

Obesity — Know Your Facts

2010 Science Ambassador Workshop

Lesson Plan

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Obesity — Know Your Facts

Summary

This interactive lesson is for high school students and helps students to understand obesity and identify risk factors associated with obesity. Students will study risk factors for obesity and explore the effects of obesity on the human body. Finally, each student will determine their own obesity level and create an obesity prevention plan for teens. Obesity is a sensitive subject, and all precautions should be taken to ensure that student privacy is respected and information is kept confidential. This lesson should be introduced after students have had a unit about human body systems, or this lesson can also be incorporated into such a unit.

Learning Outcomes

After completing this lesson, students will be able to

- identify risk factors associated with obesity and learn the indicators of body fitness and obesity;
- determine the fat content of different foods;
- describe the effect of obesity on the human body; and
- analyze risk factor data from different states and compare those data with their own.

Materials

1. Different colored manilla folders (4 colors, 3–6 of each color).
2. Locate pictures of unhealthy organs, print pictures, and paste on inside of each folder.
3. 3 × 5 cards, 1 per student.
4. Chart paper for making lists from brainstorming session.
5. Data sheet for Fat Content Continuum (Appendix 7).
6. Packaged food items (e.g., crackers, cookies, and canned meat).

Total Duration

3 hours 45 minutes

Procedures

Preparation

Step 1: Looking for Patterns

Duration: 15 minutes

Preparation

- Assign students to review the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC) websites describing an *Escherichia coli* outbreak in spinach as homework before Step 1.
- Review the CDC Obesity PowerPoint® (Microsoft Corporation, Redmond, Washington) http://www.cdc.gov/HealthyYouth/yrbs/slides/obesity_slides_yrbs.ppt.
- For further background reading, review <http://www.cdc.gov/healthyyouth/npao/strategies.htm>, http://www.yaleruddcenter.org/what_we_do.aspx?id=10, and http://www.yaleruddcenter.org/what_we_do.aspx?id=200.
- Make copies of the supplemental worksheets.
- Reserve a digital projector from the library.
- Preload website links on to a computer.
- Obtain packaged food samples.
- Find pictures of an unhealthy organ, print picture, and paste on inside of folder. Each color folder should have the same picture.

Materials

1. CDC Obesity PowerPoint slide set
http://www.cdc.gov/HealthyYouth/yrbs/slides/obesity_slides_yrbs.ppt.
2. Different colored manilla folders (4 colors, 3–6 of each color) with graphic pictures of fatty organs.

Resources

- Title: FDA Finalizes Report on 2006 Spinach Outbreak
URL: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2007/ucm108873.htm>.
Description: A case study that details how scientists were able to investigate and find the cause and source of the problem associated with spinach.
- Title: Ongoing Multistate Outbreak of *Escherichia coli* serotype O157:H7 Infections Associated with Consumption of Fresh Spinach — United States, September 2006
URL: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5538a4.htm>.
Description: A more technical report of the *E. coli* outbreak generated by the health officials involved with the investigation.
- Title: Obesity, Overweight, and Weight Control
URL: http://www.cdc.gov/HealthyYouth/yrbs/slides/obesity_slides_yrbs.ppt.
Description: CDC PowerPoint with background information that provides an option to show

this to students as a kick-off activity. This includes substantial portions of data from the National Youth Risk Behavior Survey that will be used later during the lesson.

Activity

Explain to students that the majority of diseases do not occur randomly and that certain characteristics increase the likelihood of a person having a particular disease. Explain that this likelihood of having a disease is referred to as the *risk*. Give examples unrelated to obesity (e.g., smoking and lung cancer or heart disease or driving without a seatbelt and motor vehicle injuries). These characteristics are called *risk factors* for a particular disease.

