

Teaching Nutrition and Health in the Urban-Science Classroom
A Blended-Approach to Culturally Relevant, and Problem Based Learning.

By

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Abstract

Education has been seen as the means for all young people to receive equal opportunities, however our current system of education does not currently set up all young people to have similar achievements in the field of science. Young people from urban and impoverished backgrounds are less likely to see value or purpose in their science education. For this reason it is my belief that something needs to change in the way we educate urban youth in the field science. This project aims to unite currently supported practices and theories in to a cohesive educational unit.

This unit will pull from multiple research supported theories and combine them in a unique manner to create a new experience for urban students with in the context of nutrition and human body systems. This unit will unite the notion that urban students value inquiry more than their suburban peers (Sandoval & Harven 2011), with an approach that values the unique funds of knowledge within a diverse urban classroom (Moll& Greenberg 1990). In addition an students will complete an end of the unit project that aligns itself with social justice theory (Esposito, J. & Swain 2009), and problem-based learning (Bouillion & Gomez 2001). Using a variety of techniques and researched based theories within a single unit of study will best address the engagement based issues within the urban science classroom.

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Chapter I: Introduction

The notion that our school systems are the great equalizer is pervasive but simply not true; schools do not sort students by some system of merit, but rather perpetuate social inequality. Meaning students from lower SES urban areas, economically disadvantaged backgrounds are unlikely increase their scientific trajectory based on the way they are taught science currently. Current mainstream practices are incongruent with students' cultural experiences - instructionally congruent teaching however, is thought to more effectively engage students from diverse backgrounds (Zain et. Al 2010). Current science teaching practices have resulted in urban students' underperforming in science (NAEP 2009), and seeking significantly lower rate in seeking out higher level science courses , and careers within the field of science at significantly lower rate than their suburban peers. Which will be put urban students at a larger disadvantage in the global economy as many more jobs require strong STEM skills than previously needed (APA 2013).

Research has shown urban youth often feel disconnected with typical school science, that it may not matter to them or may not be of use to them (Basu & Barton 2007). Science teachers often do not seriously consider this disconnect between students' cultural experiences and they way they learn science in school. This dissonance is often perceived by science teachers as disinterest in the field of science education or learning in general. This in turn results in lowers teacher' expectations for urban students and results in a factual rhetoric based approach often known as the "pedagogy of poverty". (Bryan & Atwater 2002). Factual rhetoric based approach to teaching science is not the best approach for teaching with the urban context, as urban students are value inquiry more than their suburban counterparts (Sandoval & Harven 2011).

Going beyond standard inquiry practices, building curriculum that pulls from students unique *funds of knowledge* within the science classroom has been recommended as a way to increase engagement and build an instructional bridge between the student's community and the community of the classroom (Upadhyay, 2006). Funds of knowledge framework can be used to develop community and problem based science instruction which increases student's sense of efficacy and interest in science education long-term (Bouillion & Gomez 2001).

The goal of this thesis project is to develop a learning module for an urban Living Environment class that will not only pull from students cultural experiences but will also require students to investigate scientific issues within their own community and develop community improvement strategies. This will be done by utilizing community resources and students' experience to create a problem-based learning experience for the extent of the instructional unit. Students will preform tasks that are congruent with their preferred culturally modalities as well as tasks that are valued in the scientific community.

Below is an outline of the project:

<p>Day 1- Lesson Title: Parts of a Whole Learning Outcome: -Students will align their to a diet a profile given -Students will identify the necessary macromolecules for ideal human living</p>	<p>Day 2- Lesson Title: What's in it? Learning Outcome: Students will accurately measure and calculate the amount of sugar and fat in their favorite foods using a triple beam balance and the appropriate volumetric tools - Student will be able to compare and contrast the foods the are eating with the allotted amount of fat and sugar in a healthy daily diet</p>	<p>Day 3- Lesson Title: Calorie Counting Learning Outcome: Students will demonstrate safe and successful laboratory techniques by accurately predicting the caloric value of both corner store foods and farmer market foods Students will be able to compare the macronutrient content of corner store foods and farmer market foods by completing the nutritional chart in the lab packet and answering subsequent questions correctly</p>	<p>Day 4- Lesson Title: Keep Up the Flow! Part One Learning Outcome: -Students will identify characteristics of a healthy heart - Students will explain how diet can impact the function of a heart.</p>	<p>Day 5- Lesson Title: Keep Up the Flow! Part Two Learning Outcome: - Students will explain how diet can impact the function of a heart.</p>
<p>Day 6- Lesson Title: Not So Sweet Anymore Learning Outcome: -Students will relate diet to health issues -Students will understand the meaning of terms such as hormone, feedback loop, and gland -Students will be able to apply technical skills to real world scenarios such as diabetes</p>	<p>Day 7- Lesson Title: Not So Sweet Anymore Learning Outcome: -Students will relate diet to health issues -Students will understand the meaning of terms such as hormone, feedback loop, and gland -Students will be able to apply technical skills to real world scenarios such as urinalysis</p>	<p>Day 8 Lesson Title: Market Field Trip Learning Outcome: -Students will relate diet to health issues -Students will explore healthy living opportunities within their own communities</p>	<p>Days 9-11 Lesson Title: Problem Based Learning Learning Outcome: -Students will explore healthy living opportunities within their own communities -Students will create a plan to improve their own health using resources available to them</p>	

Project Design

This project is designed to be a 2 to 3 week unit that will address an issue that both affects urban youth in Rochester and addresses current NYS Living Environment. The lessons will stem from the problem of Food Insecurity, and malnourishment within the Rochester community. Addressing the following essential questions: “What does your body need to flourish? What happens when your body does not get what it needs? And how can we all get what we need?”

The lessons within this unit will include a variety of techniques from direct instruction about macronutrients and body systems, to guided inquiry about caloric intake of corner store foods versus farmers market foods, to visits to/from community outreach organizations like WIC, FoodLink, and the Rochester Public Market. Culminating in each student developing a plan of how they will improve their family’s nutritional health.

Significance of Project

The issues I intend to focus on within the context of my project are really issues that plague the Rochester community and are directly related to the content I am expected to teach as Living Environment teacher. By developing cultural relevant curriculum for students within the Rochester City School district, I may be able to help engage urban students in science learning, interest them in pursuing scientific matters outside of the required science curriculum. The goal of this project is to meet student where they are and interest, engage, and empower them to make

science a part of their lives at home. My logic stands as follows, if science instruction bridges students cultural experiences and values with the values of academic science, urban students will be more likely to sustain a prolonged interest in the field of science. This sustained interest in science has a significance not only to the urban students (who are likely to have improved academic trajectory), but may help to close the achievement gap which is currently negatively affecting social mobility and equal access to opportunity in our country.

A secondary goal of my project is that student will become agents of change with in their community and will further pursue opportunities to improve their communities in the future. I hope to increase students' awareness of community outreach organizations, and increase their voice within the context of their communities.

Definition of Terms

FUNDS OF KNOWLEDGE: knowledge and skills gained through historical and cultural interactions that are essential for individuals to function appropriately in his/her community (Moll & Greenberg 1990)

INSTRUCTIONAL CONGRUENCE: how well aligned instruction is with students cultural experiences (Luyx & Lee 2007)

PEDAGOGY OF POVERTY: an authoritarian driven pedagogical approach that focuses on discrete facts and test preparation

PROBLEM BASED LEARNING: instruction where students are required to evaluate and solve a teacher generated problem about an instructional topic.

CULTURALLY RELEVANT PEDAGOGY: instructional choices that are in line with and responsive of students unique cultural backgrounds

Chapter II: Literature Review

Overview

The notion that our school systems are the great equalizer is pervasive but simply not true; schools do not sort students by some system of merit, but rather perpetuate social inequality. Meaning students from lower SES urban areas, economically disadvantaged backgrounds, are unlikely increase their scientific trajectory based on the way they are taught science currently. To counter this lack of congruency many research based approaches have been identified, several of them used in conjunction could be the key to closing the urban achievement gap in science. Culturally relevant pedagogy improve urban science education by bridging the gap between students communities and their educational experiences. Combining culturally relevant pedagogy with other techniques such as problem based learning and social justice teaching will create a learning experience that is most congruent with the needs of urban students, while improving students' self efficacy as scientists and community members.

Using Community Based- Culturally Relevant Pedagogy to Combat Urban Underperformance in Science

Issues about Science Education in Urban Classroom

As it stands currently urban students are underperforming in the area of science, recent research found that at the eighth grade level in seventeen major urban cities studied sixteen of those cities preform at a lower rate in science than the national average on standardized testing (NAEP 2009). The issue of urban underperformance in science is more than the school setting itself . Students from minority backgrounds are going into the field of science

and technology at significantly lower rates than their non-minority peers which can be seen by the demographic make up of our current science workforce, as of 2011 75% of all scientists and engineers in the United were White (National Science Foundation 2011). This sort of performance among our urban centers has potentially negative societal consequences, because scientific literacy and knowledge is becoming more and more valued in our global economy, even for entry level jobs, and a lack of STEM skills may be devastating to students, and our economy in the long run (APA 2013).

The under performance of urban youth within the domain of science is a problem with many contributing factors. These factors are broken down within the wealth of educational research into several distinct categories, teacher readiness for the urban setting (failures of teacher education), teachers' perception of students, and students' perception of school science as it has been presented to them. Within the area of urban science education, because of high vacancy rates, there is a high percentage of unqualified science teachers, teachers who are unprepared to teach science and feel that their students are incapable of learning higher order disciplines like science (King & Lietz 2001). These teachers are usually not certified to teach science and have not received the proper training to teach science and have certainly not received training to teach science within the urban setting with its unique challenges.

