

1) What ethical concerns in science have you heard from friends, family or the media?	2) What should we consider things like changing eye color?	3) Scenario #1: As mentioned in the module, crops can be genetically modified to have increased nutritional content. According to the Office of Disease Prevention and Health Promotion, over 80% of Americans' diets are insufficient in vegetable intake and about 70% of Americans' diets are insufficient in fruit intake. Fruit and vegetables are an important source of nutrients. Fruits and vegetables can be genetically modified to contain even more nutrients than they naturally do. This would be beneficial to people who don't or can't eat the recommended amount of fruits and vegetables. Oliver thinks that all fruits and vegetables should be genetically modified to have a higher nutrition content. He also believes that since all fruits and vegetables should be genetically modified, there is no point in labeling these genetically modified foods. Do you agree with Oliver? Should all fruits and vegetables be genetically modified to have a higher nutrition content? Should genetically modified fruits and vegetables be labelled? Why or why not?	4) Scenario #2: Celiac Disease is a non-life threatening disease where the body has an inappropriate response to gluten (a protein in wheat). The body's reaction to gluten leads to diarrhea and poor nutrient absorption. The severity of these symptoms range between individuals and can be mild to severe. The current treatment for Celiac Disease is to eat a gluten-free diet. Most people experience relief from eating a gluten-free diet. Recently, genes associated with Celiac Disease have been identified. While almost all people with Celiac Disease have at least one of these genes, approximately 30% of people who do not have Celiac Disease also have these genes. Cecilia thinks we should use genetic modification to ensure no one gets Celiac Disease. Do you agree with Cecilia? Should we use genetic modification to ensure humans do not get Celiac Disease? Why or why not?
I have heard of humanity concerns, like what happens to the researcher while harming other organisms.	It's not natural, and can transport bacteria and other diseases into your body that can cause bad things to happen in the future.	Yes I think they should be labeled. I think that the more you put in the more your risking the big chance of disease. Also everyone deserves to know what in the stuff they're eating and make their own choices, so I think it would be best to label it.	I think we shouldn't, if we do it and the machine doesn't work correctly it could go horribly and worsen the disease, and will only rich people be able to afford it? It will make a huge difference between wealthy and poor.
How they act or represent themselves.	The pigment of our eyes or aging.	Yes, because both fruits and vegetables should have higher nutrients and fiber in all crops. Some have more, some have less depending on the crops.	Yes, because we need to make sure we don't get Celiac Disease. For most people, they can break down gluten and some couldn't. I think everyone should take it, just in case if they age, body is not breaking down or functioning or medical history.
Climate change	No because that wouldn't make sense even tho	No I don't agree because I feel as tho some fruits and vegetables are genetically modified most don't need all of those injections and they don't need to be experimented on.	For this one I don't really know but I think you should use GM to ensure humans from Celiac disease.
Is gender selection overall safe?	That is not ethical	I don't agree with him. No not all food should be genetically modified because of people's health concern, allergic reaction can occur for some people and if fruits and vegetables are genetically modified they should be labeled because people have the right to know what they're eating.	No because Celiac Disease is non-life threatening and using GMO could allow bad diseases to be given to people based on where they live or their genetic makeup which can be very concerning.
carefulness, openness, Legality.	The eye can naturally change color as a response to the iris.	No because it might have potential health effects.	yes because it can help lots of people and save life.