Explain that the majority of diseases have >1 risk factor, and the majority of risk factors are linked to >1 disease. For example, lung cancer has been linked to both smoking and exposure to radon, and motor vehicle injuries can be the result of driving under the influence, driving while texting, or not wearing a seatbelt. Smoking is a risk factor for both lung cancer and heart disease, and unsafe sex is a risk factor for multiple infectious conditions, including human immunodeficiency virus (HIV), hepatitis B, syphilis, or gonorrhea.

Hand out folders to specific students on the basis of certain traits (see Table) and explain that the folders represent a particular disease. For example, give green folders to all the students wearing a football jersey to school that day. Students will discuss what factor they all have in common. Students should be able to understand that the common element is the risk factor for their disease.

Introduce students to the idea that certain factors in your life are controllable, and some you cannot control. Continue to hand out different colored folders and encourage students to identify risk factors for getting a particular color of folder and to discuss which factors are controllable and which are not.

Table. Examples that can be used for assigning folders.

Controllable factors	Factors beyond your control
Clothes in common (e.g., jeans or sweatpants)	Sex
Style of hair (e.g., ponytail or clips)	Wear glasses
Jewelry	Natural hair color

When done handing out folders, wrap up by discussing how this process of finding patterns among groups might help public health officials identify the cause of a disease. Explain that the process in the case study about the *E. coli* outbreak and spinach is the same one used to link other diseases with possible causes. To determine their understanding of the process, use inquiry questions, such as “How was the problem identified?”, “What type of information was collected?”, “How was it collected?”, and “How was it analyzed?” (See background information in Step 1 Resources.).

Step 2: Introduce Health Issues and Risk Factors

Duration: 15 minutes

Preparation

- Give 1 3 × 5 card to each student at the start of the class.
- Make a copy of the Obesity Epidemic Survey for Comparison (Appendix 1) for each student in the class (handed out at the end of this activity).

Materials

3 × 5 cards (1 card per student).

Resources

- Title: Obesity
URL: http://www.medicinenet.com/obesity_weight_loss/article.htm.
Description: An informative medical website for background information. Website is primarily a question and answer session and has a good section on vocabulary.
- Title: CDC Winnable Battles
URL: <http://www.cdc.gov/WinnableBattles/Resources.html>.
Description: Background information about CDC's Winnable Battles, including an overview PowerPoint presentation, frequently asked questions, and media coverage.

Activity

Ask students to name preventable diseases or health problems that they know. List their responses on the board. Responses will vary. Although certain students will reflect the domestic problems the majority of students are aware of, other students might have a more global perspective. If international problems come up, ask the class which are local and which are international. Allow a few minutes for discussion or comments. Point out that CDC has identified 7 important health problems in the United States that are all preventable. These are referred to as the 7 Winnable Battles. List the Winnable Battles on the board.

- tobacco;
- nutrition, physical activity, and obesity;
- food safety;
- healthcare-associated infections;
- motor vehicle safety;
- teen pregnancy; and
- HIV.

Ask students what controllable risk factors are associated with 2–3 of the preventable health problems. (See Appendix 2 for risk factors associated with the Winnable Battles).

Redirect students to obesity as the topic of study for this unit. Ask students for a definition of obesity. Let them know that the National Institutes of Health defines obesity as “the condition of having a high amount of excess body fat.” Body mass index (BMI) is a measure used to

determine childhood overweight and obesity. It is calculated by using a person's weight and height.

BMI does not measure body fat directly, but is an indicator of body fatness for the majority of children and teens. Overweight is defined as BMI $\geq 85^{\text{th}}$ percentile and $< 95^{\text{th}}$ percentile for children of the same age and sex.

Obesity is defined as BMI $\geq 95^{\text{th}}$ percentile for children of the same age and sex. Explain to students that a difference exists between being overweight and being obese. Overweight is the condition of having extra body weight, for a particular height, from fat, muscle, bone, or water.

Direct students to review the Internet resource that follow to calculate their BMI.

<http://www.cdc.gov/healthyweight/assessing/bmi/>.