Another issue is that urban teachers often do not understand the unique needs and experiences of their students because while classrooms are becoming more and more culturally and linguistically diverse teachers are still primarily white and female (87%) (Cross 2003).

In order to help urban students to be successful, teachers must value change, because current pedagogical techniques have proven to be unsuccessful in reaching urban students. Urban teachers need to work toward closing the urban-suburban achievement gap through the use of

research supported instructional approaches. A 2008 study by Moore (2008) found that young teachers, either in or directly after teacher education often don't feel that they are prepared to teach science in the urban classroom, either because they do not feel they have mastery over the science content or because they feel like within the larger infrastructure of the failing school system they can make a significant impact on students learning (Moore 2008).

Another issue addressed in the literature in urban science education is teacher's perception of student's interest and ability. Urban science teachers often have mistaken idea that urban students are uninterested in science or are not capable of higher-level pedagogical strategies such as inquiry (Bryan & Atwater 2002). This has resulted in what is often referred to as the pedagogy of poverty, a factual and procedural approach to science education, which leaves little room for more open ended approaches to science education, though it has been shown that urban students value inquiry more than their suburban peers (Sandoval & Harven 2011). Teachers perceptions of student ability or interest, coupled with the pedagogy of poverty has lead to a vicious cycle of low expectations, ineffective teaching strategies and underperformance that has seriously impacted the state of urban science education in our nation, creating inequity between the classroom experiences of urban versus suburban students.

Because of this pedagogy of poverty, urban students often feel disconnected with science learning, that what they are learning may not be of use to them, and therefore doesn't matter (Basu & Barton 2007). Urban students perceive a lack of utility in typical school science, because their lives are often quite different from their suburban counterparts, more often than not they don't know many people with science related careers, and they may be unaware of how science is intertwined in and effects unique issues in their community. Since urban science education is not connected with students daily lives they can become disinterested, however

urban students have found inquiry activities with real world applications to have a good deal of utility and interest (Sandoval & Harven 2011).

Culturally Relevant Pedagogy

Educational research has suggested that in order to combat this pedagogy of poverty and perceived lack of utility culturally relevant pedagogy, also called culturally responsive teaching (CRT), should be implemented. Culturally responsive teaching (CRT) can be defined as teaching strategies that support the use of cultural knowledge, previous experiences, frames of reference and unique performance styles that are familiar with the ethnically diverse students in your classroom (Gay 2000). When teachers implement CRT it reinforces that their home experiences are relevant within the classroom and helps to build bridges between the students lives and the curriculum (Grinner & Stewart 2012). As such it is important that the development of culturally responsive pedagogy should incorporate multiple voices; parents, teachers and community experts, so that the curriculum can most effectively reach students from these racially and linguistically diverse backgrounds and begin to close the achievement gaps.

Culturally relevant pedagogy is not the only useful framework to consider when trying to close the achievement gap between urban and non-urban students in science. The funds of knowledge framework proposed by Moll and Greenberg (1990) is also useful well-supported framework, which holds particular weight when considering the needs of linguistically diverse students whose cultural experiences may differ significantly from the experiences of many African-American urban students. The funds of knowledge framework suggests that each student brings with them to the classroom a “fund of knowledge” that is built from their family’s cultural and community experience, and this fund of knowledge can be drawn from in the educational experience (Moll & Greenberg 1990). Later research within the field suggested that urban

students learn science best when these funds of knowledge are drawn upon, and classroom learning allows students to make use of their personal experiences (Upadhyay 2006). Negotiating between typical school science topics and issues important within the students community is at the heart of cultural relevant pedagogy (Villegas & Lucas 2002), and at the heart of the funds of knowledge framework.

Implementing Culturally Relevant Pedagogy in Science Classroom

There have been many case studies that support culturally relevant pedagogy from a teacher that utilizes students experiences with cultural mythology, to open a dialogue about where scientific beliefs come from (Upadhyay 2009), to environmental study of pollution in local community (Price & McNeill 2013), to studying nutrition and human health within local urban communities (Upadhyay 2006). The wide variety of approaches highlighted in these case studies suggest that when using culturally relevant pedagogy there is no single prescriptive approach, rather the pedagogical approaches and methods should be reflective of the cultural experiences of the students in a particular classroom, school, or community. Since no two urban classrooms look the same culturally relevant curriculum will look different within each of this schools.

Social Justice and Problem Based Learning

Because students' from racially and culturally diverse backgrounds often face such different educational circumstances, attending school in buildings with significantly less funding and less qualified teacher, teaching within the urban context becomes a social justice issue. Some research suggests that culturally relevant pedagogy can be combined with social justice pedagogy to create a more empowering educational experience for urban students. According to Esposito and Swain (2009) by tackling social justice issues head on within the

classroom you can “sense of agency, the freedom to act on one’s behalf and to feel empowered as a change agent” (Esposito & Swain 2009).

Culturally relevant curriculum and funds of knowledge can be used in conjunction with other more mainstream science approaches to tackle social justice issues within urban communities, and make science learning empowering, and to help students become agents of change within their own schools, families, and communities. Potentially the most useful mainstream science technique for accomplishing this goal is problem based learning. Problem based learning (PBL) is centered around the idea that the students will learn content by solving a meaningful and real life problem (Jonassen 2011). Within in the context of the secondary science classroom, it is important for project based learning to have meaningful and engaging trigger. The “problem” in problem based learning can either be student or teacher generated but should be connected to students personal experiences (Ferreira & Trudel 2012). This is where culturally relevant pedagogy can be connected with problem based learning to form a meaningful and engaging learning experience for urban youth in their science classrooms. This sort of educational experience, where students solve a problem in their own lives or communities can result in long-term interest in science learning.

This approach of problem-based learning in urban community has been supported in some individual case studies. Researchers have shown that by focusing science education on issues plaguing their community, and drawing from student funds of knowledge teachers can positively impact students learning experience. Teachers have not only been able to engage students in their science learning but helped them to increase their self-efficacy and become agents of change within their own communities (Bouillion & Gomez 2001, Price & McNeill 2013, Zahur 2002). This sort of engaging and relevant curriculum, has the potential to positively

affect how students see themselves as learners, how they perceive science to fit in with their lives and their futures. It is this sort of change that is necessary to help prepare urban students to be college and career ready in the face of a changing economy that places a larger demand on science and engineering knowledge.

Conclusion

Literature within the field of science education suggests that current pedagogically techniques fail to reach urban students and are unsuccessful in closing the achievement gap. This is because current approaches are riddled with low expectations and are incongruent with students' cultural knowledge and values.

Because of this I suggest that urban science education blend a variety research based approaches that when used in combination will best suit the issue within urban science education. I suggest that culturally relevant and problem based pedagogy be used to educate urban students about social justice issues as they relate to science. This approach to teaching would be not only responsive to students' backgrounds and interests but also empower them to be agents of change within their communities.

Chapter III: Project Design

Overview

This project was inspired primarily by the work of Price et al (2013) , and Zahur et al (2002) who explored the idea of a “lived curriculum”. This unit plan will consist of a eleven standards based lesson plans that also actively relate to urban students lives. The lessons will all be centered around the topic of nutrition, and will touch on living environment standards and will engage students in community centered activities.

What a person and their family eats something very personal and deeply connected within their culture, by using nutrition a jumping point for this unit of study all students will have a fund of knowledge to pull from. This unit of study will use students current eating habits as they relate to nutrition, culture and food accessibility to educate students on the major nutritional macromolecules, and how this diet relates to students body systems in particular the cardiovascular, endocrine and excretory system. Using nutrition to focus on these body systems will allow students to learn more about health issues that directly affect the urban community, such as obesity, cardiovascular disease, and diabetes.

This unit is mean to be taught in a high-school within the Rochester City School District and will pull not only from students lived experiences but also from the Rochester community. Using positive resources available to all students such as the EBT program at our local market. In addition to positive community based resources such as the public market this unit will aim to address national social justice issues that effect urban students such as the healthy lunch program and the farm to school movement.

Below is an outline of the unit of study:

Figure 1: Unit Plan Outline

<p>Day 1- Lesson Title: Parts of a Whole Learning Outcome: -Students will align their to a diet a profile given -Students will identify the necessary macromolecules for ideal human living</p>	<p>Day 2- Lesson Title: What's in it? Learning Outcome: Students will accurately measure and calculate the amount of sugar and fat in their favorite foods using a triple beam balance and the appropriate volumetric tools - Student will be able to compare and contrast the foods the are eating with the allotted amount of fat and sugar in a healthy daily diet</p>	<p>Day 3- Lesson Title: Calorie Counting Learning Outcome: Students will demonstrate safe and successful laboratory techniques by accurately predicting the caloric value of both corner store foods and farmer market foods Students will be able to compare the macronutrient content of corner store foods and farmer market foods by completing the nutritional chart in the lab packet and answering subsequent questions correctly</p>	<p>Day 4- Lesson Title: Keep Up the Flow! Part One Learning Outcome: -Students will identify characteristics of a healthy heart - - Students will explain how diet can impact the function of a heart.</p>	<p>Day 5- Lesson Title: Keep Up the Flow! Part Two Learning Outcome: - Students will explain how diet can impact the function of a heart.</p>
<p>Day 6- Lesson Title: Not So Sweet Anymore Learning Outcome: -Students will relate diet to health issues -Students will understand the meaning of terms such as hormone, feedback loop, and gland -Students will be able to apply technical skills to real world scenarios such as diabetes</p>	<p>Day 7- Lesson Title: Not So Sweet Anymore Learning Outcome: -Students will relate diet to health issues -Students will understand the meaning of terms such as hormone, feedback loop, and gland -Students will be able to apply technical skills to real world scenarios such as urinalysis</p>	<p>Day 8 Lesson Title: Market Field Trip Learning Outcome: -Students will relate diet to health issues -Students will explore healthy living opportunities within their own communities</p>	<p>Days 9-11 Lesson Title: Problem Based Learning Learning Outcome: -Students will explore healthy living opportunities within their own communities -Students will create a plan to improve their own health using resources available to them</p>	

Lesson 1: Research Based Justification

Food being a basic human requirement is a subject that all students have at least some background knowledge of, they consume it on a daily basis, know family recipes or local favorite cuisines. Therefore using food to start the dialogue about our body system; digestive and cardiovascular systems and nutrition, is a way to pull from student’s funds of knowledge. Accessing these funds of knowledge is a way to make urban students more confident when entering new science subject (Moll & Greenberg 1990). For that reason I will begin the unit with a student survey about the types of food their families eat, and what they know about “good food” and “bad food”. This is another way to pull from their daily lives and highlight cultural differences that may make the classroom feel more familiar and comfortable place.

