

**Explore More: Genetic Engineering  
Script**

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OPEN:	
	<p>Norma: "I think it's beyond our comprehension what's potentially available, what's potentially out there."</p> <p>Vilsack: "It's not new science, it's faster science."</p> <p>Fred: "Even though there's potential for great good it also has potential to create huge harms."</p> <p>Chuck: "Basically biotechnology can affect and have impact on anything that is living and that's quite a remarkable thing..."</p>
	<p>QUITE A REMARKABLE THING INDEED. THE POSSIBILITIES PROVIDED BY BIOTECHNOLOGY ARE ENDLESS, AMAZING... AND CONTROVERSIAL. TODAY WE'LL EXPLORE MORE ABOUT A POWERFUL FORM OF BIOTECHNOLOGY,</p>

<p>TRANSITION WITH TITLE OVER A BACKGROUND: GENETIC ENGINEERING</p>	<p>GENETIC ENGINEERING, WHICH ALLOWS US TO CRACK THE GENETIC CODE, THEN MANIPULATE IT IN WAYS WE NEVER IMAGINED. WE'LL LOOK AT HOW IT'S DONE, WHY IT'S DONE, AND MOST IMPORTANTLY WHETHER IT <b>SHOULD</b> BE DONE. SHOULD WE CLONE ANIMALS? SHOULD WE CLONE HUMAN BEINGS? SHOULD A GENE FROM A FISH FIND ITS WAY INTO A TOMATO? ALL OF THAT AND MORE <b>IS</b> POSSIBLE WITH GENETIC ENGINEERING.</p>
<p>GENETIC ENGINEERING DISSOLVES TO GENES (GENES DISSOLVE ONTO BACKGROUND)</p> <p>BACKGROUND DISSOLVES TO WHITE AND HAVE "CUTOUTS" OF A DOG, CAT, A CORN PLANT, A GIRAFFE, A BACTERIA OR A HUMAN BEING.</p>	<p>TO UNDERSTAND GENETIC ENGINEERING, YOU HAVE TO START WITH THE MATERIAL IT MANIPULATES, GENES. GENES ARE UNITS OF INHERITANCE , SPECIFIC SECTIONS OF DNA THAT DETERMINE WHETHER YOU'RE A DOG A CAT OR A CORN PLANT,</p>

<p>CUTOUPS CONTINUE TO CHANGE SHOWING BLUE EYES, BROWN, TALL , SHORT, DARK, LIGHT</p>	<p>WHETHER YOU'RE A GIRAFFE A BACTERIA OR A HUMAN BEING.</p> <p>WHETHER YOU HAVE BLUE EYES OR BROWN, WHETHER YOU'RE TALL OR SHORT, DARK OR LIGHT. GENES CONTROL THOSE PHYSICAL CHARACTERISTICS AND MORE .</p>
<p>VIDEO SHOWING SOMEONE SNEEZING, THEN A COW CHEWING CUD.</p> <p>DISSOLVE TO WHITE BACKGROUND THAT QUICKLY FILLS WITH A SEQUENCE OF A, T, G, C (FILLS LEFT TO RIGHT, TOP TO BOTTOM)</p> <p>popup definition of genome?</p>	<p>THE POWERFUL LITTLE PIECES OF DNA DIRECT ALL THE DIFFERENT PROCESSES OF LIFE, FROM FIGHTING A COLD TO DIGESTING DINNER. HOW DO THEY DO ALL THAT? WRITTEN IN A CODE OF A'S, T'S, G'S AND C'S, GENES REALLY DO PROVIDE THE 'DIRECTIONS' FOR LIFE.</p> <p>TO CRACK THE CODE, YOU NEED TO KNOW THAT GENES ARE SPECIFIC SEQUENCES OF DNA. DNA IS MADE OF 4 CHEMICALS, ADENINE, THYMINE, GUANINE AND CYTOSINE, OR A G T AND</p>