BMI calculations can also be done by hand. The English formula for calculating BMI follows.

- $[\text{weight in pounds} \div (\text{height in inches})^2] \times 703$

The metric formula for calculating BMI follows.

- $\text{weight in kilograms} \div (\text{height in centimeters})^2$

Ask students to name some risk factors that can lead to obesity. Students will list answers or thoughts on the front of the 3 × 5 card. Ask students to list some health problems associated with obesity. Students will write those responses on the back of the card. Collect the cards from students to be used later for assessment purposes.

Responses to both questions should be listed on the board and discussed. Risk factors will be identified as those that can be controlled or those that cannot. Point out that, although risk factors exist for obesity, obesity itself is a risk factor for other health problems.

Note: Give homework for lab for the next class, the Obesity Epidemic Survey for Comparison (Appendix 1). Instruct students to answer the questions at home and bring it to the next class.

Step 3: Youth Risk Factor Website

Duration: 55 minutes

Preparation

- Make sure that the computer lab is available.
- Make a copy of Computer Lab Comparison with Teens from Across the Country handout (Appendix 2) for each student in the class.
- Review the Nutrition, Physical Activity, and Obesity Data and Statistics website <http://www.cdc.gov/nccdphp/dnpao/index.html>; practice using different variables and filters in the Youth Online section; and become familiar with the organization and information at that website.

Materials

Computer Lab Comparison with Teens from Across the Country handout (Appendix 2)

Resources

- Title: Childhood Obesity Facts
URL: <http://www.cdc.gov/HealthyYouth/obesity/facts.htm>.
Description: CDC website has information about the health effects and prevention of obesity among young persons.
- Title: Obesity, Overweight, and Weight Control
URL: http://www.cdc.gov/HealthyYouth/yrbs/slides/obesity_slides_yrbs.ppt.
Description: CDC PowerPoint with background information with an option to show this to students as a kick-off activity. This includes substantial portions of data from the National Youth Risk Behavior Survey that will be used later during the lesson.
- Title: Division of Nutrition, Physical Activity, and Obesity
URL: <http://www.cdc.gov/nccdphp/dnpao/index.html>.
Description: This website has a link to data from each state that reflects the results from the National Youth Risk Behavior Survey.
- Title: Health Weight — it's not a diet it's a lifestyle!
URL: <http://www.cdc.gov/healthyweight/assessing/bmi/>.
Description: This website provides information about waist-to-height ratio (WHtR), as well as an embedded calculator for students to find out their own WHtR and if they rank within the healthy range.
- Title: Calculate Your Body Mass Index
URL: http://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm
Description: This website has a calculator that is easy to use for students to calculate their BMI.
- Title: Body Mass Index, Waist-to-Height Ratio, Basal Metabolic Rate, Body Fat & Surface Area, and Willoughby Ideal Weight & Waist
URL: <http://clymer.altervista.org/bmi/>
Description: Students can input their personal data to calculate their fitness. The majority of calculations are done by the computer and provide a good explanation of what the results might mean.

Activity

Students should have completed their surveys for homework before going to the computer lab. Introduce the Nutrition, Physical Activity, and Obesity Data and Statistics website <http://www.cdc.gov/healthyyouth/npao/data.htm>, and show which results to analyze. Prepare an example from their own survey.

Give the Computer Lab Comparison with Teens from Across the Country (Appendix 3) comparison sheets and have students work by using a computer to complete their analysis.

After the computer lab, have students share their results regarding the health of teens in other states.

Discuss with students that we all face obstacles and risk factors. Using your own examples, discuss times when willpower was needed or when you failed.

Step 4: Effects of Obesity on the Human Body

Duration: 30–75 minutes

Preparation

- Return 3 × 5 cards from Step 2 to the students.
- Divide class into groups of 4 students and assign each group either an organ system or organ. (Note: if groups are divided into organ systems, each member of the group should be assigned a separate organ. Although initially, certain organs, such as the skin, might not appear to be directly affected by obesity, minimal research should allow students to come up with either direct or indirect affects).
- Develop a set of discussion questions for class wrap-up.