In addition I have chosen to show a clip from *Food Inc.* because it brings in the notion of inequality of experiences in our country, and looks at how fast food is cheap easily accessible. Is it socially just that unhealthy foods are most accessible to the poor in this country, and that these foods impact our health negatively. This will lead into a classroom discussion of food insecurity. This gives the science topics a social justice components and if correctly implemented may be able to motivate students to be agents for change with in their own communities (Esposito & Swain 2009).

Lesson 1: Lesson Plan

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT Living Environment
DATE	TIME 60 minutes
TOPIC Nutrition	LESSON TITLE Parts of a Whole

PURPOSE
To familiarize students with the typical American diet as well as the importance of a diet rich and balanced in specific macromolecules including lean protein, good fats omega 3 fatty acids, and vitamins. And pull from their home experiences to access knowledge about nutrition

LEARNING OUTCOMES
<ul style="list-style-type: none"> - Students will align their to a diet a profile given - Students will identify the necessary macromolecules for ideal human living

NYS STANDARDS	COMMON CORE STANDARDS
<ul style="list-style-type: none"> - 1.2 H - 1.2 B 	

MATERIALS	MODIFICATIONS/ACCOMODATIONS
-Video , Powerpoint, Surveys	

PROCEDURES

Hook- Opening discussion using the section of the documentary *Food Inc, The Dollar Menu* and then use the discussion guide created by the creators of *Food Inc* to stimulate a discussion on food insecurity and unequal access to nutrition. I have included a link to the pdf of this discussion guide. I would be utilizing pages 47-53.

<http://www.takepart.com/foodinc/faq>

Components of Our Food- Macromolecule – Fats, Carbs, Proteins, Vitamins – Powerpoint

Teacher Will: -Lead the

discussion about what a macromolecule is, and what the 4 main categories are:

- Fats: Help to insulate our bodies, cushion our organs, line our nerves but too much fat in your diet can clog arteries, and result it in obesity
- Carbs: Provide energy for our bodies- link back to cellular respiration.
- Ask students: “ What was the molecule that the mitochondria makes energy from?”
Too much sugar or carbs can be converted and stored as fats, and can result in your body needed to produce too much insulin
- Proteins help your body build muscle –LEAN proteins LOW in fat are healthiest.
- Vitamins- help you remove toxins and help your body function at its peak

Students will: participate in discussion questions, and will take turns using the interactive portions of the SMART board lesson.

Self Survey-

Teacher will – introduce that all families have their own unique food practices and this culture is important it is also important for students to understand that not only should the food they eat be reflective of their culture but be good for their bodies. Our goal in the next couple of weeks is for you to figure out how to do both.

Students will- spend time reflecting on the questions below as they take a survey that will be collected:

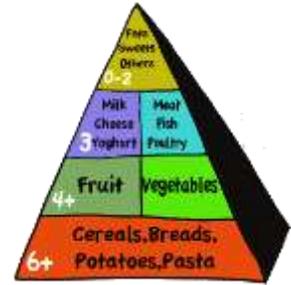
What do you eat every day? What are your favorite healthy foods? What are your favorite unhealthy foods? Which macromolecules do you get too much of? Which macromolecules do you get too little of?

HW- Bring in the nutrition facts for your favorite snack, or fast food meal. If your family is from a different country please bring in the recipe and nutrition facts from a favorite meal that is common in your household or tradition.

Day 1, Student Worksheet: Food Survey

Name: _____

Food Survey



1. My favorite food that is cooked at home is...
2. My favorite food that is not cooked at home is...
3. I eat fast food _____ days a week
4. My favorite vegetable/ vegetable dish is...
5. My favorite fruit/ fruit dish is....
6. My favorite healthy food is...
7. My favorite unhealthy food is...
8. On a scale of 1-10 (1 being not at all healthy to 10 being very healthy) I think I eat...

Lesson 2: Research Based Justification

One of the major flaws in urban science education at the moment is that students don't see the connection from what they are learning in the classroom to their everyday life or where they perceive their life going in the future (Basu& Barton 2007). To combat this issue it would seem logical that urban science teachers begin to teach in a way that is congruent with student's experiences currently and which allows students to see where science can be connected to their future. Researchers also have found that compared to their suburban peers, urban students value inquiry more, especially when it is connected to their life directly (Sandoval& Harven 2011).

The aim of this lesson is to strive toward culturally relevant inquiry. The students will bring in nutrition facts for their favorite foods, either from their homes or from neighboring restaurants, including fast food chains if that is a common place where their families eat. The student will then look at the contents of two macromolecule carbohydrates (in particular sugars) and fats, they will determine a baseline standard amount of sugar and fats that should be eaten at a meal and then measure that out. And then do the same for the amount in the meal they have chosen. Students will then analyze their meal and what the health ramifications maybe for based on any discrepancy. I will use my favorite guilty pleasure meal, the garbage plate as my example in an effort to make no one student feel bad about their current eating habits or culture traditions.

Day 2 : Measuring the fats and sugar in students favorite food using butter and sugar

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT High School – Living Environment
DATE	TIME 60 Minutes
TOPIC Nutrition	LESSON TITLE What's in it?

PURPOSE

To create the visual relationship between unhealthy foods and the amount of sugar and fats so that student's will be able to better align their nutrition choices with the biological components that make up the food

LEARNING OUTCOMES

- Students will accurately measure and calculate the amount of sugar and fat in their favorite foods using a triple beam balance and the appropriate volumetric tools
- Student will be able to compare and contrast the foods the are eating with the allotted amount of fat and sugar in a healthy daily diet

NYS STANDARDS

COMMON CORE STANDARDS

1.2 b, 1.2 e, 2.2 e Lab skills checklist	
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MATERIALS	MODIFICATIONS/ACCOMODATIONS
-Butter, Sugar, nutrition charts, scales, chart paper, markers, tape, plastic baggies	

PROCEDURES
<p>-Warm Up- Teacher Will: Ask students to put your nutrition facts on their desks for their favorite fast food meal. Highlight them amount of sugar in yellow ? And the amount of fat in them in pink? Students Will: isolate the important elements of the nutrition labels and highlight the correct elements.</p> <p>Calculations- Teacher Will: provided students will provide students with the daily allotment of fats and sugar and instruct students to calculate the allotment per meal.</p> <p>Students Will : Divide the allotted DV of fat and sugar by 3 to get the approximate fat and sugar allotment for a meal</p> <p>Measure- Teacher Will: model how to use triple beam balance, asking for students to supply the steps for using it as the teacher acts it out. This will activate knowledge students will already have on thise</p> <p>Students Will: Use a triple beam balance to measure the amount of fat and sugar for a “typical meal” and the amount of sugar and fat in your meal</p> <p>Assessment- Create a visual representation of you project using large paper including a short reflection about the activity and your food choice.</p>

Day 2, Student Lab Worksheet: Fat and Sugar Analysis

Name: _____

Period: _____

Date: _____

Fat and Sugar Analysis

Intro: We have learned about the importance of certain macromolecules. All macromolecules are needed at some level so our body can maintain homeostasis. Our bodies need **fats** to insulate our bodies and our brains, and our bodies need **carbohydrates (sugars)** so that our cells have the building blocks needed to provide our bodies with energy to perform daily tasks, however too much of any macromolecule is not good for your body and can lead to negative health consequences. A typical person should eat about 50 g. of fat a day and about 60 g. of sugar or less in a day. Let's compare our food choices to the daily goals.

Material:

- Food Labels
- Sugar
- Butter or Crisco
- Plastic Bags
- Wax Paper
- Triple Beam Balance

Procedure:

1. Using the nutrition information you brought in calculate the total fat and sugar in your favorite meal. Record in the table below
2. Knowing a healthy diet contains 50 g of fat and no more than 60g of sugar calculate the amount of each macromolecule in a typical healthy meal assuming that you eat three even sized meals a day and do not snack in between meals. Then record your calculations in the table below.
3. Measure out the amount of sugar in the healthy meal using a triple beam balance put in a bag which you will label.
4. Measure out the amount of sugar your favorite meal using a triple beam balance put in a bag which you will label.
5. Measure out the amount of fat in the healthy meal using a triple beam balance put in a bag which you will label.
6. Measure out the amount of sugar in your favorite meal using a triple beam balance put in a bag which you will label.
7. Create a visual representation of your project using large paper including a short reflection about the activity and your food choice.

Data Table:

	Daily Allotment	Healthy Meal Allotment	Favorite Meal
Sugar (g)	60 g		
Fat	50 g		



Lesson 3: Research Based Justification

The research-based evidence in this lesson is drawn from the idea that urban students value relevant inquiry more than their suburban peers directly (Sandoval & Harven 2011). Malnutrition and obesity are issues that plague the urban youth. This lesson will build upon the last lesson and allows students to compare their current food choices to healthier local food choices using relevant scientific strategies such as calorimetry.