BLUEPRINT ROLLS OVER VIDEO

GENES DISSOLVE ONTO BLUEPRINT  
IN “SHAPE” OF ORGANISM, OUTLINE  
OF ORGANISM WRITTEN IN A,T,G,C’s

CROWDS OF PEOPLE, ANIMALS,  
FIELDS OF GRAIN

C. DNA IS DOMINATED BY ONE  
FUNDAMENTAL RULE, AN A ALWAYS  
PAIRS WITH A T, AND A G ALWAYS PAIRS  
WITH A C. THESE LETTER-PAIRS ARE THE  
ALPHABET IN THE LANGUAGE OF DNA.  
STRUNG TOGETHER IN VERY SPECIFIC  
SEQUENCES THE LETTER-PAIRS SPELL  
OUT WORDS, OR GENES, WHICH TELL  
CELLS HOW TO ACT. IF YOU ADD UP ALL  
THE WORDS OR GENES TELLING AN  
ORGANISM’S CELLS HOW TO BEHAVE  
YOU GET A “BLUEPRINT” FOR BUILDING  
AND MAINTAINING EACH AND EVERY  
LIVING THING. THAT BLUEPRINT IS  
KNOWN AS A GENOME. THAT’S WHERE  
THE TRUE POWER OF GENETIC  
ENGINEERING LIES. NATURE PROVIDES  
US WITH A GENE POOL THAT’S DEEP AND  
WIDE, BRIMMING WITH TRAITS AND

	<p>PROCESSES. GENETIC ENGINEERING GIVES SCIENTISTS THE POWER TO PICK AND CHOOSE FROM THAT POOL, THEN PUT THE GENES TO WORK WHEN AND WHERE THEY WANT. (george bite - there's a lot of biodiversity out there, mother nature already created very elegant tools and elegant processes to already do what we're looking for. so why not tap into that?)</p>
<p>GENETIC ENGINEERING TITLE OVER BACKGROUND (SAME AS EARLIER)</p> <p>VIDEO OF LAB PERSON MONKEYING AROUND WITH EQUIPMENT, VIDEO CONTINUES WITH TRANSPARENCY RIPPLES OVER IT</p> <p>GENES CAN BE:</p> <ul style="list-style-type: none"> <li>- FIXED (spin a letter around to "fix" _</li> <li>- REPLACED ( add in a missing letter)</li> <li>- CLONED (copy the word)</li> <li>- RECOMBINED (mix two words)</li> </ul>	<p>NOT ONLY CAN SCIENCE TAP INTO THE POWER OF THE GENE POOL, THE POWER CAN BE MAXIMIZED THROUGH GENETIC ENGINEERING. GENETIC ENGINEERING CHANGES OR MANIPULATES GENES IN ORDER TO ACHIEVE SPECIFIC RESULTS, AND THERE ARE MANY WAYS TO "ENGINEER" GENETIC MATERIAL; DEFECTIVE GENES CAN BE FIXED, MISSING GENES REPLACED, GENES CAN</p>

take the basic gene splicing animation, and incorporate a fish and a tomato behind it.

BE COPIED OR CLONED, AND GENES ARE MIXED AND MATCHED THROUGH RECOMBINANT DNA TECHNOLOGY.

(chuck link bite – in recombinant dna , you can think of it like a poster you put together, by pasting pictures on the poster, you put together the pieces to communicate something.

recombinant dna is taking pieces of dna and cutting and pasting it together)

(animation.....).SO LET'S SAY YOU HAVE A FISH THAT LIVES IN EXTREMELY COLD CONDITIONS. IF YOU COULD FIND THE GENES THAT PROTECT THE FISH FROM THE COLD, YOU COULD "CUT AND PASTE" THEM INTO THE GENETIC CODE OF A TOMATO PLANT. THE FISH GENES ARE NOW FUNCTIONING IN THE TOMATO PLANT, GIVING IT THE SAME PROTECTION FROM THE COLD THEY

	GAVE THE FISH.
<p>FAST CUTS OF VIDEO ILLUSTRATING DIFFERENT SETTINGS (INDUSTRY, HOSPITAL, FARMFIELD)</p> <p>Graphic with 3 boxes, large one is title, smaller two are video illustrating that use. “INDUSTRY”</p>	<p>THE POSSIBILITIES OF THIS TECHNOLOGY ARE ENDLESS, AND EVERYONE FROM MEDICINE TO INDUSTRY IS SCRAMBLING TO ADOPT IT AND ADAPT IT TO THEIR SPECIFIC NEEDS.</p> <p>INDUSTRIES ARE DEVELOPING A WIDE RANGE OF GENETICALLY ENGINEERED PRODUCTS, FROM TEXTILES, TO HEALTH CARE , TO CLEANING PRODUCTS. FOR INSTANCE, SOME DETERGENTS USE GENETICALLY ENGINEERED ENZYMES TO REPLACE HARSH CHEMICALS, MAKING THE DETERGENT SAFER FOR THE ENVIRONMENT. THE JEANS YOU’RE WEARING MIGHT GET THEIR “FADED FINISH” FROM A GENETICALY ENGINEERED ENZYME.</p>

TITLE = "FARMING"

Video in small boxes of crops, closeups of foods,

Video transitions to livestock

TITLE = "FARMING" TO "PHARMING"

Video boxes of crops & livestock, banana, glass of milk

DOWN ON THE FARM, GENETIC

ENGINEERING GIVES CROPS RESISTANCE

TO PESTS AND DISEASES.