Materials

1. Overhead or drawing of a human body that displays organs.
2. Post-it® (The 3M Company, St. Paul, Minnesota) pads.
3. 3 × 5 cards from Step 2.
4. Obese Organs Jigsaw Instructions (Appendix 4).
5. Fit or Fat? Human Body Research Rubric (Appendix 5).

Resources

- Title: Obesity Impacts Multiple Organ Systems
URL: http://ezinearticles.com/?obesity_impacts_multiple_organ_systems&id=4326657.
Description: This website has medical information about the effects of obesity on different organs in the human body.
- Title: Obesity and its Health Effects (American Council on Science and Health)
URL: <http://acsh.org/2008/12/obesity-and-its-health-effects/>.
Description: This handbook was written with the layman in mind and is designed to be a comprehensive and concise source of reliable information for the educated consumer.

Activity

Using an overhead projection of the human body (or a full scale drawing and post it pads) ask the class to indicate the organs of the body most affected by obesity (connect to 3 × 5 card information from Step 2). Fill in any gaps to indicate body organs affected by obesity (overlay or additional Post-it pads).

Introduce jigsaw group activity with the handout guidelines and discuss the project, including the rubric. Discuss due dates, computer work time, and student expectations.

Give students 1–2 class periods to finish their research and present it to the class. During presentations, students should fill in their human body grid. (Appendix 6: Informational Chart of Body Organs That Are Affected by Obesity).

Class wrap up of projects. Ask leading questions.

Step 5: Observing Fat Content in Foods

Duration: 20 minutes

Preparation

- Obtain samples of packaged foods, including sesame seeds, granola bar, hummus, mayonnaise, various cheeses, canned meats (e.g., Vienna sausage, tuna in oil or water, or sardines), or other foods of your choice.
- Carefully cover food labels so students cannot see them.
- Obtain dietary information for unlabeled food items from the Internet by using search terms that include “calories fruits,” “fats vegetables,” or “fats meat” or review the websites listed in the following section.
- Make copies of the Fat Content Continuum handout (Appendix 7) that will be completed by students.
- Set up food items in advance so students can complete activity.
- Place the food items randomly on the lab work tables.

Materials

Fat Content Continuum handout (Appendix 7)

Resources

- Title: USDA Food and Nutrition Information Center
URL: <http://fnic.nal.usda.gov/>
Description: This website from the U.S. Department of Agriculture has multiple resources about foods and nutrition.
- Title: USDA National Nutrient Database for Standard Reference
URL: <http://www.nal.usda.gov/fnic/foodcomp/search/>.
Description: Searchable database that provides nutritional information about a variety of food items.

Activity

Explain that FDA has established a recommended daily intake (RDI) for many vitamins, minerals, and nutrients. RDIs represent the amount of each item that is believed to be sufficient to meet the requirements of nearly all (97%–98%) healthy persons of each sex and in each stage of life.

Ask students, “What is the RDI for fat?” Answer: No RDI for fat exists; however, the Mayo Clinic states that 1 tablespoon of vegetable oil per day will supply all the essential fatty acids a person needs. On average, Americans eat 8 times that amount or the equivalent of 1 stick (quarter pound) of butter every day. The average family consumes 400 pounds of fat per year. The essential fatty acids or those that the body cannot manufacture are linoleic (omega 6) and linolenic (omega 3). These can be obtained from oils, nuts, and seeds.

1. Distribute the Fat Content Continuum handout (Appendix 7) to students. Students should address the following questions:

- Which foods contain the highest amount of fat?
 - Which foods contain the lowest amount of fat?
 - On the basis of fat content, which foods are most healthy?
 - On the basis of fat content, which foods are least healthy?
2. Working singly or in pairs, students will arrange the food items and place the item that they think has the highest fat content on the left and the remaining items with progressively less fat content in order from left to right. Record this sequence on a data sheet that you will create. After students record their own sequence, they will uncover the labels and list the correct order of fat content on their data table.