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT High School- Living Environment
DATE	TIME 60 mins
TOPIC Nutrition	LESSON TITLE Calorie Counting

PURPOSE

Many students within the Rochester City School District (RCSD) get most of their food supplies from local corner stores, where food is often expensive and unhealthy, which can result in larger issues of food insecurity and malnourishment. However within the Rochester community there is a wonderful farmer market that provides reasonably priced produce and proteins and even accepts EBT.

LEARNING OUTCOMES

EQ: Why does it matter where we get our foods?

- Students will demonstrate safe and successful laboratory techniques by accurately predicting the caloric value of both corner store foods and farmer market foods
- Students will be able to compare the macronutrient content of corner store foods and farmer market foods by completing the nutritional chart in the lab packet and answering subsequent questions correctly
- Students will answer the essential question using information obtained in the laboratory

--	--

MATERIALS

Food products, Nutritional Info, Bunsen Burners, Test tubes, ring stand, thermometer, evaporating dish, matches

MODIFICATIONS/ACCOMODATIONS

- Preview lab set-up with students with IEPs
-

PROCEDURES

Opening Question(Day Prior) :

Where do you get your groceries poll?

- Get 5 random items from the most frequently mentioned place
- Get 5 random items from the farmers market

Teacher will- introduce the concept of calorimetry.

- Ask: “What do you think a calorie represents?” Take students answers if no one seems to be able to answer attempt them to think about what they get from food...ENERGY.
- By burning items you can determine the energy with them, the energy that is used to fuel the fire.
- -Show the students the 5 foods from the corner store and the 5 foods from the market and ask the essential question. And tell the students we will work to answer it through the lab.

Students will – take turns reading the lab procedure while the teacher models the lab set up for the students. Pausing to address safety concerns—like wearing lab goggles and fire safety

-

Students Will Complete: Lab Procedures

Have each student choose one corner store food and one farmers market food. For each food students will complete the calorimetry lab and nutritional data table. All results will be recorded on the board to get a class set of data.

When students complete the lab the will work to answer the essential question.

Using data from their lab findings to support their results

Have a basket of market EBT chips on the teachers desk available to students at the end of the lesson

Lesson 3- Student Worksheet: Corner Store Calorimetry Lab

Name: _____

Per: _____

Corner Store Calorimetry Lab

INTRODUCTION:

Plants have evolved processes that convert light energy into the chemical bonds of complex molecules. The chemical bonds in carbohydrates, fats, and proteins store energy until needed by the plant. The plant can then release the energy by breaking the appropriate chemical bonds.

Every animal maintains its life processes by consuming complex molecules that store energy. The processed plants and animals we eat as foods contain varying amounts of proteins, carbohydrates, and fats. Because each of these types of foods contains varying amounts of energy, these foods will release varying amounts of energy when they are used by cells. Within our bodies, the energy is released slowly by a series of chemical reactions.

In this lab we will compare the caloric content of corner store food products to food products found

PRE-LAB PREPARATION:

By burning pieces of food, the chemical energy stored in molecular bonds is released as heat and light. The heat can be measured in units called **calories**. A calorie is the amount of heat (energy) required to increase the temperature of one gram of water by one degree C. This process is the basis of the technique of **calorimetry**.

The more calories a food contains, the more heat is given off when burned. Foods high in calories will release large amounts of energy. One gram of a protein will release far fewer calories than one gram of fat. You will see how much energy a snack food from the corner store release and then find out how much energy a healthier food from the public market releases.

MATERIALS:

Food Samples	50 mL beaker
Balance	Watch Glass
Ring stand	Lighter
Thermometer	
Empty soda can	Water

PROCEDURE:

1. Assemble the ring stand, clamp, and watch glass. The clamp should be 12 inches above the watch glass.
2. Place **20 mL** of water in the empty soda can and clamp the pop can into the clamp. The bottom of the pop can should be 12 inches above the watch glass. Place the thermometer in the pop can.
3. Obtain 1 corner store food and 1 public market food sample. Find the mass of the sample to the nearest **0.1 g** (one decimal place), and record its mass in the **DATA TABLE**.
4. Measure the temperature of the water in the soda can to the nearest **0.5 degrees C** and record in the **DATA TABLE** as initial water temperature.
5. Place the food sample onto the watch glass. Place the sample on the table away from the can. Set the food on fire. *Immediately* move the sample under the can. Let the sample burn itself out completely. Relight it *immediately* if it goes out before all of the food is burnt to a black crisp.
6. After the food sample is completely burned, measure the temperature of the water again to the nearest **0.5 degrees C**, and record in the **DATA TABLE** as final water temperature. **Be sure to watch the thermometer carefully, to catch the highest temperature reached.**
7. Find the mass of the sample remaining to the nearest **0.01 g** and record in the **DATA TABLE** as mass of sample after burning (ash weight).
8. Repeat procedure for another healthy food sample. You should have 2 trials total trials.

DATA TABLE:

Table 1 – First Hot Cheetos Data

Food Sample	Mass before burning (g)	Mass after burning (g)	Change in Mass (g)	Initial Temperature (°C)	Final Temperature (°C)	Change in Temperature (°C)
Corner Store Trial 1						
Healthy Food Trial 2						

CALCULATIONS:

1. To estimate the calories in the food sample you will need the mass of the water you heated. The **20.0 mL** of water you used is **20.0 g**. Calculate the amount of energy transferred to the can in terms of calories. Then, convert to kcal.

$$\text{Kcal(kilocalories)} = \frac{\text{calories}}{1000}$$

Corner Store Food Trial 1:

Healthy Food Trial 2:

2. Calculate the number of Kilocalories per gram of food. Take the kcal answer from #1 and divide by the number of grams of food used in each trial.

Corner Store Trial 1:

Healthy Food Trial 2:

3. Calculate the heat that was released by the food and absorbed by the water in **joules**.

$$\text{Calories} = \text{mass}_{\text{water}} \times \Delta T \times C_p$$

$$C_p = 4.184 \frac{\text{J}}{\text{g} \times ^\circ\text{C}}$$

Snack Food Trial 1:

Healthy Food Trial 2:

4. Calculate the **joules** released per gram of food that burned.

$$\text{Joules per gram} = \frac{\text{Heat in J (Answer to \#3)}}{\text{Grams of Food}}$$

Snack Food Trial 1:

Healthy Food Trial 2:

Reflection Questions

1. Which food has more calories in it?
2. How do you think an excess of calories in your body could influence your overall health?
3. Do you find it easier to access healthy foods or unhealthy foods? How could you change this?

Lessons 4-7: Research Based Justification

These two two-day lessons have similar research justifications, for this reason I have combined them in my rationale, however I have separated them into four separate lesson plans that outline student and teacher actions. These lessons aim to pull from urban students funds of knowledge and apply relevant issues in their lives or lives of their loved ones to the subjects of nutrition and the human body system. This is in an attempt to build a bridge between their school-life and home-life , to help bolster buy-in from students (Grinner & Stewart 2012).

In America unlike in many other developed nations the impoverished population is more likely to be obese, and suffer from obesity linked diseases, such as Heart Disease and Type II Diabetes. This two lessons will link the students' recently acquired knowledge on nutrition to their family or communities experiences with Heart Disease and Type II Diabetes. These lessons will also be an opportunity for students to learn about two of the human body systems in a way that is congruent with their own community. Students will begin the lessons by interviewing family members about their experiences, then directly learning about the body system and disease and then engaging in a relevant inquiry experience to increase engagement (Sandoval& Harven 2011).

Lesson 4: Lesson Plan

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT High School- Living Environment
DATE Day 4	TIME 60- 1 of 2
TOPIC Nutrition	LESSON TITLE Keep up the flow! Pt1

PURPOSE

In this lesson students will use the information they gained in the previous three lessons and apply it to cardiovascular health. Looking at how unhealthy foods, food that are not properly balancing required macromolecules influence cardiovascular health and how those issues may impact someone in their lives. As well as how a healthy heart looks and works, leading to how healthy eating can positively impact a persons heart health.

LEARNING OUTCOMES

- Students will identify characteristics of a healthy heart
- Students will explain how diet can impact the function of a heart.

MATERIALS

Power Point, Surveys, Computer, Projector

MODIFICATIONS/ACCOMODATIONS

- Preview lab set-up with students with IEPs
-

PROCEDURES

Student Poll-

- Teacher Explains- Heart Health is a issue that impacts many families, but is a particularly serious issue in parts of the country where poverty is high and obesity rates are also high.
-
- Have a secret poll of students-
- Do you know anyone who is obese?
- Do you know anyone who has high blood pressure?
- Do you know someone who has had a heart attack?
-
- Connect these students issue to the cardio vascular system having a diet that is high in fat like many we look at in the labs in the last two days can result in heart complications
-
- Healthy Heart Lesson
- Teacher will -ask all students to stand up and complete 40 jumping jacks and then measure their heart rate for one minute.
- Students will – preform task
-
- Teacher will say-
- The healthy heart rate during exercise is between 120-170 because when exercising your heart has to work overdrive to get oxygen through out your body. If your heart has to pump too hard this is also not good

- Then teacher will review with the students using circulatory system notesheet the job of the circulatory explaining each of three parts of the system blood, arteries, heart.
-
- Through out the lecture teacher will use the analogy of transport system like delivery man.
-
- Students will complete- note guide and participate in discussion
-
- Unhealthy Heart Video
- Teacher will
- Show students a video that talks about how fatty foods can influence our hearts ability to work.
- Students will think back to the lab where they measured out Crisco to represent the fat in their favorite foods, all of that food gets digested and much of the fat eventually get absorbed in to the blood which pumps through their heart. And write a explanation of how they think food can affect the flow of blood through their bodies
-
- HYPERLINK "<https://www.youtube.com/watch?v=xUgKekv57hI>"
<https://www.youtube.com/watch?v=xUgKekv57hI>
-
- HW- Day 1
- Have students conduct interviews of family members to see if heart issues run in their family

Lesson 4: Student Worksheet- Family Interview

Name: _____

Per: _____

Interviewing My Family

Ask five adults in your family who are over the age of 21 if they have any of the conditions listed below. Place a check beside all the conditions they say they have. The adults in your family could include parents, grandparents, aunts, uncles, or cousins. If you are not able to talk to five adults, you can also ask younger family members.