Ethical concerns like over population,	other things we should consider is changing hair color.	I agree with Oliver because all fruits and vegetables should be genetically modified to have a higher nutrition content but I do not agree with not labeling them as genetically modified foods. I say this so the people don't need to look for this specific type of fruit to be more healthy, but they should know if this type of food or fruit got modified so they know what's happening.	I also agree because who wants to live a life without ever tasting gluten
I have heard no ethical concerns in science from friends, family, or media.	We should we consider how it isn't ethical	GMO fruits and vegetables should be labeled because people should have the decision to choose if they want to have GMO fruits and vegetables or NON-GMO fruits and vegetables. All fruits and vegetables shouldn't be genetically modified to have a higher nutrition content because it wouldn't be ethical to not give people the choice between NON-GMO fruits and vegetables and GMO fruits and vegetables so I don't agree with Oliver.	We should use genetic modification to ensure humans do not get Celiac Disease because there is no known consequence for doing so, so I agree with Cecilia

1) Should synthetic biology products be assumed safe until proven harmful or vice versa?	2) Do you think GMO food products are beneficial or harmful?	3) Should GMO food manufacturers be required to conduct post market safety surveillance instead of the FDA?	4) Synthetic biology can be used on animals for foods, such as the salmon we talked about, as well as for other purposes such as animal research, endangered species conservation, or exotic pets. What other applications of GMO animals can you think of?	5) What do you know about the technical challenges and ethical concerns around gene therapy?	6) Do GMO pesticides increase the risk of pesticide-resistant pest species? If yes, what can be done to avoid the risk?	7a) Please name three commercial synthetic biology products you know of, either through this module or from other sources.	7b) Do those three products require premarket or postmarket safety reviews?
Yes They should	I think GMO is harming our food products because the real crop workers are losing money and business. Although current research suggests that GMO foods are safe for consumption, some people are concerned about their potential health effects. Due to a lack of long-term human studies, more research is needed. In the United States, it's currently not mandatory to label foods that contain GMOs.	yes i think they do	N/A	I dont think they should do that because that could damage their DNA  Immediate issues are the control and confidentiality of results of genetic testing, possible discrimination against those found to have genetic diseases, and the just allocation of beneficial genetic therapies.	yes it does increase the risk . they need to not modify the pesticides and let nature take its course  I would have to say because when they inject things into those foods they don't know what gonna happen they could only guess. To avoid that from happening i would more into it a stop it fro happening by experimenting.	Pig kidney cut in half, earthworms 9"-12", beef eye	yes
I would say no because The public outcry over the creation of "synthetic life" within a laboratory is both predictable and valuable.  no. Because Sometimes it is harmful so you do know what happening. So in my opinion you should test it first.	I think it is artificial because Genetically modified.	It depends on the situation.	I dont know if Genetic Breeding can count as GMO but that's what I'm thinking about.	Gene therapy can be helpful because it treats a patients diseases.	yes. Try to do it safely as possible.  Yes, GMO pesticides increase the risk of pesticide-resistant pest species. To avoid the risk the regulations should provide safety without inhibiting innovations.	Biochemistry, Engineering, Microbial	postmarket safety reviews
NO, synthetic biology products be assumed safe until proven harmful.	I think that GMO food products are beneficial.	No. GMO food manufacturers should be required to conduct post market safety surveillance instead of the FDA because what if they take that as a advantage and probably not do it or not follow the rules.	Other applications of GMO animals like pigs, chickens and sheeps.	Evaluate risks of gene transfer to wild plants and chemical properties and degradation times of new proteins.	Yes, GMO pesticides increase the risk of pesticide-resistant pest species. To avoid the risk the regulations should provide safety without inhibiting innovations.	Detergents, Lactose-free, and Dairy products.	I'm sure these products require premarket reviews.