Conclusion

Conclusion Summary

Duration: 25 minutes

Preparation

Materials

None

Resources

- Title: Youth Physical Activity Guidelines Toolkit
URL: <http://www.cdc.gov/healthyyouth/physicalactivity/guidelines.htm>.
Description: This website is devoted to youth physical activity. It highlights the different types of activities (e.g., aerobic, muscle strengthening, or bone strengthening) and includes a video demonstrating youth physical activity recommendations.
- Title: Dietary Guidelines
URL: <http://health.gov/dietaryguidelines/>.
Description: The dietary guidelines encourage Americans to focus on eating a healthy diet that includes foods and beverages that help to achieve and maintain a healthy weight, promote health, and prevent disease.
- Title: School Health Guidelines to Promote Healthy Eating and Physical Activity
URL: <http://www.cdc.gov/healthyyouth/npao/strategies.htm>.
Description: This website provides information explaining what can be done in schools to promote healthy eating and physical activity.

Activity

- Brainstorm as a class about how teens can prevent obesity.
- Write ideas and suggestions on chart paper.
- In groups, make a poster or PowerPoint slide with motivational jingles or slogans.

Modifications or Extensions

Modification 1: Weight Bias and Stigma Around Obesity

Duration: 30 minutes

Subject matter experts from the CDC Division of Nutrition, Physical Activity, and Obesity highly recommend that you consider adding a section about weight bias and stigma regarding obesity. Please refer to the following websites for resources.

Resources

- Title: Weight Bias & Stigma
URL: http://www.yaleruddcenter.org/what_we_do.aspx?id=10.
Description: The website has information about the bias and discrimination that obese children and adults can face every day. The social consequences of obesity can include

employment discrimination, education barriers, biased attitudes from health care professionals, media stereotypes, and interpersonal relationship stigma.

- Title: Schools and Educators
URL: http://www.yaleruddcenter.org/what_we_do.aspx?id=200.
Descriptions: Resources and handouts for schools about weight bias.

Consider including the observing fat contents in food activity by using popular fast food items.

Extension 1: Invite Personal Trainer

Duration: 45 minutes

Invite a personal trainer to assist in body measurements and obesity prevention planning. Encourage students to brainstorm what a rubric for life would look like. Spread the word to organize a nutrition day, activity week, or obesity awareness event. Other websites are available to explore these activities.

Resources

- Title: Obesity (Weight Loss)
URL: http://www.medicinenet.com/obesity_weight_loss/page3.htm.
Description: A thorough discussion about obesity and identifying obesity characteristics (e.g., height-to-weight charts). Website has a BMI conversion chart as well.
- Title: Body Mass Index Measurement in Schools
URL: http://www.cdc.gov/healthyyouth/obesity/BMI/BMI_measurement_schools.htm
Description: CDC website containing guidance and information on program safeguards for measuring bodyfat in schools*

* If a personal trainer is invited to assist in body measurements, make certain to ensure student privacy and confidentiality! Permission from parents might be required Check you school policy.

Science Education Standards

National Science Education Standards

Science as Inquiry Content, Standard A

As a result of activities in grades 9–12, all students should develop the following:

- abilities necessary to conduct scientific inquiry, and
- understanding scientific inquiry.

Life Science Content, Standard C

As a result of their activities in grades 9–12, all students should develop understandings of the following:

- the cell;
- molecular basis of heredity;
- matter, energy, and organization in living systems; and

- behavior of organisms.

Science and Technology, Content Standard E

As a result of activities in grades 9–12, all students should develop the following:

- abilities of technologic design, and
- understandings about science and technology.