FAMILY HISTORY

Name	Condition
	<input type="checkbox"/> None <input type="checkbox"/> High blood sugar <input type="checkbox"/> High blood cholesterol or triglycerides <input type="checkbox"/> High blood pressure <input type="checkbox"/> Low good cholesterol (HDL*) <input type="checkbox"/> Fat in the stomach area (abdominal obesity)
	<input type="checkbox"/> None <input type="checkbox"/> High blood sugar <input type="checkbox"/> High blood cholesterol or triglycerides <input type="checkbox"/> High blood pressure <input type="checkbox"/> Low good cholesterol (HDL*) <input type="checkbox"/> Fat in the stomach area (abdominal obesity)
	<input type="checkbox"/> None <input type="checkbox"/> High blood sugar <input type="checkbox"/> High blood cholesterol or triglycerides <input type="checkbox"/> High blood pressure <input type="checkbox"/> Low good cholesterol (HDL*) <input type="checkbox"/> Fat in the stomach area (abdominal obesity)
	<input type="checkbox"/> None <input type="checkbox"/> High blood sugar <input type="checkbox"/> High blood cholesterol or triglycerides <input type="checkbox"/> High blood pressure <input type="checkbox"/> Low good cholesterol (HDL*) <input type="checkbox"/> Fat in the stomach area (abdominal obesity)
	<input type="checkbox"/> None <input type="checkbox"/> High blood sugar <input type="checkbox"/> High blood cholesterol or triglycerides <input type="checkbox"/> High blood pressure <input type="checkbox"/> Low good cholesterol (HDL*) <input type="checkbox"/> Fat in the stomach area (abdominal obesity)

*HDL= High-density lipoprotein

Lesson 5 – Lesson Plan

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT High School- Living Environment
DATE Day 5	TIME 60 minutes –Part 2
TOPIC Nutrition	LESSON TITLE Keep up the flow!

PURPOSE

In this lesson students will use the information they gained in the previous three lessons and apply it to cardiovascular health. Looking at how unhealthy foods, food that are not properly balancing required macromolecules influence cardiovascular health and how those issues may impact someone in their lives. As well as how a healthy heart looks and works, leading to how healthy eating can positively impact a persons heart health.

LEARNING OUTCOMES

Day 2: EQ: What are the effects of a blockage on the flow of blood? How does this impact your body?

--	--

MATERIALS

Tubing, Playdough, Model Blood

MODIFICATIONS/ACCOMODATIONS

- Preview lab set-up with students with IEPs
-

PROCEDURES

- Day 2
-
- Opening- Teacher Will-Ask students to share the findings of their family interviews.
-
- Ask questions like:
-
- Was there more or less heart issues than you expected?
-
- What is one thing you could recommend to your uncle with high blood pressure?
-
- Students will write the answer to this question using vocabulary from the previous lesson:
-
- How would you explain to your grandmother how high fat foods affect they way her heart pumps?

Modeling- Go with the Flow Worksheet- Materials From
<http://blogs.tc.columbia.edu/cfe/files/2010/10/c3-Lesson-152.pdf>

Tell the students that they are going to now model what a clogged artery looks and acts like

Pass out the Go with the Flow Worksheet and distribute baskets with lab materials in them.

Students will- Read the lab set up

Teacher will- model lab set up while students read

Students will- Complete the lab actions

Teacher will – Circulate while and help students successful model clogged arteries

Lesson 5: Student Worksheet- Go with the Flow

Name: _____

Go with the Flow

In this experiment, students compare the flow of “blood” in clogged and unclogged model blood vessels.

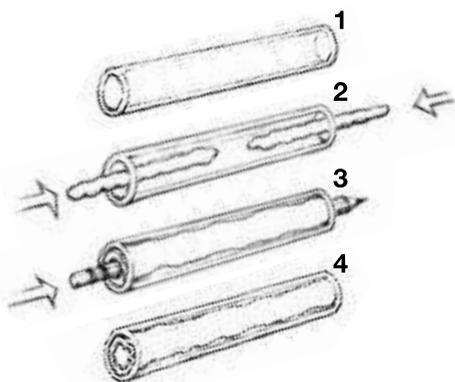
Setup

1. Gather materials.
2. Make simple “blood” by mixing red food coloring with water. If you wish to have thicker “blood,” follow the *Cornstarch “Blood”* recipe (p. 282).
3. Cover work surfaces with newspaper or other covering so any “blood” that might spill will not stain.

Procedure

1. Have students work in pairs.
2. Give each pair of students two plastic tubes. Tell them that these tubes represent blood vessels.
3. Distribute the yellow play dough to each student pair. Tell them that this play dough represents plaque, which comes from the fat and cholesterol in the foods we eat.
4. Have them set aside one plastic tube. Tell them that this represents a blood vessel that has not been clogged with plaque.
5. Have them use the second plastic tube to make a blood vessel that is clogged with a lot of plaque and only has a small opening for blood to flow through. Demonstrate how to do this. Use your hand to roll the play dough into two long, thin logs. Make them slightly smaller in diameter than the plastic tube. Stuff one log into each end of the tube. Stick a pencil through the middle of the play dough in the tube so that there is a small opening from one end to the other.

Steps for making a plaque-filled blood vessel:



1) Take one of the clear tubes.

2) Roll the play dough into two logs thin enough to insert into the tube. Stuff one log into each end of the tube so it is filled with play dough.

3) Use a pencil to make a narrow hole all the way through the tube. Twist the pencil to help it pass through the play dough.

4) Remove the pencil. Now the tube models a plaque-filled blood vessel.

6. After the student pairs have made the plaque-filled blood vessel, distribute the “blood” — a cup to each pair.
7. Instruct the pairs to have one student hold the unclogged blood vessel over the plastic bowl. Tell the other student to pour the “blood” through the blood vessel as quickly as possible. Have the partner holding the blood vessel count the seconds it takes for the blood to flow through. Tell them to record the time in their LiFE Logs.
8. Have students pour the “blood” back into the cup. Students should now switch roles. This time, have one hold the clogged blood vessel over the plastic bowl. Have the other pour the blood through while the partner holding the blood vessel counts out the seconds. Tell them to record the time in their LiFE Logs.
9. After they have completed this experiment, have them clean the play dough out of the clogged blood vessel by pushing a paper towel through the tube with a pencil.

Questions

1. *What did you observe when the blood flowed through the unclogged blood vessel?*
2. *What did you observe when the blood flowed through the clogged blood vessel?*
3. *Did you observe any differences in the way the blood flowed through the two different blood vessels? Describe what you observed.*
4. *What do you think would happen if your heart had to pump blood through very clogged blood vessels?*

Lesson 6 -Lesson Plan

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT Living Environment
DATE Day 6& 7	TIME 60 Min 1 of 2
TOPIC Endocrine/ Diabetes/ Nutriton	LESSON TITLE Not So Sweet Anymore?

PURPOSE

This two day lesson will highlight a health concern that is of major concern to the urban community- Diabetes. The lesson will begin with an introduction to the endocrine system then get into students reading articles that compare and contrast Type I and Type II Diabetes, and discover the relationship between type of diet and occurrence of Diabetes . Then student’s will do a lab where they test several “patients urine” and figure of if any of the patients have urine. This will loop back to skills earlier in the year w

LEARNING OUTCOMES

- Students will relate diet to health issues
- Students will understand the meaning of terms such as hormone, feedback loop, and gland
- Students will be able to apply technical skills to real world scenarios such as diabetes

NYS STANDARDS

1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles).
 Analyzes results from observations/expressed data • Formulates an appropriate conclusion or generalization from the results of an experiment • Recognizes assumptions and limitations of the experiment
 • Follows directions to correctly use and interpret chemical indicators

COMMON CORE STANDARDS

RST 7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

MATERIALS

-Video , Powerpoint, Urine Samples, Test Tubes, Test Tube Racks, Pipettes, Salt Indicator, Protein Indicator, Glucose Indicator, Hot Water Bath

MODIFICATIONS/ACCOMODATIONS

PROCEDURES

- Hook- Begin the lesson with a video that shows a teenagers struggle with Type II Diabetes. Ask students if they know any one who has diabetes, and also reveal to students that there are higher incidences of Type II Diabetes in the African American and Hispanic community
- HYPERLINK "<https://www.youtube.com/watch?v=eKnZ6X37K4M>"
- <https://www.youtube.com/watch?v=eKnZ6X37K4M>
-
- Endocrine Lesson
- Teacher will present a power point on the endocrine system.
-
- Students will take notes on a powerpoint that introduces the endocrine system
-
- Then they will read an article that compares and contrasts Type I and Type II diabetes and answer questions and analyze the relationship between health and diet.

Lesson 6- Student Worksheet- Endocrine Notes

Name: _____

Living Environment

Per: _____

Endocrine Powerpoint Notes

As we go through the Powerpoint define the following terms:

1. Endocrine system-

2. Hormones-

3. Glands-

4. Inhibition-

5. Endocrine gland-

6. Exocrine gland-

7. Pancreas-

8. Insulin-

9. Glucose-

Diabetes Article-

Diabetes Rising Rapidly Among U.S. Kids

Both type 1 and type 2 disease rates up more than 20 percent in past decade, finds study

HealthDay June 9, 2012 | 12:00 p.m. EDT + More



By Serena Gordon

HealthDay Reporter

SATURDAY, June 9 (HealthDay News) -- Diabetes is increasing among U.S. children at an alarming rate, say researchers who report jumps of more than 20 percent since 2001 for type 2 disease, which is linked to excessive weight and sedentary lifestyles, and type 1 diabetes, which is an autoimmune disease.

