

# EVERY ACTION MATTERS

## CLASSROOMS TAKE CHARGE

### Service-Learning Lesson Plan

**Project:** Hamilton Take Charge

**Author:** Jen Fox at Hamilton International Middle School in Seattle, WA

**Project Overview:** Students will work individually or collaboratively with a group to create a scientific argument for reducing carbon emissions. They will make their arguments public by creating an announcement to their community. The announcement will encourage the community to participate in Communities Take Charge.

#### Learning Objectives

Work individually or collaboratively with a group to create a scientific argument for reducing carbon emissions.

#### How were the learning objectives evaluated?

As a graded assignment.

#### Service Objectives

Make your argument public by creating an announcement to our community. Encourage community members to participate.

#### How were the service objectives evaluated?

Students received credit/no credit for completing their announcement in public. Students also reflected in their journals about their experience, what worked, and what didn't.

**Subject Areas:** Biology

**Grade Levels:** 7th, 8th, 9th, 10th, 11th and 12th

**Materials Needed:**

- Computers and poster supplies

**Key Partners:**

- Parents of Hamilton Students
- Students at Hamilton
- Administration at Hamilton
- Teachers at Hamilton
- 

**Time Required to Complete Project:**

- Three months



**Photo:** Banner made by students to post in school commons to promote Take Charge month.

## Human Energy Systems Units Used (For lesson plans visit: [carbontime.bsccs.org](http://carbontime.bsccs.org))

**Activity 1.1** Human Energy Systems Unit Pretest

**Activity 1.2:** Graphing Arctic Sea Ice

**Activity 1.3:** Finding a Trend in Large-Scale Data and Generalizability

**Activity 1.4:** Finding a Trend in Arctic Sea Ice Data

**Activity 2.1:** Home Groups: Three Considerations for Making Sense of Large Scale Data

**Activity 2.2:** Expert Groups: Analysis of A Large-Scale Phenomenon

**Activity 2.3:** Home Groups: Share Expertise

**Activity 2.4:** Identifying Patterns and Asking Questions for Climate Change Data

**Activity 3.1** Millions of Flasks of Air

**Activity 3.2** The CO<sub>2</sub> Trend: Your Ideas about the Keeling Curve

**Activity 3.3** Why We Care About the Keeling Curve

**Activity 4.1** Finding the Carbon

**Activity 4.2** The Organic/Inorganic Swap

**Activity 4.3** The Seasonal Cycle

**Activity 4.4** Zooming Into Fossil Fuels

**Activity 5.1** Carbon Emissions Jigsaw

**Activity 5.2** Energy Scenarios

**Activity 5.3** The Upward Trend

**Activity 6.1** How We Use Organic Carbon

**Activity 6.2** Extreme Makeover: Lifestyle Edition

**Activity 6.3** Secrets Revealed

## Lessons & Activities (See below.)

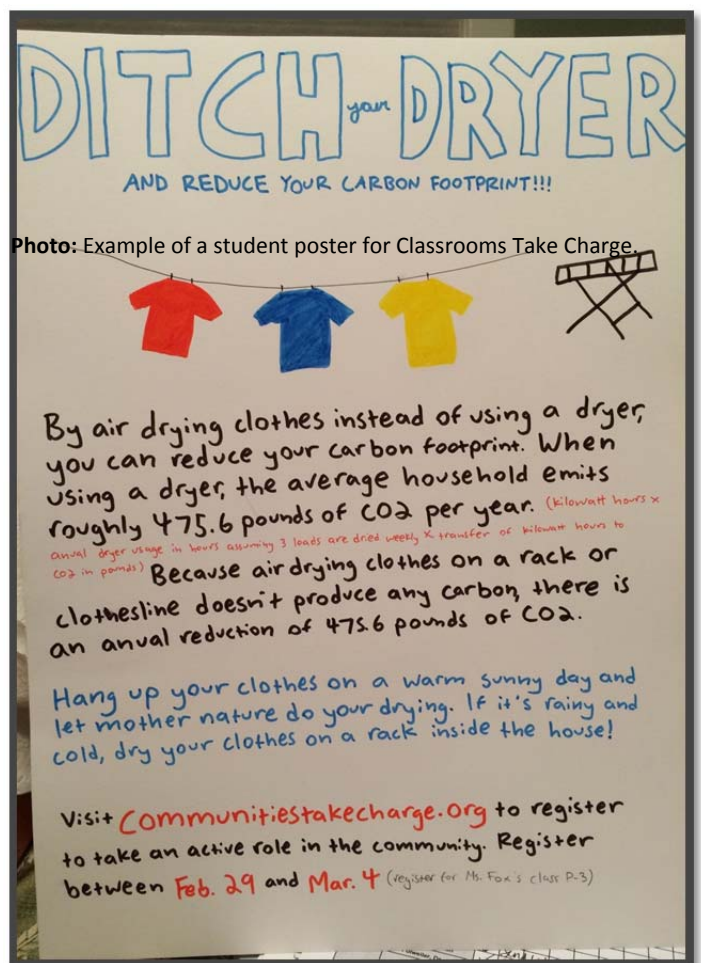
- Hamilton Takes Charge Project Overview for Students
- Hamilton Take Charge Grading Criteria
- Example Press Release
- Example Student Projects

## Celebrating Student Accomplishments

We had a day where students made their final carbon calculations, and we reflected on our project. We celebrated the amount of carbon reduced, hours of time spent of the project and our overall efforts. We also had popsciles.