No, you shouldn't assume anything is safe just because it looks safe.	It depends on what the food product is, for instance, corn is considerably beneficial Its both because something it can be beneficial and sometime it may not be.	No. FDA is supposed to make the food regulations so that it is safe for public consumption	Cattle, pigs, dogs, cats and certain fish	The problem with gene therapy is that doctors use genes instead of medicine to treat diseases. Gene therapy can be beneficial because it cures diseases.	Yes, it does and the way to avoid the risk is to well, use natural solutions to get rid of the pests instead of pesticides.	Food, crops and animals	postmarket
It should not because that is not right.		It should with both because it depends really on the situation.	It seems to be that generic breeding would be good.	Gene therapy includes the person with the disease being injected with the cancer cell to try to help them or something along the lines of that and ethical concerns with this therapy is that the oerson can reject the cell which can hurt the patient.	Yes, just like with the fu they would adapt to the resistant. The best thing is either to not create a resistant or keep changing the resistant.	Vaccines, medicine, tires	Premarket safety reviews
Synthetic biology products should be assumed harmful until safe because assuming something is safe is risky and can lead to many negative consequences.	I think GMO food products are harmful because the substances in it might improve the quality of the product but there are also health risks, I think.	Yes, GMO food manufacturers should be required to conduct post market safety surveillance instead of the FDA because I'm pretty sure this insures the safety of the products or something like that.	I can think of cows being genetically modified where I think they are bred a certain way to show certain traits likeable to consumers or sellers.	Gene therapy can be helpful because it treats a patients diseases.	Yes, it does and the way to avoid the risk is to well, use natural solutions to get rid of the pests instead of pesticides.	Detergent, Lactos-free, Dairy.	These products require premarket reviews.
Synthetic biology products should be assumed harmful until proven safe.	I think it's less harmful than beneficial, but near the same.	Yes, since the FDA doesn't have to check it someone should.	The anti-pesticide plants for farmers.	It could cause diseases.  I know that with gene transplant the persons body may reject the gene but gene therapy uses the patients own cells to fight off things like cancer and sickle cell.	Yes, just like with the fu they would adapt to the resistant. The best thing is either to not create a resistant or keep changing the resistant.	The natural replication of rubber for tires, using agricultural waste to make "green chemicals", and the development of biobased products.	Yes they do require premarket or postmarket safety reviews because this tells the manufacturers or whatever they're called if their product need to be improved or not or if this synthetic biology works and whatnot.
I think that synthetic biology products should be assumed harmful until proven safe.	I think that GMO food can be beneficial because they can allow food to last longer for example the apple.	I think that the FDA should still be required to conduct post market safety surveillance instead of the FDA.	They may genetically modify chickens or eggs.	It could cause diseases.  I know that with gene transplant the persons body may reject the gene but gene therapy uses the patients own cells to fight off things like cancer and sickle cell.	Yes, just like with the fu they would adapt to the resistant. The best thing is either to not create a resistant or keep changing the resistant.	Insect Control, Food(Crops, etc), and animals.	Food require premarket insect control and animals postmarket.
I believe that if certain synthetic biology products have been consumed over a certain number of years (i.e. a decade) and no negative effects have been recorded, it should remain consumed until proved harmful. In regards to assuming if it is safe or harmful, I believe that studies should be taken in order to prove safe or harmful.	Considering manufacturers do not have to disclose if their GMO product has a negative impact compared to the real food until it is less nutritious, is controversial but understandable. I believe that each product may vary in its intended use, but overall I think it is beneficial.	I think the FDA needs to be involved in all testing and studies related to post market safety surveillance.	mice, goats, and mosquito.	Could affect the development of a fetus, or side effects that are unknown.	Yes, it is a valid concern, actions that can be taken to avoid these risks are minimizing the use of pesticides and use different pesticides.	I have learned about cell therapy, Gmo plants, and gmo animals aswell.	Plant and animal gmo require premarket safety review aswell as cell therapy.