"Both types of diabetes are increasing," said study co-author Dr. Dana Dabelea, associate dean for faculty affairs at the University of Colorado School of Public Health in Aurora. "For type 2, we have some clues as to why it's increasing, but for type 1, we still need to better understand the triggers of this disease."

Many of the type 2 diagnoses are explained by the rise in overweight and obese children. According to the U.S. Centers for Disease Control and Prevention, 17 percent of U.S. children and teens are obese -- three times the number of a generation ago.

Type 1 diabetes occurs when the body's immune system mistakenly turns on healthy cells responsible for producing insulin, a hormone needed to metabolize the carbohydrates in food. It's been suggested that exposure to certain viruses may trigger the onset of type 1 diabetes. It is not linked to lifestyle factors, such as being overweight.

The exact cause of type 2 diabetes is less clear. People with type 2 either don't produce enough insulin, or their bodies don't use insulin efficiently. The disease is linked to sedentary lifestyles and to being overweight. However, other factors may be responsible, too. The disease can often be controlled in its early stages with lifestyle changes that include losing weight and becoming more active.

The first study found that about 189,000 people under the age of 20 had diabetes in the United States. Of those, 168,000 had type 1, and more than 19,000 had type 2.

From 2001 to 2009, the number of American children with type 2 diabetes increased 21 percent, and cases of type 1 ballooned 23 percent, the researchers found.

The study also found that children with type 2 were more likely to have protein in their urine than children with type 1 diabetes, suggesting that they might be at greater risk for early kidney damage. Youngsters with both types of diabetes also showed early indications of damage to the nerve system that regulates the heart and its blood vessels, according to the study.

The researchers also found that children with diabetes who watched more than three hours of television daily had poorer blood sugar control and higher levels of triglycerides, a blood fat, than children who watched less TV.

Dabelea and her colleagues were scheduled to present their findings on Saturday at the American Diabetes Association annual meeting in Philadelphia. The study was funded by the CDC and the U.S. National Institutes of Health.

In another presentation planned for the meeting, researchers who are also from the University of Colorado studied children with type 2 diabetes and found the disease may progress more rapidly in young people than in older folks. With an average follow-up of just four years, this study found that about one-third of children with type 2 diabetes had high blood pressure, compared to 12 percent at the start of the study. Almost 17 percent showed early signs of kidney damage, and 13 percent had early signs of eye disease.

"Type 2 is not a benign condition in children," said Dabelea.

Dr. Joel Zonszein, director of the clinical diabetes center at Montefiore Medical Center in New York City, said he wasn't surprised by either study's findings on type 2 diabetes.

"We're seeing more children with type 2, and at younger ages. They often have more aggressive disease at the time of diagnosis and other conditions, such as [abnormal cholesterol levels]," he said. "I'm concerned because these are young people being diagnosed with an adult disease, and they will probably progress to cardiovascular disease much faster."

Zonszein was surprised at the dramatic rise in the rates of type 1 diabetes. "I don't know what would cause more autoimmune disease in type 1," he said.

While there are no known ways to prevent type 1 diabetes, both experts said that a healthy lifestyle can go a long way to preventing type 2 in children. Zonszein's first recommendation is to get TVs out of children's bedrooms.

Both Zonszein and Dabelea recommended a healthy diet with lots of fruits and vegetables, and an active lifestyle, not just for the children, but for the whole family.

Data and conclusions presented at meetings should be considered preliminary until published in a peer-reviewed medical journal.

Name: _____
Living Environment
Period: _____

Diabetes Article Questions

1. Which gland(s) within the endocrine system are responsible for the onset of diabetes?
2. What is one way that Type II diabetes is similar to Type I diabetes?
3. What are two ways in which Type II diabetes is different from Type I?
4. What is thought to be the cause of the increase in Type II diabetes in this country?
5. If someone recently was diagnosed with Type II diabetes what macromolecule (carbohydrate, protein or lipid) do you think their diet would be highest in?
6. What are some of the suggestions that experts suggested would help prevent Type II diabetes?

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT Living Environment
DATE Day 6& 7	TIME 120 Min
TOPIC Endocrine/ Diabetes/ Nutriton	LESSON TITLE

PURPOSE

This two day lesson will highlight a health concern that is of major concern to the urban community- Diabetes. The lesson will begin with an introduction to the endocrine system then get into students reading articles that compare and contrast Type I and Type II Diabetes, and discover the relationship between type of diet and occurrence of Diabetes . Then student's will do a lab where they test several "patients urine" and figure of if any of the patients have urine. This will loop back to skills earlier in the year w

LEARNING OUTCOMES

- Students will relate diet to health issues
- Students will understand the meaning of terms such as hormone, feedback loop, and gland
- Students will be able to apply technical skills to real world scenarios such

NYS STANDARDS

1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles).
Analyzes results from observations/expressed data • Formulates an appropriate conclusion or generalization from the results of an experiment • Recognizes assumptions and limitations of the experiment
• Follows directions to correctly use and interpret chemical indicators

COMMON CORE STANDARDS

RST 7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

MATERIALS

-Video , Powerpoint, Urine Samples, Test Tubes, Test Tube Racks, Pipettes, Salt Indicator, Protein Indicator, Glucose Indicator, Hot Water Bath

MODIFICATIONS/ACCOMODATIONS

PROCEDURES

Teacher will remind students of the indicators the have used already to test for substances

- “Who remembers how we test for glucose? What about salt? How about protein ? What about carbohydrates?”
-
- Today we will use these tests to test “urine samples” and diagnose patients with health conditions such as Type II Diabetes.
-
- Lab Safety/ Procedure:
- Teacher will overview lab using a powerpoint that reminds students of the different indicators they will be using and how to tell if a sample is positive or negative for each substance.
- Students will read lab work sheet and ask any questions they have about the procedure
-
- Students will follow lab procedure to test “urine samples” and then answer reflection questions at the end of the lab
-
- Teacher will supervise students for safety and assist students in lab procedures as needed.
-

Lesson 7, Student Worksheet- Urinalysis Lab

Urinalysis Lab

Lab

Partners: _____ Per _____

Research: What is Diabetes insipidus, diabetes mellitus, and Bright's disease. Predict the effect of severe dehydration on urine.

Background: This lab will include a few of the tests commonly used in a routine analysis of urine. In this lab activity, you will be using simulated urine and specific chemical reagents that will determine pH and the presence of proteins and glucose. A results from these tests can be used to diagnosis various kidney problems.

The nutrients in the food you eat supply your body with energy for growth and repair. These principle substances include carbohydrates, proteins, fats, minerals and vitamins.

Carbohydrates make up a group of organic compounds that include sugars and starches, which are important in supplying your body with energy (and structure). Some starches provide your body with indigestible fiber (roughage) which aids in digestion.

Proteins are organic compounds important for growth and repair. Lipids (e.g. fats) are organic compounds that can supply as much as four times the amount of energy as carbohydrates or proteins.

Vitamins aid in growth and also help to protect the body from disease.

Using Simple Chemical Indicators

We can test for the presence of these important compounds in food by using chemical reagents that react in predictable ways in the presence of these nutrients.

Safety: Wear your safety glasses and aprons at all times!

Procedure:

Part A-pH: pH refers to how acidic or basic urine is. The **pH** is a measure of how acidic or alkaline (basic) the urine is. A urine pH of 4 is strongly acidic, 7 is neutral (neither acidic nor alkaline), and 9 is strongly alkaline. The pH of normal urine is approximately 6.0, which is slightly acidic. Urine may be highly acidic in the case of diabetes or dehydration. Highly basic urine is present when there is a urinary tract infection, aspirin overdose, certain types of kidney disease or a diet high in citrus.

1. Place 1 drop of each type of urine on individual strips of pH paper.
2. Record whether the urine is acidic or basic (record the pH number as well).

Part B-Benedict's test

Glucose: There should be no glucose in the urine. Glucose is the type of sugar found in blood. Normally there is very little or no glucose in urine. When the blood sugar level is very high, as in uncontrolled [diabetes](#), the sugar spills over into the urine. It often means the sugar level in blood entering the kidney is so high that it exceeds the kidney's ability to pass it back into the blood. Glucose can also be found in urine when the kidneys are damaged or diseased. This condition is associated with diabetes but is often common with pancreatitis and hypothyroidism.

Benedict's solution is used to test for simple sugars, such as glucose. It is a clear blue solution of sodium and copper salts. In the presence of simple sugars, the blue solution changes color to green, yellow, and brick-red, depending on the amount of sugar.

1. LABEL 4 test tubes to correspond to the sample names.
2. Check your water bath and make sure it has water in it and is not boiling over... heat should be on a medium number.
3. Put about 5-10 drops of liquid in each test tube... just make sure you are putting the "A" unknown in the "A" test tube, etc.
4. At your lab station, put 3-4 drops of Benedict's solution in each test tube.
5. Place all 4 test tubes in the hot water bath and wait 3-4 minutes for a color change. Remove the test tubes using the test tube clamp and place in your rack.
6. Record the results in the chart.
7. Dump the liquids into the sink and use the cleaning bucket and brush to clean the test tubes. Make sure to wash them completely.