Science in Personal and Social Perspectives, Content Standard F

As a result of activities in grades 9–12, all students should develop understanding of the following:

- personal and community health;
- natural and human-induced hazards; and
- science and technology in society.

History and Nature Science, Content Standard G

As a result of activities in grades 9–12, all students should develop understanding of the following:

- science as a human endeavor, and
- nature of scientific knowledge.

Appendix 1

Obesity Epidemic Survey for Comparison

Students will be using the following data to compare themselves with a typical teen from another state, so please read carefully when answering the questions. This information is for each student's own use and will not be turned in or shared with other students or teachers.

Part 1: Dietary Behaviors

1. During the day, I eat ≥ 5 fruits and vegetables. Yes _____ No _____
2. During the day, I eat fruit or drink 100% juice ≥ 2 times. Yes _____ No _____
3. During the day, I eat ≥ 3 vegetables. Yes _____ No _____
4. During the day, I drink ≥ 1 soda. Yes _____ No _____

Part 2: Physical Activity

5. During the last, week I did 60 minutes of activity ≥ 1 day. Yes _____ No _____
6. During the last week, I did 60 minutes of activity every day. Yes _____ No _____
7. During this school year, I attend physical education (PE) classes. Yes _____ No _____
8. If I have PE, I do PE every day of the school week. Yes _____ No _____
9. I watch television or I am on the computer ≥ 3 hours per average school day (combined).
Yes _____ No _____

Additional questions: Estimate a percentage for the number of schools in the United States where this activity occurs.

10. Students are offered opportunities to participate in clubs or intramural sports. _____
11. Students CAN purchase soda or juice that is not 100% fruit juice. _____
12. Schools will NOT sell any fried foods for lunch. _____

Personal data: Height _____ Weight _____ Waist (at 1 inch above the navel) _____

(needed for calculations)

Appendix 2

Controllable Risk Factors

Controllable risk factors are those factors over which a person has control. For example, the controllable risk factors for cardiovascular disease include a sedentary lifestyle, smoking, unhealthy cholesterol levels, high blood pressure, diabetes, and obesity. To lessen the risks for having cardiovascular disease, a person can become physically active, avoid smoking, and eat a healthy nutritious diet.

Examples of Controllable Risk Factors for Select Health Conditions

Tobacco use (a risk factor in itself)

Do not start.

Being in environments where smoking is not allowed, which minimizes exposure to second-hand smoke and reduces peer pressure to start in the first place.

If possible, avoid being around friends and family members who smoke while they are smoking.

Nutrition

Increase your intake of vegetables and fruits.

Eat a variety of vegetables, especially dark green and red and orange vegetables and beans and peas.

Increase your whole grain intake by replacing refined grains with whole grains.

Increase your intake of fat-free or low-fat milk and milk products, such as milk, yogurt, cheese, or fortified soy beverages.

Choose a variety of protein foods, including seafood, lean meat, poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds.

Use oils to replace solid fats where possible.

Choose foods that provide more potassium, dietary fiber, calcium, and vitamin D.

Physical activity

Increase physical activity and reduce time spent in sedentary behaviors.

Obesity

Control total calorie intake to manage body weight. For persons who are overweight or obese, this will mean consuming fewer calories from both foods and beverages.

Food safety

Keep raw meats and fish away from other foods, especially those that will not be cooked immediately.

Thaw frozen meats in the refrigerator, microwave oven, or under cold, running water, but never by being left to thaw at room temperature.

Wash all produce before it is used, even if it looks clean.

Use soapy, hot water to clean utensils, counter surfaces, and cutting boards immediately after preparing raw meats and fish. If you use sponges, clean them by placing in the upper rack of

the dishwasher during a wash cycle. Wash your hands, faucets, and anything else you might have touched.

Health care–associated infections

Do not pressure physicians to prescribe antibiotics.

Make sure your health care provider washes or sanitizes his or her hands before you receive a health care examination.