Vice versa, harmful until proven safe	I think that GMO food products are beneficial if done correctly	I think they both should do it. The manufacturers may be biased toward their own product and the FDA can't get to everyone. So they should both be doing postmarket safety surveillance.	I think the police force could use genetically engineered dogs to better the police force in finding criminals or in finding drugs.	Gene therapy can be very dangerous if done incorrectly. It has been around for a bit but has only just been approved in 2017. Essentially what we are doing is playing god which can go very wrong, but also can be very good. Its a high risk high reward thing.  Some people think that it is dangerous and that people shouldn't genetically modify or engineer anything. It was a discussion when people were trying to genetically modify their babies to look like how they wanted.	Yes, to avoid the risk we must always be evolving. The only way to fight evolution is with our own evolution. Fight fire with fire.	papayas, corn syrup, and granulated sugar.	yes
I think they should be vice versa. They should be safe but also proven harmful to a certain point of how much genetic chemical and physical change is happening to the product.	Beneficial because they allow food such as apples to last a little longer and not go brown.	I think they should but I also think the FDA should then double check their surveillance. Just so that both can be extremely positive of the results.	Dogs and cats are genetically modified when they are partnered with different dog or cat.	Some people think that it is dangerous and that people shouldn't genetically modify or engineer anything. It was a discussion when people were trying to genetically modify their babies to look like how they wanted.	Yes, to avoid the risk we must always be evolving. The only way to fight evolution is with our own evolution. Fight fire with fire.	Insect resistant corn Herbicide tolerant soybean Virus resistant plum	Premarket safety reviews
					I think if they can form pesticides they can attract more pesticides.	Apples, Strawberries, and Chicken	Premarket

If you were to own a biosensor from the image above, which one would you choose?	If you were to create your own biosensor what would you create? Tell me which diseases you would like to look for, what body fluids would you want to test and how do you wear or use your device? Be as creative as possible!	2) Define a biosensor using your own words	3) Who's considered to be the father of biosensors?	4) What was the first biosensor?	5) Define a bioreporter using your own words	6) What is a possible future model for bioreporters?	7) From what you have learnt what is the benefit of detecting genotoxicity?
contact lens biosensors	I want to create something that can cure AIDS like the vaccination, you put a dead or a weak enzyme in them so they won't get any flu, something like that probably helps.	It is a device that uses living organism, enzymes, and antibodies to detect the chemicals in them.	Leland C Clark	oxygen detection	Bioreporters are living microbial cell that are genetically engineered to produce a signal to a specific chemical in their environment.	Nanomaterials	if you find it early, you can fight it and probably get cured from it.
wristband	I would create a stylish digital watch that would look for anything that doesn't seem normal	devices that checks analyte molecules like heavy metal, chemical toxicant or ph change	Leland C Clark	It was developed by leland clark in 1956 for oxygen detection	Bioreporters are intact, living microbial cells that have been genetically engineered to produce a measurable signal in response to a specific chemical or physical agent in their environment.	wristband	You catch it early so it doesn't develop into cancer
The temporary tattoo biosensor.	So, its a face mask that looks for Covid-19 in the breath that you breath through it.	A biosensor is similar to an alarm. There are different types of alarms for different things like carbon monoxide or smoke from a fire. Biosensors do that but on a much smaller scale seeing as they look for things like chemicals.	Leland C Clark	The "Clark Electrode", an oxygen electrode.	A bioreporter is like a radio. It can receive a group of signals due to the range of the frequencies it is set to and send out a signal, just like a radio.	They could look into preserving the activity of the bioreporter in the cell.	We could stop genes from mutating if we were to detect the amount of genotoxicity in their genes and help to prevent any further genotoxicity or help to possibly remove the genotoxicity.
