Eating and Exercise Activity

Name: _____

Learning Goals - Students will be able to:

- explain which variables affect BMI and which do not (weight, height, body fat, age, gender)
- explain what BMI tells about a person including its limitations.
- describe what a person can do to increase their heart's strength and what affects strain on the heart and how these two measures are different.
- create a diet that allows a person to adjust their weight by 10 lbs while maintaining % body fat.

Open the PhET simulation "Eating and Exercise".

1. Adjust the variables under the figure one at a time to determine which variables affect BMI. Identify whether they are directly related (one goes up, the other goes up) or inversely related (one goes up the other goes down).

Variable	Affect BMI?	Dependence
Age		
Height		
Weight		
Body Fat		
Gender (*Warning:* the sim automatically changes other variables when gender is changed)		

2. What does Wikipedia say it means if BMI (Body Mass Index) is high or low?

Test out a diet: *To test a diet in the sim, drag food onto the plate and exercise into the log. Then press play to see how things change as time goes by.*

3. Figure out how to make the figure in the sim starve. What defines "Starving" in the sim?   Is it BMI or %fat?

4. Is the starving cutoff different for men and women? Why do you think this is?

5. What would be an example of a person who has a BMI in the "Obese" range but who has a healthy percentage of body fat?

6. Investigate the heart strength and heart strain indicators.◆ This problem takes a lot of experimenting and you will be graded on your specific answer to this question.
    a. How can you get both in the green?

    b. How about both in the red?

    c. How about Strength green and strain red?

    d. Strength red and strain green?

7. Why do you think the sim has lifestyle choices (sedentary, active etc…) but also allows you to put in a certain amount of exercise?

8. Decide as a group on a person whom you will experiment on (realistic person).

      Gender: height:

      Weight: percent body fat to start with:

      Lifestyle: Exercise:

      b. Determine how many calories you need to feed this person for them to maintain their weight exactly over the 2 year period.

            Calories:

9. Prediction: If a person eats the same amount of calories and exercises the same but changes what they eat do they gain or lose weight?

    a. Specifically, if a person eats a balanced diet of 2000 calories and they burn exactly 2000 calories will they gain or lose weight?

    b. How about if the same person eats 2000 calories of fat and sugar (chips, cookies etc…) and burns 2000 calories, will they gain or lose weight?

10. Create diets in the simulation that test your predictions in the question above.

    a. Try the following: Female, 5'5", 135 lbs, 22.5% body fat, Sedentary. You can use the Food pyramid option that has the red edit button on it and type in the exact number of calories that your person needs to balance what they burn.

    b. Now feed her the exact number of calories to match what she burns but use nearly all sugar and fat. What happens?

11. Name two things you learned from the sim that you did not already know.