Motor vehicle injury

Always wear a seat belt.

Do not text or talk on a cell phone while driving.

Do not drive under the influence of drugs or alcohol.

Teen pregnancy prevention

Abstain from having sexual intercourse.

Use a pregnancy prevention method when having sexual intercourse.

Appendix 3

Computer Lab Comparison with Teens from Across the Country

Using what you learned from Day 1, go to the following CDC website for information about obesity in the United States <http://www.cdc.gov/HealthyYouth/obesity/facts.htm>.

Your assignment is to **choose any state** from the list and compare your answers with those that were given during a National Youth Risk Behavior Survey. For each of the 10 questions, complete the following grid.

Question number or topic	My answer Yes or no	% like me (Be careful; you might have to subtract!)	Comments!
1. During the day, I eat ≥ 5 fruits and vegetables.			
2. During the day, I drink 100% juice ≥ 2 times per day.			
3. During the day, I eat ≥ 3 vegetables per day.			
4. During the day, I drink ≥ 1 sodas per day.			
5. During the last week, I did 60 minutes of activity on ≥ 1 days.			
6. During the last week, I did 60 minutes of activity every day.			
7. During this school year, I attended physical education (PE) classes.			
8. I have PE and I do PE every day of the school week.			
9. I watch television ≥ 3 hours per day			
10. I use the computer ≥ 3 hours per day			

Using the online calculators, record your WHtR and body mass index (BMI) in the space below.

WHtR _____ BMI _____ raw score _____ (percentage)

Personal reflection

1. How do you feel you compare with teens in your chosen state?
(Pick selected parameters to discuss in detail, and use specific numbers in your discussion.)
2. Do you agree with the CDC definition of obesity or overweight on the basis of the body mass index? Explain, again by using your own measurements, if possible.
3. What do these measurements mean to you in terms of personal health?

Appendix 4

Obese Organs Jigsaw Instructions

During your expert group conversation, please research the following components:

1. Name of organ _____
 - 1.1. Name of body system _____
2. Basic facts
 - 2.1. Normal function of organ (bullet points are acceptable)
 - 2.2. Possible disease or medical condition as a result of obesity
 - 2.2.1. Symptoms
 - 2.2.2. Diagnosis
 - 2.2.3. Treatment
3. Demonstration: Create a visual aid or model that compares the normal or obese organ with each other with regards to functionality
4. Presentation
 - 4.1. Poster with bullet point facts and graphics
 - 4.2. PowerPoint slides

Appendix 5

Fit or Fat? Human Body Research Rubric

Name: _____

Criteria	0 or Emerging	1 or Needs Improvement	3 or Good	4 or Very Good	5 or Excellent
Is the focus on organ function and obesity					
Accuracy of facts or sources					
Quality of communication included with project (e.g., spelling or grammar)					
Demonstration meaningful to presentation concepts					
Ability to discuss the scientific product (understanding of the material and presentation)					
Product submitted on time					

Appendix 6

Informational Chart of Body Organs That Are Affected by Obesity

(to be completed during presentations)

Name of Organ	Normal function	Obesity signs or symptoms	Diagnosis	Treatment
Lungs				
Heart				
Liver				
Gall bladder				
Pancreas				
Brain				
Breast				
Prostate				
Colon				

Extra credit for additional organs?

Appendix 7 Fat Content Continuum

LAB WORKSHEET — CDC CREATED

Which food items had the highest percentage of saturated fat; which had the lowest? Which food had the highest percentage of unsaturated fats; which had the lowest?

Among the foods sorted, which one is the most healthy to eat; which is the least healthy?

What are the typical fats that you consume in a day?

On the basis of this information, estimate how much fat you consume in a day. What food items could you replace the fats with in your diet?

Fat Content Continuum Table

	Amount per serving (% daily value)				
Food item (e.g., crackers)	Saturated fat	Trans fat	Polyunsaturated fat	Monosaturated fat	Total fat