FOOD CAN BE MADE MORE FLAVORFUL

OR MORE NUTRITIOUS. WOULD YOU LIKE

APPLES WITH GENES FROM ORANGES, SO

THEY'D PRODUCE MORE VITAMIN-C?

HOW ABOUT A TOMATO THAT KEEPS ITS

FLAVOR LONGER AND STAYS FRESHER?

JUST LIKE CROPS, LIVESTOCK CAN BE

GENETICALLY ENGINEERED; FOR

LEANER MEAT, MORE FLAVOR, MORE

WOOL OR MORE MILK.

BEYOND USES IN FARMING ARE USES IN

"PHARMING", GENETICALLY

ENGINEERING CROPS OR LIVESTOCK TO

PRODUCE MEDICINES. IMAGINE EATING

TITLE = "MEDICINE"

Video boxes of lab workers etc.

Generic lab looking video again,

A BANANA INSTEAD OF GETTING A SHOT,  
OR DRINKING MILK TO TAKE AN  
ANTIBIOTIC.

SOME OF THE MOST PROMISING AND  
POWERFUL APPLICATIONS OF GENETIC  
TECHNOLOGY ARE IN THE FIELD OF  
MEDICINE. RESEARCHERS ARE USING IT  
TO DIAGNOSE AND PREDICT DISEASE,  
AND TO DEVELOP THERAPIES AND  
DRUGS TO TREAT DEVASTATING  
DISEASES LIKE CANCER AND  
ALZHEIMER'S, DIABETES, AND CYSTIC  
FIBROSIS.

THE **POSSIBILITIES** OF THIS  
TECHNOLOGY ARE LIMITED ONLY BY  
OUR IMAGINATIONS, BUT THE **USES** OF  
THE TECHNOLOGY ARE LIMITED BY THE

	<p>MORALS AND ETHICS THAT SOCIETY ACCEPTS, AND BY THE LAWS AND REGULATIONS WE ENACT TO GOVERN THE TECHNOLOGY. .</p>
	<p>(norma bite---technology is really neutral. it isn't good or bad. we people, we humans, give it it's moral valence by how we use it. so while a couple might argue we'd rather have a baby that doesn't have cystic fibrosis than one that does, someone might say but you can use that same technology to alter a situation that you shouldn't alter, like create a designer baby)</p>
<p>ONCAM HOST IN LAB SETTING AGAIN</p>	<p>SO HOW DO YOU DETERMINE WHICH USES OF THIS TECHNOLOGY ARE GOOD USES, AND WHICH ONES AREN'T? IF YOU COULD CHOOSE TRAITS FOR YOUR CHILD, WOULD YOU? IF RESEARCHERS CAN GENETICALLY ENGINEER CROPS TO FEED THE WORLD, SHOULD THEY? WHAT</p>

<p>EXPLORE MORE LOGO, GO THRU MAG GLASS</p>	<p>IF THE HARMFUL IMPACT HUMANS HAVE HAD ON ANIMALS COULD BE REVERSED? LET'S START THERE AND EXPLORE MORE.</p>
<p>GRAPHIC: "AT ISSUE: GE &amp; THE ANIMAL KINGDOM"</p> <p>NATSOUND CLIP FROM JURASSIC PARK, DINO STOMPING AFTER THE JEEP</p> <p>CHROMOSOMES</p> <p>Step by step animation/graphics CHROMOSOMES DUPLICATE CHROMOSOMES INSERTED EGG GOES INTO "COW?"</p>	<p>JUST LIKE IN JURASSIC PARK, GENETIC ENGINEERING REALLY DOES MAKE IT POSSIBLE TO "RESURRECT" EXTINCT ANIMALS. IMAGINE DINOSAURS BACK ON THEIR FEET, OR PASSENGER PIGEONS FLYING HIGH AGAIN. IF, AND IT'S A BIG IF, IF YOU CAN RECOVER A USEABLE SAMPLE OF AN EXTINCT ANIMAL'S DNA</p> <p>*(the downfall of the dinos in the movie)</p> <p>...THROUGH A FORM OF GENETIC ENGINEERING CALLED CLONING, YOU CAN COPY THE DNA, INSERT IT INTO A DONOR EGG, IMPLANT IT INTO A</p>