Temporary tattoo	I would want to make a cure to any disease so I would take blood samples and stuff and you wear your device on the arm to check the tempature and stuff to make sure our not sick or anything	An electronic device	G.P Hicks	Transducing Element	living cells	A marine	none

<p>1) How can standardizing a process be beneficial?</p> <p>It helps you understand how a certain process is done.</p> <p>The benefits of standardization. Fundamentally, standardization means that your employees have an established, time-tested process to use. When done well, standardization can decrease ambiguity and guesswork, guarantee quality, boost productivity, and increase employee morale.</p> <p>Fundamentally, standardization means that your employees have an established, time-tested process to use.</p> <p>For example standardization can mean that your employees have an established, time-tested process to use.</p>	<p>2) After completing Activity #3, paste your google document link for Activity #3 here.</p> <p><a href="https://docs.google.com/document/d/1G28XAGELVC_wCBaw70Xa33Tj2_8TjZVxL_wGHhVed/edit">https://docs.google.com/document/d/1G28XAGELVC_wCBaw70Xa33Tj2_8TjZVxL_wGHhVed/edit</a></p> <p><a href="https://docs.google.com/document/d/1T1A6cQL_ScFnyDKUzAuR2yxGqkdeh3CvCv0h0M7zWmynR3U3Q_vq6f0m/edit">https://docs.google.com/document/d/1T1A6cQL_ScFnyDKUzAuR2yxGqkdeh3CvCv0h0M7zWmynR3U3Q_vq6f0m/edit</a></p>	<p>3) List the four BioBrick parts that we discussed in this module. What is their defined function?</p> <p>Producer Coding region Terminator Ribosome entry site</p> <p>coding sequences, promoters, ribosomal binding sites, and terminators</p> <p>Promoter: Recruits transcription machinery. Ribosome Binding Site (RBS): Encodes part of mRNA that binds to ribosome. Coding Region (CDS): Encodes amino acid sequence of protein. Terminator: Causes transcription to stop.</p> <p>promoter: recruits transcription machinery. Ribosome binding site encodes part of mRNA that binds to ribosome. Coding region: encodes amino acids sequence of protein. Terminator: causes transcription to stop.</p>	<p>4) Which of the following is true of all BioBricks? (You are allowed to select more than one)</p> <p>They have a defined biological function. They contain a promoter. They are a DNA sequence. They are like Legos. They are standardized</p> <p>They do not have a defined biological function. They contain a promoter. They are a DNA sequence. They are like Legos. They are standardized</p> <p>They do not have a defined biological function. They contain a promoter. They are an mRNA sequence. They are like Legos. They are not standardized</p> <p>They have a defined biological function. They contain a promoter. They are a DNA sequence. They are an mRNA sequence. They are like Legos. They are standardized</p>	<p>5) Describe two advantages of using BioBricks in synthetic biology.</p> <p>One advantage of BioBricks in synthetic biology is that it helps understand the breakdown of the dna. Another reason it's an advantage is that they help carry out defined functions.</p> <p>Many of these industries are taking advantage of synthetic biology tools, like BioBricks, to engineer organisms to produce many of their products. Synthetic biology can be defined as A) the assembly of new biological parts, devices, and systems or B) the reconfiguration of existing, natural biological systems for useful purposes. BioBricks are making it easier to design and assemble the biological pathways needed for engineered organisms to perform new tasks.</p> <p>Speeds up designing process, Decreases error</p> <p>engineers can use bioBricks to produce lots of their products and it makes it easy for them to design and assemble the biological pathway.</p>
---	---	--	---	--

1) Define synthetic biology as best as you can-- if you are not sure, guess!	2) What is the difference between synbio and genetic engineering?	3) Synthetic biology can be used to solve diverse problems in many fields.	4) Define synbio in your own words.	5) Give 3 ideas on how you can use synthetic biology to improve your own life or problems that are important to you.
I'm guessing synthetic biology is something that has to do with DNA and how it works.	Synbio is multiple than in the one in genetic engineering it has one	TRUE	Synbio is DNA that can help us in our daily lives to help the environment around us	Helping people in need, balance the chemicals in synthetic biology and introduce a new organism into the world.
synthetic biology has to do with living cells that will be useful to cure a disease etc.	Genetic engineering usually involves the transfer of one gene another and synthetic is science that involves redesigning organisms for useful purposes by engineering them to have new abilities.	TRUE	synbio deals with living cells and making them useful	-If I have a disease probably synthetic biology could help cure it -With synthetic biology, the cells can clean the water -preserving the environment we have
synthetic biology is when they engineer living cells to do something useful.	the difference is that genetic engineers are usually introducing one or two small changes to investigate a specific system, whereas synthetic biologists aim to design new genomes and redesign existing genomes at a grand scale.	TRUE	synbio is when you change something to do a better job	3 ideas is that it can help us provide ways to make drugs for cancer etc. We can engineer plants to have more nutrients. synthetic biology can improve or help the environment.