## Project Milestones

- Teach Carbon Cycles (Oct-Jan)
- Teach HES (Feb)
- Announce project with class (Feb 17th)
- Research and Work time on projects (Feb 17-22)
- Argument and Communication due (Feb 24)
- Take Action - Communication to community (Feb 29-March 4)
- Community participation in "Hamilton Takes Charge" (March 4 - April 4)
- Complete online assessment follow up (April 5)



## Hamilton Take Charge Project Overview for Students

**Background:** In biology we studied biological processes that transfer carbon in our environment. In recent weeks we examined human impact on carbon transfers and the effect of increased CO<sub>2</sub> in our atmosphere. Through the reflection of different lifestyle choices, we brainstormed different ways we can reduce our carbon emissions.

**Question:** What actions can we take as an individual, a class, and community to reduce our carbon emissions?

**The Challenge:** Work individually or collaboratively with a group to create a scientific argument for reducing carbon emissions. Make your argument public by creating an announcement to our community. The announcement will encourage our community to participate in Communities Take Charge. Our goal is to get as many community members to participate. Examples of announcements include posters, radio announcements, letter to editor, lunch info, sandwich boards, homeroom presentations, etc.

**“Communities Take Charge”** – The announcement you create must encourage community members to visit this online resource to learn different ways our community can reduce carbon, encourage participants to commit to reducing carbon and will help their participation over 30 days.

### Scientific Criteria for your argument:

- Make a claim for one way our community can reduce carbon emissions.
- Include scientific evidence to support your claim.
- Provide reasoning to justify how the data supports your claim.

### Informational Criteria for your announcement:

- Inform community about the Hamilton Takes Charge Challenge and dates of registration (Feb. 29th to March 4th)
- Include “Communities Take Charge” website and how to navigate to HAMILTON group
- Explanation of your argument and announcement: Explain how you will communicate your announcement (What? Who is your audience? When?)
- Document all working hours on the project AND implementation of the commutation (use sample log)
- Photograph of you and your team in action (optional- with parental consent only)

### Creativity and Motivation

- Interesting and engaging way to communicate message
- Message is appealing to our eyes and/or ears
- Motivation and time clearly spent on project

### Overarching goals

1. Work individually or collaboratively with a group to create a scientific argument for reducing carbon emissions.
2. Make your argument public by creating an announcement to our community.
3. Encourage community members to participate.

## Hamilton Take Charge Grading Criteria

Argument (3 pts each, 9 points total):

1. Make a claim for one way our community can reduce carbon emissions.
2. Include scientific evidence to support your claim.
3. Provide reasoning to justify how the data supports your claim.

Informational for your communication (2 pts each, 4 points total):

1. Inform community about the Hamilton Takes Charge Challenge and dates of registration (Feb. 29th to March 4th)
2. Include "Communities Take Charge" website and how to navigate to HAMILTON group

Explanation of your argument and communication (2 pts each, 4 points total):

1. Explain how you will communicate your announcement (What? Who is your audience? When?)
2. Document all working hours on the project AND implementation of the commutation (use sample log).  
Photograph of you and your team in action (optional- see Ms. Fox for parental consent forms)

Creativity(1 pt each, 3 points total):

1. Interesting and engaging way to communicate message
2. Message is appealing to our eyes and/or ears
3. Motivation and time clearly spent on project

TOTAL POSSIBLE SCORE: 20 points



## The Hamilton Weekly News

FEBRUARY 25, 2016

### HAMILTON AND SPS NEWS

## Biology Students Participate in “Hamilton Takes Charge: Reducing CO2”



Biology students are hosting a “Hamilton Takes Charge: Reducing CO2” week, Feb. 29 – March 4! They will collaborate with the University of Nebraska and Corvallis Environmental Center to study the impact youth have on promoting the reduction of fossil fuels. Students will share scientific arguments for reducing carbon emissions with the community and promote participation in the online carbon tracking program “[Communities Take Charge](http://Communities Take Charge).” Please contact Jen Fox with questions or comments, [jbfox@seattleschools.org](mailto:jbfox@seattleschools.org)