<p>VIDEO OF BESSIE AND NOAH</p>	<p>SURROGATE MOTHER AND DEVELOP IT LIKE A NORMAL EMBRYO.</p> <p>THIS PROCESS PLAYED OUT IN IOWA, WHEN A COW NAMED BESSIE GAVE BIRTH TO NOAH. NOT SUCH A BIG DEAL UNLESS YOU KNOW NOAH WASN'T A COW AT ALL BUT A GAUR, AN ENDANGERED OX-LIKE ANIMAL, NATIVE TO INDIA AND BURMA. NOAH DIED SHORTLY AFTER HIS BIRTH FROM AN</p>
<p>VIDEO/STILLS OF ENDANGERED ANIMALS – PANDAS, CHEETAHS ETC.</p>	<p>INFECTION, BUT THE EVENT BRINGS UP AN IMPORTANT POINT. IT'S NOT JUST EXTINCT SPECIES THAT COULD BENEFIT FROM GENETIC ENGINEERING.</p> <p>ENDANGERED SPECIES TEETERING ON THE EDGE OF EXTINCTION COULD BE PULLED BACK FROM THE BRINK! SO WHY AREN'T SCIENTISTS LINING UP TO CLONE ENDANGERED OR EXTINCT</p>

THE PANDA “DUPLICATES”, FILLS  
SCREEN

VIDEO OF EXOTIC LOCATIONS

SPECIES? BECAUSE OF POTENTIAL

PROBLEMS IN THE APPROACH.

THE TECHNOLOGY CAN ONLY CREATE

"COPIES" OF EXISTING DNA. SO ALL THE

OFFSPRING CREATED WOULD SHARE THE

SAME DNA. (bite from monica post... it would

be like having a whole herd of twins. sharing the

same genes means sharing the same strengths **and**

the same weaknesses. so a single disease could

strike and wipe out every one of the genetically

engineered animals) ANOTHER CONCERN

CENTERS ON HABITATS FOR THESE

ANIMALS. MANY ARE EXTINCT OR

ENDANGERED BECAUSE THEIR HABITATS

ARE DISAPPEARING. WOULD ZOOS

BECOME THE ONLY HOMES FOR THESE

GENETICALLY ENGINEERED ANIMALS?

(monica post on zoo's mandate/purpose – I think

genetic modification of animals really flies in the

<p>HOST ONCAM IN LAB</p> <p>Video tag, explore more through mag glass to host oncam in grocery store</p> <p>Fastforward action of host going through aisles putting food into shopping basket</p>	<p>face of what zoos are about...public would look at zoos differently if they became a place for “entertainment”, not education. Zoo supposed to preserve)</p> <p>“SAVING” EXTINCT OR ENDANGERED ANIMALS ISN’T THE ONLY APPLICATION OF GENETIC ENGINEERING. WHAT COULD YOU COME UP WITH IF YOU LET YOUR IMAGINATION RUN WILD?</p> <p>XXXXXXXX SOTS FROM KIDS XXXXXXXXXXXX</p> <p>CLONING EXTINCT OR ENDANGERED ANIMALS ISN'T COMMON YET, BUT LET'S EXPLORE MORE ABOUT A USE OF GENETIC ENGINEERING THAT IS COMMON AND AFFECTS ALL OF US, FOOD PRODUCTION. LET’S DO SOME SHOPPING!</p> <p>I’M GOING TO PICK UP ALL THE INGREDIENTS FOR THAT BALANCED</p>
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<p>Oncam real time</p> <p>Whip pan to breakfast table</p>	<p>BREAKFAST EVERYONE'S ALWAYS TALKING ABOUT.</p> <p>WHEW!</p>
<p>"AT ISSUE: LABELING GE FOODS"</p> <p>cam circles "over" the breakfast, stops on a point where you can freeze it and see everything.</p> <p>Freeze on margarine, transparency pops up with graphic title: &gt;50% of soybeans Are GE varieties</p> <p>Cam circles again, freeze on muffins, Transparency pop-up with graphic title:</p>	<p>O.K. LET'S EAT!</p> <p>CAN YOU TELL WHICH OF THESE FOODS USED GENETIC ENGINEERING DURING ITS PRODUCTION PROCESS? (highlight margarine tub, muffins, cereal, milk, each one highlights with a popup graphic window with stats)</p> <p>IT <b>COULD</b> BE THE MARGARINE WHICH CONTAINS SOY OIL. MORE THAN HALF OF THE SOYBEANS PLANTED IN THE U.S. ARE VARIETIES THAT ARE GENETICALLY ENGINEERED TO RESIST HERBICIDES, SO THE ODDS ARE GOOD THAT THE SOY OIL IN THE MARGARINE COMES FROM GE</p>