Part C- Iodine test

iodine tests for the presence of starch and will turn a dark blue/purple if starch is present

1. Place your test tubes in the rack (be sure they are still labeled)
2. Put about 5 to 10 drops of liquid in each test tube (be sure that each liquid corresponds to the correct test tube).
3. Add 2 drops of iodine solution to each test tube and swirl the tube.
4. Record the color changes in TABLE 2.
5. Dump the liquids into the sink. Use the cleaning bucket and brush to clean the test tubes. Make sure to wash them completely. Place them in the test tube rack, on the pegs, upside down and CLEAN YOUR STATION!!

Part D- Protein Test with Biuret Solution

Protein is normally not found in the urine. [Fever](#), hard exercise, [pregnancy](#), and some diseases, especially kidney disease, may cause protein to be in the urine. Biuret solution is used to identify the presence of protein. Biuret reagent is a blue solution that, when it reacts with protein, will change color to pink-purple

1. Place your test tubes in the rack (be sure they are still labeled)

2. Put about 5 to 10 drops of liquid in each test tube (be sure that each liquid corresponds to the correct test tube).
3. Add 3 drops of Biuret solution to each test tube and swirl the tube.
4. Record the color changes in the table.
5. Dump the liquids into the sink. Use the cleaning bucket and brush to clean the test tubes. Make sure to wash them completely. Place them in the test tube rack, on the pegs, upside down and CLEAN YOUR STATION!!

Results section

Test tube letter	pH	Benedict's test (+ or -)	Iodine test (+ or -)	Biuret Solution	Which Disorder?
A					
B					
C					
D					

UNKNOWN URINE ANALYSIS:

Obtain a urine specimen.

Following the test procedures from above determine the results of each test.

Specify which disorder you think this patient might have.

SPECIMEN NUMBER: _____

SUSPECTED DISORDER (CONDITION): _____

Analysis:

1. Blood contains glucose, phosphates, and chloride molecules whereas urine normally contains only phosphates and chlorides. What does this indicate about the function of the kidneys?

2. The contents of a person's urine can change throughout the day. Explain why you think this might occur.

3. How would a positive result for each of these components in the urine look?
 - a. Glucose

 - b. Phosphates

4. Which of these patients most likely has Type II diabetes? Why do you say this?

5. If you were a doctor treating the patient above how would you explain their disease to them? And what suggestions would you make to them as far as lifestyle change? Answer this question in several complete sentences.

Lesson 8- Field Trip to the Public Market

This lesson aims to give the students an opportunity to see what is available to them right with in their own community, and mostly likely accessible to them and their families. Giving the students a chance to increase their own agency and take control of their own health and diet (Esposito & Swain 2009).

Lesson 8: Lesson Plan

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT Living Environment
DATE Day 8	TIME 120 Min
TOPIC Nutrition	LESSON TITLE Market Field Trip

PURPOSE

At this point in the unit the students should have a grasp on the types of foods a body needs and the consequences of not getting the nutrition they need. The field trip the students will take now will be an opportunity for the students to see how they can make healthy choices regardless of budget.

LEARNING OUTCOMES

- Students will relate diet to health issues
- Students will explore healthy living opportunities within their own communities

NYS STANDARDS

1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles).
Analyzes results from observations/expressed data • Formulates an appropriate conclusion or generalization from the results of an experiment • Recognizes assumptions and limitations of the experiment
• Follows directions to correctly use and interpret chemical indicators

COMMON CORE STANDARDS

MATERIALS

-Video, Field Trip Guide

MODIFICATIONS/ACCOMODATIONS

PROCEDURES

Pre- Field Trip-

Show the students these videos that explain how EBT can be used at our market and the testimonials of local costumers

[https://www.youtube.com/watch?v=hZMT-](https://www.youtube.com/watch?v=hZMT-2F_GIY&context=C2e9adADOEgsToPDskLBXDoRTGFr0fhfO1PZjJv1)

[2F_GIY&context=C2e9adADOEgsToPDskLBXDoRTGFr0fhfO1PZjJv1](https://www.youtube.com/watch?v=hZMT-2F_GIY&context=C2e9adADOEgsToPDskLBXDoRTGFr0fhfO1PZjJv1)

<https://www.youtube.com/watch?v=Rkdc0lPrIto>

During Field Trip- Students will be give the opportunity to explore the market and will be given field trip guides by the staff at the market

Lessons 9-11: Research Based Justification

In the final days of this unit the students will be given a choice of problem based learning projects and will engage in drafting a plan to improve nutrition and health for themselves and their families, this project will ultimately culminate in a research fair in which they will be able to invite their friends and families to.

Problem-based learning is a way for urban students to be engaged in classroom activities that are directly related to their lives outside of the classroom and activities that have sense of purpose. This sort of student directed work has been show to motivate urban students and help to find a sense of purpose and agency within their work in the science classroom both immediately and in the future (Bouillion & Gomez 2001).

NAME Alexa Cavalli	GRADE LEVEL + SUBJECT Living Environment
DATE Day 9	TIME 180Min
TOPIC Nutrition	LESSON TITLE Problem-Based Learning

PURPOSE

LEARNING OUTCOMES

- Students will explore healthy living opportunities within their own communities
- Students will create a plan to improve their own health using resources available to them in the community

NYS STANDARDS

COMMON CORE STANDARDS

1.2 Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles).
 Analyzes results from observations/expressed data • Formulates an appropriate conclusion or generalization from the results of an experiment • Recognizes assumptions and limitations of the experiment
 • Follows directions to correctly use and interpret chemical indicators

MATERIALS

MODIFICATIONS/ACCOMODATIONS

PROCEDURES

Teacher will introduce the three project options to students and help students in the research process.

-
-

Project 1- Home Cooking Made Healthy

Have students bring in a favorite recipe from home that reflects their culture whether it is baked macaroni and cheese, fried rice, fried chicken, or whatever else might be cooked in their home. Have them research the nutrition facts of their recipe as is. And then have them research ways to make it healthier, and have them work with the Food and Consumer Science teacher to create a sample of this new and improved recipe for the research fair

-

Project 2- Healthy Eating at Schools

Have the students obtain current nutrition facts on the school lunches provided to them. Then have them research the Farm to School Movement and create a 5 day healthy and sustainable menu to propose to the school.

-

Project 3- Personal Health Plan

Have the students evaluate their current level of health by keeping a food log for a day and by performing a basic fitness test. And then have them create a list of goals and action steps to get them to their desired level of health. They will then create a poster of this personal health plan to present at their research plan.

-

-

Students will select a project based on their own interest level and will spend three class periods working to complete the extensive project.

-

-

Lesson 9-11, Student Worksheet- Project 1

Name: _____

Per: _____

Living Environment

Project 1- Home Cooking Made Healthy

Step 1: Create an account at myfitnesspal.com. Then click on the recipe tab and input your recipe into the form provided (make sure to include how many servings this creates). Now put the nutritional information for your recipe into the table below.

Recipe: _____

	In this Recipe	Daily Value	% of Daily Value
Calories		2000 cal	
Carbs (g)		300 g	
Sugars (g)		25 g	
Fats (g)		65g	
Protein (g)		50g	
Sodium		2400 mg	

Step 2: Analyze your favorite recipe

1. What is the caloric value of your recipe like? If you ate this food for three meals a day would you be getting too many calories? Or not enough?
2. Does your meal have enough protein? What might be some effects on your body of low protein intake?
3. Are you more concerned with the amount of fat or sugar/ carbs in your recipe? Why?
4. What could be the long-term health implications of this sort of meal?

5. Look back over the itemized analysis of your recipe on myfitnesspal.com, which ingredients do you think are making your recipe most unhealthy? Why?

6. Which parts of the recipe do you think you could replace or remove and still have your recipe be tasty and remind you of your families cooking?

Part 3: Healthy Recipe Research- Use the websites listed below to research healthy alternatives to recipes that are very popular in your home or culture. Use these to help inspire the new version of your favorite recipe.

Italian-

http://www.eatingwell.com/recipes_menus/recipe_slideshows/favorite_italian_food_made_healthy?slide=14

Asian-

<http://www.cookingchanneltv.com/recipes/healthy-chinese-and-asian-take-out-recipes.html>

Latin American-

http://www.eatingwell.com/recipes_menus/collections/healthy_hispanic_recipes

Southern Cooking/Soul Food

http://www.eatingwell.com/recipes_menus/recipe_slideshows/soul_food_recipes?slide=1#leaderboard

Part 4: New and Healthy Recipe

Ingredients:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Directions:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Part 5: New Recipe Analysis

Now input your new recipe into the website myfitnesspal.com and fill in the table below.

	Original Recipe	New Recipe	Daily Value	Percent Change from Original Recipe
Calories			2000 cal	
Carbs (g)			300 g	
Sugars (g)			25 g	
Fats (g)			65g	
Protein (g)			50g	
Sodium			2400 mg	

Final Reflection

Create a one page typed summary that addresses the following questions.

- A. How could the original recipe affect your health?
- B. What sort of substitutions or changes were made between the two recipes?
- C. What are your thoughts about using new healthier recipes in your household/ what do you think your family member will think of the recipe?

Lesson 9-11, Student Worksheet- Project 2

Name: _____

Per: _____

Living Environment

Project 2- Healthy School Lunches

Introductions: Eating healthy at home is great but many students in our school and all over the Rochester City School District eat two of their meals each day at school. But is what we are eating as healthy as it could be? How does the food we are eating in school impact how we learn and our health outside the classroom?

Part One- Read about the benefits of a healthy school lunch in the article linked below and answer these questions.

<http://www.livestrong.com/article/289100-what-are-the-benefits-of-healthy-school-lunches/>

1. What are some of the changes that were made with the Healthy, Hunger-Free Kids?
2. Why should fats be limited in school lunches? What are the consequence of a high fat diet?
3. Which types of fats are healthier saturated or unsaturated? What types of food have healthy fats and what types of food have less healthy food?
4. How does healthy food help you preform in school?
5. What do you think of our schools lunches? Are they tasty? Are they healthy?