stuff in the body that was created synthetically made to help the body function or see if that synthetic part can be used in the human body	synbio engineering is where you are engineering a living cell for something useful and genetic engineering is when you are using cells that a naturally made from a living	TRUE	synbio is when you are engineering new cells for the good of it that can help in multiple diverse fields of work	1. it can make the food we grow better for us to eat that would probably give better nutrition 2. make new medicine for people that are allergic to a certain kind of medicine as I am 3. Engineer new ways to get vitamins for the body so it can properly function such as if you are working out and need vitamins
Redesigning organisms to make them more useful and have more abilities	Genetic is moving genes from one cell to another and synbio is redesigning the gene or cell	TRUE	Redesigning organisms	Better food Better medicine Help create cures

2) What made you choose to take this course?	3) What is your background in biology? What are some courses you have taken so far?	4) Have you heard about synthetic biology before? If yes, can you describe it in few sentences?	5) What are something you are excited to learn in this course?	6) Tell us something you are really passionate about! What kind of person are you aspired to become?
I like to understand how organisms can be changed to fit the need of humans and society. I thought that it could be interesting to learn	I took a semester of biology my junior year at Wilson High School. I took living environment my freshman year at West Irondequoit, then my sophomore year I took earth science.	Yes, I had heard of synthetic biology before but it was during my freshman year while I was taking living environment. Synthetic biology is the act of creating new parts of organisms that already exist in nature.	I am excited to learn and understand how people can redesign organisms to fit societies needs.	I am passionate about learning new things that interest me. I aspire to become a person that is honest to others, and especially myself.
Because I want to learn more about science and life.	I didn't take a biology class and I'm hoping for one for my Senior year in highschool. I did dissected a pig and a chicken wing that was my experience.	No	To learn more information about science and how things we use work.	I'm passionate about modeling and acting(One of the most challenging careers). To be an optimistic and determined person.
The course didn't appear to be difficult	I don't really have a background in biology but I've taken Living Environment.	No I have not heard about synthetic biology	Something I'm excited to learn is molecular engineering.	Something I'm really passionate about is skateboarding and I aspire to have a job in tech.
I love science	I did labs and experiments and things like that.	is a field of science that involves redesigning organisms for useful purposes by engineering them to have new abilities.	I want to do experiments i just love science.	I love helping others and think that's gonna be a major part to what im gonna become in life.
Genetic engineering seems interesting to me.	I don't have much back round in biology, i havent really taken any biology classes	I don't think I have heard of the term synthetic biology before.	I am excited to learn how they are able to genetically modify organisms in a way that benefits us.	I am mostly interested in astronomy and chemistry. If possible i'd like to be either an astronomer or a chemical engineer. I am also planning on minoring in piano.
It looked interesting and I would like to know something I've never seen or experienced before	I do not think I've taken any courses	nope. But I did research about it so I would say it is a science that involves redesigning organisms for useful purposes by engineering them to have new abilities.	everything	I like to think of myself as a person who would help somebody in need. And I would aspire to be a professional soccer player and a detective as a back up plan.
To get help with my high school and college activity	Living Environment, Earth science and Biology	No	something new that i have ever learn	i am a confuse type of person and i change my mind a lot
im intrested in doing new things.	I havent taken any.	Yes, i know that its a field of science that involves redesigning something.	Anything and everyting because i know it will be fun	Qriting i want to be a book writer and tell my story
I'm interested in the different types of science	No my biology class was canceled at school	No really but I think synthetic things are created	What it's really about and what kinds of things are really made	Ask I really want to learn I find it interesting and I want to become a independent and responsible person