### Here’s an example of a scientific argument for reducing carbon emissions by Paul F. and Nick K. in Ms. Fox’s Period 1 class for this effort - **NEW**:

*It’s obvious that we have to do something about global warming and the increasing percentage of carbon dioxide in our atmosphere. One easy way to help is to simply turn off lights when they are not in use. Sometimes you may not need to light the whole room, instead use task lighting (lamps, reading lights, etc.) to save power and reduce your CO2 emissions. If everyone in the US turned off two lights in our homes for an hour each day, we would save so much energy that the amount of coal it would take to produce that much electricity could fill up the Empire State Building three times. If you leave 17 typical light bulbs on for one hour you will release around 2 pounds of CO2 into the air. It is easy to think about this and realize how much CO2 we produce daily and, clearly, it’s a lot.*

*This is one way that you can make an impact, and there are countless others. Our Biology class with Ms. Fox is taking part in the “Hamilton Takes Charge Challenge” to do all sorts of activities to reduce CO2 production. We encourage you join the cause and sign up on a website called “[Communities Take Charge](http://Communities Take Charge)”. Simply go to the site, answer a few questions, pick a few actions that will help reduce your CO2 emissions, and select the Hamilton group. Thank you!*





# Example Student Projects



**SUP DUDE! WANNA HEAR SOMETHING HECKA RAD?**

**YOU CAN...**

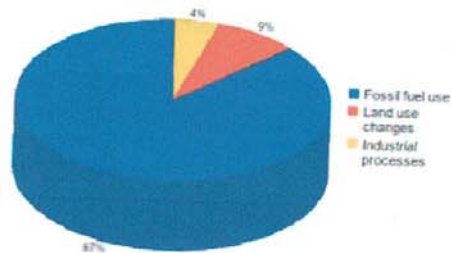
*Professional Skater and Entrepreneur, Tony Hawk™*

**REDUCE YOUR CARBON EMISSIONS AND SAVE THE ENVIROMENT!**

### How do I Reduce my Carbon Emissions?

You can reduce your carbon footprint by biking or walking to school each day. **Did you Know?** Over 12% of the Carbon Emissions are because of Cars. For Cars to move, they need to get energy, and the way they do that is by burning fossil fuels such as gas and oil. When these fuels are burned, they give energy, but also produce CO<sub>2</sub>, which pollutes the air around you. Burning Fossil Fuels is the lead human source of Carbon Dioxide in the air. One way you can stop this daily assault on our environment, is by finding ways to get to places that use less fuel per person. These activities include **Biking** (21g\*), **Taking the Bus** (101g\*), and **Walking** (0g\*) versus **Driving a Car alone** (271g\*). As we can clearly see, all of the forms of transportation that are highlighted in blue, produce much less than half of the Co<sub>2</sub> that is produced from driving a car. Here's the great thing, there are plenty of other fun ways to get to places that don't burn fossil fuels, so fund your own way and go outside and have fun, while saving the environment.

Human sources of carbon dioxide



\* results in grams of CO<sub>2</sub> per passenger per kilometer traveled

*to save your CARBON EMISSIONS, take one...*

<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>	<p>Join!</p> <p><a href="http://CommunityTakeCharge.org">CommunityTakeCharge.org</a></p> <p>Select HMAS Period #1</p>
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# Eat local and take a step towards reducing your CO<sub>2</sub> emissions!

## How?

Go to your local farmer's market and buy produce that is in season.

## How can eating local reduce CO<sub>2</sub> emissions?

Food that is produced locally often releases less CO<sub>2</sub> than other food produced in farther locations.

1. Local food doesn't have to travel as far. It doesn't release as much carbon dioxide in transport which can often use sources of energy that aren't renewable and that release CO<sub>2</sub> (example: burning fossil fuels, such as coal).
2. Small scale and local farms are more likely to use greener methods of growing food. This way they reduce the amount of greenhouse gases that are released during food production.

## The numbers:

Conventional food distribution has been found to release 5 to 17 times the amount of CO<sub>2</sub> that is released by local food production. (Rich Pirog, C.S. Mott Group for Sustainable Food Systems, 2001)

## What else can I do?

Go to [communitiestakecharge.org](http://communitiestakecharge.org) and create your own one-month plan to reduce your CO<sub>2</sub> emissions. Join us in giving back to our planet and sign up between February 29<sup>th</sup> and March 4<sup>th</sup>. When asked for your class you can sign up under Jen Fox's period 2 class at Hamilton International Middle School and join our class in a competition to create the most community participation.



For more info go to:

<http://blogs.ei.columbia.edu/2012/09/04/how-green-is-local-food/>

<http://www.worldwatch.org/node/6064>

<http://www.davidsuzuki.org/what-you-can-do/food-and-our-planet/food-and-climate-change/>