**Name**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Biology

**ACTIVITY**: **Genetically Mo**dif**ied foods Case Study**

 Sara and Cassie decide they are going to throw their friends a fancy dinner party and go grocery shopping to pick out the food they wish to cook and serve. Cassie’s mother has agreed to pay for their groceries but has given them a budget of fifty dollars. If they want to spend any more, they have to use their own money.

 The first section of the grocery store they come to is the produce section where they will pick out the vegetables they will prepare for their entrée and the fruit they will include in their dessert.

 “Now, where do they have the organic section?” Sara asks.

 “But organic food is more expensive,” Cassie argues, “and we don’t have enough money to pay for that.

 “I do not eat any fruit or vegetable that has been grown with pesticides because the poisons will kill you!” Sara responds. “And besides, they genetically modify them so they’re all strange inside with funny hormones that will change our bodies! They even destroy the environment!”

“You’re such a drama queen! Do you know that farmers have been modifying plants to increase their nutritional and economic value for centuries? They chose plants with traits that they favored and used the seeds of those plants to begin the next generation of plants. Slowly, over many generations, differences accumulated in both the genotypes and phenotypes of the original and domesticated crop. I just learned about this in Biology. My teacher said that genetic engineering is just an alternative to traditional plant breeding. Rather than using artificial selection, where a farmer chooses two plants that exhibit the desired traits and breeds them, she buys seed or seedlings that have been produced using bioengineering methods. Using the techniques of molecular biology, a single gene that codes for a desired trait, such as insect resistance, increased protein content, or tolerance to drought, is isolated and then combined with a promoter sequence that will allow the gene to be “turned on” in the receiving cells. This combination of genes is then introduced directly into the plant DNA. It’s much easier and more efficient than trying to breed specific plants, and it’s totally harmless!”

 “Well, I don’t care! I *refuse* to buy the stuff. Everyone will just have to eat less.”

***Assignment***

Part 1: HOMEWORK (INDIVIDUAL)

Corn, soy, canola, and cotton make up the majority of genetically engineered crops in the United States. These products are commonly found on the shelves of our grocery stores.

1. Choose corn, soy **or** canola and look for all of the products in your kitchen that contain this product. Be careful to include oils or other derivatives produced from these crops, such as canola oil or high fructose corn syrup.
2. Write a list of 10 items you found.
3. Select **three** **(3)** of the products that you found and look at the following website:

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

1. Use the website (or other sources) to determine whether the three products that you have selected contain genetically modified crops.
2. Take photographs of yourself with these items and print the pictures.
3. Write a paragraph that describes what you have found – were you surprised? Do your discoveries frighten you?

Part 2: IN-CLASS WORK IN GROUPS OF NO MORE THAN 3 STUDENTS

Do some research on the internet on the risks and benefits associated with the use of genetically modified crops. Organize your research in the attached table. You may use the sites listed below and others of your own choosing. When you use a different site, make sure to cite that resource at the end of this section of the assignment. Also use the online library resources.

* National Center for Biotechnology Information (NCBI) - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2288773/>
* International Union of Nutritional Sciences – <http://www.iuns.org/2012/05/statement-on-benefits-and-risks-of-genetically-modified-foods-for-human-health-and-nutrition/>
* *Nature* Journal – <http://www.nature.com/scitable/topicpage/genetically-modified-organisms-gmos-transgenic-crops-and-732>

Part 3: IN-CLASS WORK IN GROUPS OF NO MORE THAN 3 STUDENTS

As a group, decide with whom you agree, Cassie or Sara, about the use of genetically modified crops in this country and around the world. State your opinion in a typed paragraph (1 page, double-spaced) that summarizes the risks and benefits of GM foods and expresses your ideas. Be sure to **support** your opinion using the information that you obtained during your research. Was Sara right about the pesticides, and the hormones?

**Assessment:**

* Part 1: **INDIVIDUAL**
	+ A list of items found in your pantry that contain your chosen ingredient (corn, soy, or canola).
	+ Three photographs of you with your items.
	+ A well written paragraph, grammatically correct, that includes your reflection on your findings.
* Part 2: **GROUP**
	+ Complete the risk/benefits table. Wherever possible, use examples.
* Part 3: **GROUP**
	+ This section should be in paragraph form. Grammar and spelling count. Explain the reasons for your opinion.

|  |  |
| --- | --- |
| **Risks** | **Benefits** |
| Source: | Source: |
| Source: | Source: |
| Source: | Source: |
| Source: | Source: |
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