<p>GE grains resist pests</p> <p>Cam circles to cereal bowl</p> <p>Cam circles to milk jug, transparency pop-up with graphic title: bST, GE hormone boosts milk production</p> <p>Cam circles again stops on wide</p> <p>Could cover part of jerry bite with document with highlighted quote from FDA policy, or move this down and cover next bit of track</p>	<p>SOYBEANS. THE MUFFINS <b>COULD</b></p> <p>CONTAIN FLOUR GROUND FROM GRAIN</p> <p>THAT'S GENETICALLY ENGINEERED TO</p> <p>RESIST PESTS. THE CEREAL <b>COULD</b></p> <p>COME FROM THOSE SAME GRAINS. HOW</p> <p>ABOUT THE MILK? THE COW IT CAME</p> <p>FROM <b>COULD</b> HAVE BEEN INJECTED</p> <p>WITH bST, A GENETICALLY ENGINEERED</p> <p>HORMONE THAT BOOSTS MILK</p> <p>PRODUCTION.</p> <p>SO WHICH ONE IS IT? YOU CAN'T TELL,</p> <p>BECAUSE CURRENTLY IN THE UNITED</p> <p>STATES, THE FDA DOESN'T REQUIRE</p> <p>FOODS THAT USE GENETIC ENGINEERING</p> <p>IN THEIR PRODUCTION TO BE LABELED.</p> <p>(Jerry bite - in '92 the fda made a ruling that was</p> <p>landmark concerning gmos *[pop up explaining</p> <p>gmo], on labeling, said unless there's a significant</p>
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Generic grocery store shots

difference doesn't need to be any labeling)

THE FDA STATES THERE IS NO  
SIGNIFICANT DIFFERENCE BETWEEN GE  
FOODS AND "TRADITIONAL" FOODS.

THEY'RE RULED AS SAFE SO THEY DON'T  
NEED TO BE LABELED.

BUT NOT EVERYONE AGREES THAT THE  
FOODS ARE SAFE. THIS LAWYER  
ACTUALLY SUED THE FDA, SAYING THEY  
IGNORED THE FINDINGS OF SOME OF  
THEIR OWN SCIENTISTS....

(steve bite –It's clearly clear that the predominant  
opinion among the FDA's, the Food and Drug  
Administration's own scientists that reviewed the  
issue, was that genetic engineering is very  
different. In fact, one of the officials at the FDA  
whose job it was to summarize the input from  
their scientists stated in a memo to the  
Biotechnology Coordinator "the processes of

Video of crops

genetic engineering and traditional breeding are different and according to the technical experts in the agency they lead to different risks."

THOSE "RISKS" ARE WHAT CONCERN MANY PEOPLE. THEY FEAR THAT GROWING GENETICALLY ENGINEERED CROPS COULD AFFECT THE ENVIRONMENT, PLANTS, AND ANIMALS.

Cu of a food label

OR THAT WHEN USED IN FOODS, THE CROPS COULD TRIGGER ALLERGIES. IN EUROPE, MANY CONSUMERS REFER TO THE FOODS AS "FRANKENFOODS" AND DEMANDED THEY BE LABELED.

LABELING IS VIEWED BY MANY AS ONE WAY TO TRACK ANY EFFECTS OF THE FOODS. SOME EVEN SEE LABELING AS A BASIC CONSUMER RIGHT.

