DID MCDONALD'S HAVE TO TORCH ITS NEW HAPPY MEAL?
By Sam Schechner – published online at http://www.slate.com/id/2099285/

(1) Late last week, McDonald's announced that it would start offering the Go Active! Adult Happy Meal to health-conscious fast-food consumers. According to the company, the meals—which include a salad, bottled water, and a health brochure penned by Oprah Winfrey's personal trainer—contain between 130 and 550 Calories. How do companies measure the calories in the food they sell?

(2) Graduates of 9th-grade science may remember a very simple answer: Burn the food to see how much heat it gives off. That energy can be measured in calories; nutritionally speaking, one Calorie is defined as 1,000 times the energy it takes to heat a gram of water from 14.5 to 15.5 degrees Celsius. But instead of burning anything, food laboratories often freeze their samples in liquid nitrogen and then blend them into a fine, monochromatic powder that can then be used in a variety of chemical analyses. In a Kjeldahl analysis, for example, lab techs remove nitrogen from the food powder and then use it to calculate the amount of protein the sample contains. A hexane extraction can gauge the amount of fat. Carbohydrates are usually measured by difference—they're what is left over when you remove everything else.

(3) To determine the number of calories contained in these building blocks, however, food labs rely on conversion factors first assembled more than 100 years ago by the agricultural chemist Wilbur O. Atwater, who literally did burn things like beef and corn in a device called the "bomb calorimeter." While today's calorimeters look a lot more sophisticated, Atwater's was more or less a fireproof container sheathed in water and hooked up to a thermometer. He used it, along with a larger device capable of measuring the heat output of an active person, to figure out how much usable energy different foods possess. The idea is that burning, say, a hamburger shows the total energy that hamburger contains, but it doesn't account for what the human body cannot absorb, nor what is used in the digestive process. So Atwater derived a set of tables that specify the practical energy values of different foods, distinguishing, for example, among different sources of protein. The most recent update to the conversion tables was published by the U.S. Department of Agriculture in 1973.

(4) These days, the FDA requires that companies print accurate calorie data on food labels but doesn't say how they must gather the information. It's permissible, for example, to guesstimate from the USDA's published nutritional data for thousands of foods, a set of tomes that used to take up four feet on a bookshelf but is now available online. The database contains figures down to the calorie (and vitamin, and amino acid) for everything from Spam to foie gras—even fast-food items.

(5) Even so, many food companies use labs to ensure their numbers are accurate enough to pass an FDA spot check. Although the USDA database contains several fast-food salads, for example, McDonald's sent the ones in its new Happy Meal for independent testing.
Origins: Ours is a weight conscious society, obsessed with the chimera of physical perfection and frantic in its pursuit of the trim waistline. Yet ours is also an overfed society adrift in an endless sea of gastronomic temptation, and an under-exercised one in that our daily routines provide us with significantly less physical exertion than that of our ancestors. As a result, almost all of us – even those who at other times or in other places would have been worshiped as the epitome of perfect proportion – are constantly trying to shed a few pounds, are fighting with gritted teeth to maintain our weight at a set level, or are convinced we’re hopelessly fat and unattractive.

The promise of a quick ‘n’ easy weight loss solution is a siren’s call to us. We race from pillar to post looking for the magic pill or food or breathing exercise or magnetic belt that will melt those pounds away and strip inches from our measurements. It is for this reason that the promise of “negative calories” draws us like moths to a flame.

The calories in food are a measure of energy content. For something we eat to be a source of “negative calories,” it must provide fewer of these units of energy than we expend in consuming it. Yet everything contains calories, so at first this concept appears impossible. Therefore, the hunt is on for ingestibles whose energy content is not released into our bodies because we humans lack the ability to break them down – it doesn’t matter how many calories these goodies have, provided we can’t extract them. Cellulose in plants is one such substance: although it contains a goodly amount of carbohydrates, they are packaged in a form we cannot digest, so we fail to absorb their calories.

Celery has about 6 [C]alories per 8-inch stalk, making it a dieter’s staple. Although it’s loaded with latent energy, the amount we are capable of extracting from it is negligible thanks to the plant’s cellulose composition. Its ingestion can result in negative calories, but it is a fallacy to believe that effect had to do with energy expended in chewing. Though chewing might feel like a somewhat strenuous activity, it burns about the same amount of energy as watching paint dry. It is the bodily energy devoted to the digestion of the green stalks that exhausts calories. A cold low-calorie drink would enhance the effect, because the liquid needs to be warmed to body temperature, an act that requires further expenditure of energy.

Yet as enticing as all this sounds, the dietary bankroll built by this approach would be very small, probably amounting to no more than a few dozen calories a day. In a world where it takes 3,500 [C]alories to work off a single pound of fat, feasting on celery would make only the merest difference.

There have been those who have taken this tiny sliver of truth and used it to form the basis of what they tout as “negative calorie diets,” proving once again that anything can form the core of a diet plan someone wants to sell to others, provided it contains a notion that so much as vaguely sounds like it might work and weds it to the promise of easy, quick, effortless, and pain-free weight loss.

But in defense of celery, we note that even if it doesn’t contribute mightily to a caloric imbalance which serves to work waistline magic, those who are eating it aren’t eating something else. Sometimes the key to a successful reducing plan is not so much the ingestion of “good” foods as it is the avoidance of “bad” ones. And it’s hard to sneak a chocolate bar into a mouth that’s busy chewing celery.

Celery serves one final purpose in the battle of the bulge: it’s a symbol of dietary virtue and singleminded intent. Its presence in our refrigerators signals to all comers that we are serious about the weight loss plan this time around.
Did McDonald’s Have to Torch its New Happy Meal? GIST activity

Summarize each of the following sections in twenty words or less.

(1) ________________________________________________________________________________

(2) ________________________________________________________________________________

(3) ________________________________________________________________________________

(4) ________________________________________________________________________________

(5) ________________________________________________________________________________

Now, summarize the entire five-paragraph article in twenty-words or less:

___________________________________________________________________________________

___________________________________________________________________________________

___________________________________________________________________________________

Stalk Marketed GIST Activity

Summarize each of the following sections in twenty words or less.

(6&7) ________________________________________________________________________________

(8) ________________________________________________________________________________

(9) ________________________________________________________________________________

(10&11) ____________________________________________________________________________
Now, summarize the entire eight-paragraph article in twenty-words or less:

Non-GIST questions from the readings

1. Paragraph (3) mentions a series of conversions that are used to calculate how much energy is stored in foods. To the right is a list of those conversions.

Use this information to calculate the number of joules that would be present in a marshmallow that is composed of 6.25 g of carbohydrates (none of which is fiber) and no fat or protein.

2. The heat of combustion of sucrose (C\textsubscript{12}H\textsubscript{22}O\textsubscript{11}) as listed in your book is -5645 kJ/mol. If the entire marshmallow in #1 is made of sucrose, how much energy would be released when the marshmallow was burned?

3. If all the energy from question #1 went into heating 125 mL of water at 20.5°C, what would be the final temperature of the water?

4. The nutritional label from Jet-Puffed marshmallows is shown at the right. Calculate the energy in one marshmallow according to the label and convert that into kJ.

5. If the information from the label at the right is assumed to be the accepted value of energy in one marshmallow, find the percent error from your answer in #1. And then from your answer in #2.