Part 2: Our School Lunch

	Monday	Tuesday	Wednesday	Thursday	Friday
Lunch Description					
Calories					
Fat (g)					
Saturated Fat (g)					
Protein (g)					
Carbs (g)					
Sugar (g)					
Calcium (g)					
Fiber(g)					
Vitamin A (g)					
Vitamin C (g)					

1. After looking at a weeks menu what how would you rank our schools lunches?
2. What macromolecules should be increased?
3. What macromolecules should be decreased?
4. What lunch item is healthiest? Which is least healthy?
5. Do you feel that the school lunches are fresh? Do you think you would like the school lunches better if they used fresh produce like the produce we sampled at the market?

Part 3- Farm to School Research

In attempts to make school lunches both more healthy and more tasty many school districts around the country have adopted a farm to school, school lunch program these programs work with local farmers to create healthy lunches using local products. Not only does this give you a fresher lunch but, helps our local economy. Read about the Farm to School movement and some schools that have jumped on board.

http://www.fns.usda.gov/sites/default/files/F2S_FarmtoSchool_March2014.pdf

http://www.fns.usda.gov/sites/default/files/F2S_10Facts_March2014.pdf

<http://www.feingold.org/PF/wisconsin1.html>

<http://www.farmentoschool.org/get-started>

Farm to School Questions

1. What is the Farm to School movement? And what does it mean to serve local products?
2. What are some of the ways schools can get funding for a Farm to School program?
3. How have healthier lunches affect students in the school in Wisconsin? What has happened to their grades, behavior and health?
4. What are some ways we could help promote a Farm to School culture here at our school?

Part 4: Farm to School Menu and Nutrition Fact

Now take a look at this electronic cookbook that shows healthier school cafeteria options that use local produce and plan a new five-day menu that you think you would enjoy. And then log the nutrition facts in the table below.

http://www.vtfeed.org/sites/default/files/New_School_Cuisine_Cookbook.pdf

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Fruit/Veggie/ Salad					
Grain					
Meat/Meat Alternative					

Beverage					
	Monday	Tuesday	Wednesday	Thursday	Friday
Lunch Description					
Calories					
Fat (g)					
Saturated Fat (g)					
Protein (g)					
Carbs (g)					
Sugar (g)					
Calcium (g)					
Fiber(g)					
Vitamin A (g)					
Vitamin C (g)					

Part 5: Persuasive Letter

Now use all of this information to write a persuasive letter to the board of education, about the changes you think we should make to school lunches. And whether or not the Farm to School Movement is right for the Rochester City School District.

Points to include:

- Issues with our current lunch program- include specific nutrition information
- How unhealthy lunches will negatively impact students (health and school performance)
- Some examples of success using Farm to School movement
- The types of food to include in new lunches
- Grant opportunities
- Next steps

Lesson 9-11, Student Worksheet- Project 3

Name: _____

Per: _____

Living Environment

Project 3- Personal Health Plan

Part 1: Current Level of Nutrition

Keep a food and exercise log for three days before this project starts. Now create an account on myfitnesspal.com and input the information you kept into the “food diary” section of this website, and fill in the table below. Please know the information in this project will be kept private from everyone else in this class, it is only going to be used for your own personal growth.

	Day 1	Day 2	Day 3
Target Calorie			
Calories Eaten			
Calories Burned			
Fat Intake			
Carb Intake			
Protein Intake			

1. How does your total calorie intake compare the target calorie intake for some one of your age, gender, and height?
2. Is there one macromolecule in particular that you are getting too much of? Or one that you are getting too little of?
3. What are some of the health impacts of too much fat in your diet? How do these conditions affect the ability of your circulatory system to function properly?
4. What are some of the health impact of too much sugar in you diet? How do these conditions affect the ability of your endocrine system to function properly?

5. How does your amount of exercise impact your target calorie intake? Do you think based on this you are getting enough physical activity?

Part 2: Current Level of Fitness

Height: _____ **Weight:** _____

Now calculate your Body Mass Index (BMI) using the equation below:

$$\text{BMI} = \frac{\text{Weight (lbs)}}{\text{Height (in)}^2} \times 703$$

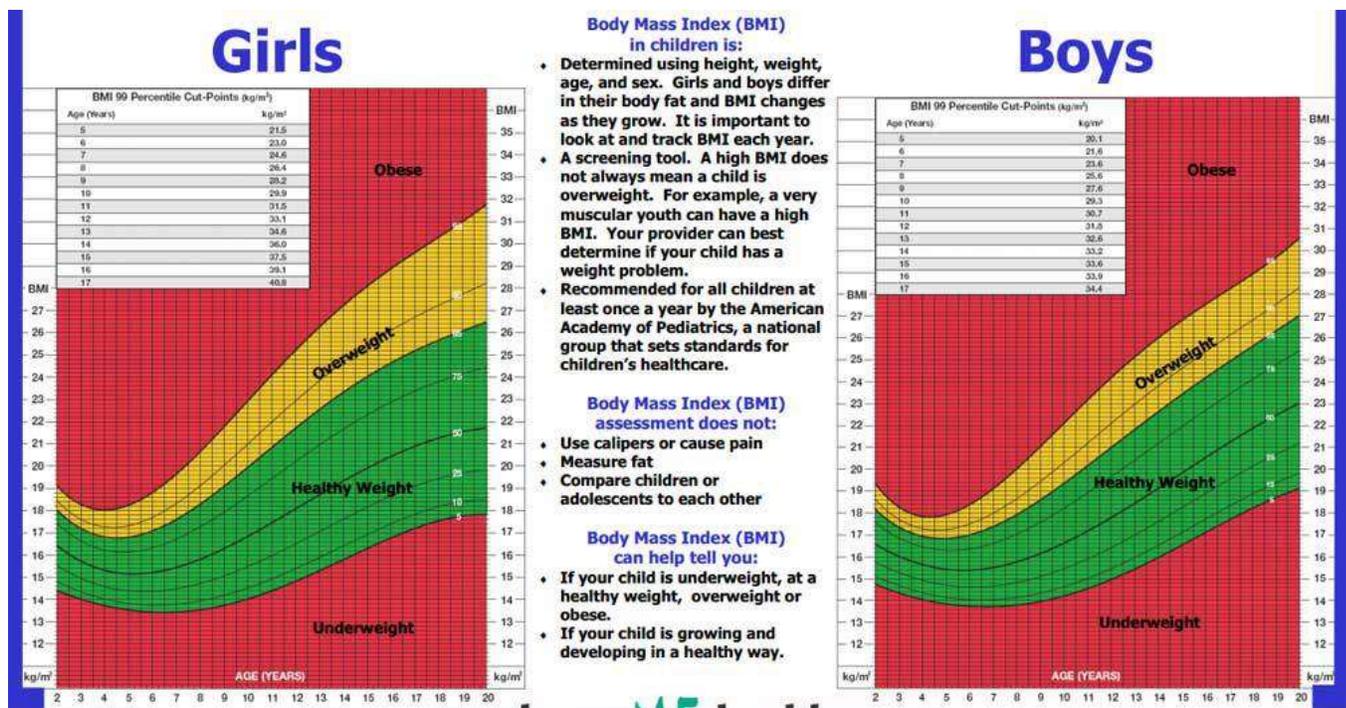
OR

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)} \times \text{Height (m)}}$$

BMI: _____

Body Mass Index- is a simple way to calculate the healthiness of your body type, and help screen for obesity and obesity linked disease. Though for some people particularly athletes with very high muscle mass this may not be an accurate measure of health.

Test	What's being measured	Score
Push -Up	Muscular Strength/Endurance	
Sit Up	Abdominal Strength/Endurance	
3 min Stair-Test	Aerobic Fitness	



Use the table on the previous page to determine the weight range you are in.

Mile	Aerobic Fitness	
-------------	------------------------	--

Next lets conduct some basic physical fitness tests...

Push Up Results – Male

Excellent	> 54
Good	45-54
Average	35-44
Poor	20-34
Very Poor	< 20

Push Up Results—Female

Excellent	>48
Good	34-48
Average	17-33
Poor	6-16
Very Poor	< 6

Sit-Up Results—Male

Rating	< 35 years
Excellent	60
Good	45
Marginal	30
Needs Work	15

Sit-Up Results—Female

Step Challenge- Male

Excellent	50-76
Good	79-84
Above Average	88-93
Average	95-100
Below Average	102-107
Poor	111-119
Very Poor	124-157
Excellent	52-81
Good	85-93
Above Average	96-102
Average	104-110
Below Average	113-120
Poor	122-131
Very Poor	135-169

Rating	< 35 years
Excellent	50
Good	40
Marginal	25
Needs Work	10

Mile—Male

Excellent	<11:54
Good	11:54-13:00
Average	13:01-13:42
Fair	13:43-14:30
Poor	>14:30

Mile-Female

Excellent	<13:12
Good	13:12-14:06
Average	14:07-15:06
Fair	15:07-16:30
Poor	>16:30

1. What areas of fitness are your strongest?

2. What areas of fitness are your weakest?

Part 3- Personal Goal Setting

Set three health and wellness goals for your self for each of these three goal create three action steps that will help get you to your goal. Use some of the following websites to help you set goals and action steps.

<http://www.myfitnesspal.com/>

<http://www.livestrong.com/>

<http://www.joesgoals.com/>

Goal 1: _____

Action Step:

1.

2.

3.

Goal 2: _____

Action Step:

1.

2.

3.

Goal 3: _____

Action Step:

1.

2.

3.

Part 4: Create a poster that highlights your health plan if you feel comfortable, or a poster that documents a general health plan that anyone might try to improve their health.

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