(Fred K. bite – It seems to me that labeling is a fundamental right that consumers should have. I

Generic shots of food again

mean we after all live in a democracy and people should have access to information. The only way that you can have adequate access to information in terms of how your food was produced is if you have some kind of label that says here's what happened. Even if there are only 10 consumers that demand that it seems to me those consumers have a right to be heard. [If someone does get ill and the food is not labeled, there's no way to track it. If someone comes down with an allergy and the food hasn't been labeled and there's no way to know whether or not the food they ate was a genetically engineered variety or not, how do you track that? So then you really can't protect future consumers from that. So I think labeling is essential.]

IF THE REGULATORY AGENCIES DID  
AGREE TO A LABELING SYSTEM FOR GE  
FOODS, HOW WOULD THAT SYSTEM

<p>FOOD VIDEO TAG</p>	<p>FUNCTION AND WHERE WOULD YOU DRAW THE LINE?</p> <p>(vilsack bite – right now we have no way of testing , how would you label a pig that ate ge corn, so sometimes labeling creates more problems than it solves )</p> <p>IT'S NOT JUST AN ISSUE FOR POLITICANS AND PRODUCERS OF FOOD, KID CONSUMERS HAVE DEFINITE OPINIONS ABOUT THE FOOD THEY EAT AND HOW IT'S MADE.</p> <p>XXXX SOTS FROM KIDS XXXXX</p>
<p>HOST ONCAM BACK IN LAB</p>	<p>RIGHT NOW MOST OF THE TRAITS BEING GENETICALLY ENGINEERED INTO FOODS ARE ON THE PRODUCTION SIDE, MEANING THEY BENEFIT THE FARMER. THE TRAITS MAKE THE FARMER MORE PRODUCTIVE OR MORE EFFICIENT, OR REDUCE COSTS. BUT THERE ARE</p>

<p>HOST ONCAM IN LAB</p> <p>GRAPHIC “AT ISSUE: GOLDEN RICE”</p> <p>Cover video from world food prize people, hopefully an interview with someone</p>	<p>"CONSUMER" TRAITS BEING DEVELOPED TOO, TRAITS THAT DIRECTLY BENEFIT YOU, MAKING YOUR FOOD MORE FLAVORFUL, OR MORE NUTRITIOUS.</p> <p>WHAT KINDS OF TRAITS WOULD YOU LIKE TO SEE DEVELOPED ?</p> <p>(kids tossing out ideas about what they'd like to see, “grass that never grows higher than 2 inches – no mowing!”, “something with full rda of all vitamins /minerals”)</p> <p>GOLDEN RICE IS A CLASSIC EXAMPLE OF A CONSUMER TRAIT THAT ALSO SERVES A GREATER GOOD.</p> <p>GOLDEN RICE WAS DEVELOPED BY RESEARCHERS INGO PROTRYKUS AND PETER BEYER, WITH A VERY SPECIFIC GOAL IN MIND, TO PREVENT VITAMIN-A DEFICIENCY. EACH YEAR, THAT DEFICIENCY CAUSES BLINDNESS IN</p>
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HALF-A MILLION PEOPLE IN DEVELOPING COUNTRIES. THE RESEARCHERS GENETICALLY ENGINEERED GOLDEN RICE TO PROVIDE INCREASED LEVELS OF VITAMIN-A. THEY INSERTED 3 DIFFERENT GENES INTO THE RICE, ONE GENE CAME FROM A DAFFODIL, TWO CAME FROM OTHER PLANTS. THE 3 GENES, WORKING TOGETHER, REPRODUCED THE GENETIC PATHWAY THAT CONTROLS THE PRODUCTION OF BETA-CAROTENE, WHICH WHEN EATEN, TURNS INTO VITAMIN-A. BY EATING THE GENETICALLY ENGINEERED RICE, MALNOURISHED CHILDREN AND ADULTS WOULD GET THE VITAMIN-A NEEDED TO PREVENT BLINDNESS.

SOUNDS LIKE A PRIME USE OF THE

	<p>TECHNOLOGY RIGHT? CRITICS OF GENETIC ENGINEERING IN FOOD PRODUCTION DON'T AGREE.</p> <p>(steve drucker: if in 20 years we find out we've given those starving people cancer, we haven't done them any favors have we?)</p>
<p>GRAPHIC: "AT ISSUE: FEEDING THE WORLD"</p>	<p>GOLDEN RICE WAS DEVELOPED TO ADDRESS A SPECIFIC SYMPTOM WITHIN THE LARGER PROBLEM OF WORLD HUNGER, A PROBLEM THAT EXPERTS AGREE WILL CONTINUE TO GROW. THE WORLD POPULATION IS EXPECTED TO HIT 8 BILLION BY THE YEAR 2020, SO HOW WILL WE FEED THE WORLD? (jerry from pioneer – since I started this sentence, the world's population is growing. The only way we'll be able to feed the world, without dramatically destroying land we love to look at like rainforest, is to use biotechnology)</p>

