings, teachers will receive professional development training in a laboratory setting to support the BTRD course labs, and students will work on the Biotech Global Solutions Challenge with leading scientists in the field. Students will also hear from local researchers about the cutting-edge research currently being conducted regarding global solutions, visit research labs, and network with other students and professionals.

Meetings will be held during the following months:

October      December      January      March      April (TBD)

### Expo Schedule and Deadlines

May

Monday, May 4: by 5 PM—Post BTRD team Web site to our [ctexpo.org](http://ctexpo.org) server.

Friday, May 8: 3 PM to 6 PM—Exhibition Booth Set-up  
6 PM to 8 PM—Connecticut Student Film Festival

Saturday, May 9: 9 AM to 4 PM—CT Student Innovation Expo Awards Ceremony and Public Viewing

**[www.ctexpo.org](http://www.ctexpo.org)**



*"Advanced biofuels and cleantech manufacturing can offer consumers 'green' options and provide solutions to energy and environmental global challenges."*

Health and Beauty Close-Up. "BIO International Convention: Biotechnology Companies Ramp Up with 'Green' Options, Solutions." Farmington Hills, MI: The Gale Group, 2008.



# PROGRAM PARTICIPANTS

## Participating School Districts

Bridgeport Regional Vocational Aquaculture School  
Brien McMahon High School  
CT Scholars, New Haven  
Glastonbury High School  
Hamden High School  
Hill Regional Career High School, New Haven

Nathan Hale-Ray High School, East Haddam  
Norwalk High School  
Oxford High School  
Pathways to Technology, Windsor  
Sport and Medical Sciences Academy, Hartford  
Wilbur Cross High School

## Program Partners

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The Center for 21<sup>st</sup> Century Skills  
@ EDUCATION CONNECTION  
[www.skills21.org](http://www.skills21.org)

Connecticut College of Technology Regional  
Center for Next Generation Manufacturing  
[www.nextgenmfg.org](http://www.nextgenmfg.org)

Connecticut Education Network  
[www.cen.ct.gov](http://www.cen.ct.gov)

Connecticut State Department of Education  
[www.state.ct.us/sde](http://www.state.ct.us/sde)

EDUCATION CONNECTION  
Regional Educational Service Center  
[www.educationconnection.org](http://www.educationconnection.org)

The Office for Workforce Competitiveness  
[www.ct.gov](http://www.ct.gov)

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<<http://ctcareerchoices.org>>



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*"We cannot solve our problems with the same thinking we used when we created them."*

~Albert Einstein



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