BIOTECH CROPS CAN BE GENETICALLY ENGINEERED TO DELIVER HIGHER YIELDS, TO WITHSTAND DROUGHT, TO GROW IN UNUSUAL CONDITIONS, OR TO PACK MORE NUTRITION INTO EVERY BITE. ALL OF THOSE FACTORS COULD BE IMPORTANT WITH AN EXPLODING WORLD POPULATION. BUT NOT EVERYONE AGREES THAT BIOTECH IS THE BEST OR ONLY OPTION TO FEED THE WORLD. .

(fred k – even if we're wildly successful in producing tons of corn and soybeans through genetic engineering, its not going to feed the world. We're producing more right now than the world can consume and we have 840 million people malnourished on the planet. Hunger is caused by complex set of factors , local ecologies and social systems. It boils down to the fact that

	<p>people aren't entitled to food. Simply producing more stuff isn't going to solve it. )</p> <p>SO HOW WILL WE MEET THE GROWING DEMAND FOR FOOD AROUND THE WORLD?</p> <p>(kids discuss amongst themselves)</p>
<p>VIDEO TAG OF CROPS, GROCERY STORES</p> <p>EXPLORE MORE LOGO, MAG GLASS MOVE</p>	<p>WHETHER YOU'RE FEEDING THE WORLD, OR FEEDING YOURSELF, GENETIC ENGINEERING CAN BE A CONTROVERSIAL CHOICE. LET'S CLEAR FOOD FROM THE TABLE AND EXPLORE MORE ABOUT MEDICINE.</p>
<p>GRAPHIC: "AT ISSUE: GE &amp; MEDICINE"</p>	<p>THERE IS LITTLE DOUBT THAT GENETIC ENGINEERING IS PROVIDING THE MEDICAL FIELD WITH THE MOST POWERFUL TOOLS EVER, TO RESEARCH DISEASES AND THEIR CAUSES, AND TO DEVELOP TREATMENTS AND CURES.</p> <p>(norma bite --- i think that genetic technology</p>

	<p>really has the potential to impact the entire life span. i think it has the potential to impact babies and their genetic makeup, it has the impact to alter the course of diseases like diabetes, and it has the potential to alter things like alzheimer's that might mean people are more productive in their later years, so genetic technologies really have the potential to impact our entire life span and change the entire lifespan).</p>
HOSPITAL/DOCTORS/LABS	<p>WITH THIS POWER, COMES AN AWESOME RESPONSIBILITY. THESE TECHNOLOGIES CAN &amp; WILL AFFECT THE FUTURE OF THE HUMAN RACE BECAUSE OF THE POTENTIAL APPLICATIONS OF GENETIC ENGINEERING IN HUMAN REPRODUCTION.</p>
IN VITRO VIDEO?	<p>THE TECHNOLOGY ALREADY EXISTS TO OVERCOME INFERTILITY THROUGH</p>

TECHNIQUES LIKE IN VITRO FERTILIZATION. SCIENTISTS ESSENTIALLY “CREATE” AN EMBRYO BY JOINING THE EGG AND SPERM TOGETHER OUTSIDE THE MOTHER’S BODY. THAT EMBRYON CAN THEN BE IMPLANTED IN THE MOTHER’S UTERUS. GENETIC ENGINEERING COULD TAKE THAT POWER ONE STEP FURTHER BY **ALTERING** THE EMBRYO THAT’S CREATED. AN UNBORN CHILD WITH A GENETIC DEFECT, LIKE CYSTIC FIBROSIS, COULD THEORETICALLY HAVE THAT GENE REPAIRED. FROM “FIXING DEFECTS”, IT ISN’T A VERY BIG LEAP TO “CHOOSING TRAITS”, CREATING DESIGNER BABIES - ( if you have the technology to eliminate cystic fibrosis then you also have the technology to alter genes and give someone a baby with brown eyes

or with particular sports ability or with particular intellect. you know do you want to get a whole group of people like albert einstein or a whole group of michael jordans and you could potentially do that, and would that be equally as good an idea as using the technology to have a baby not have cystic fibrosis. )

BEYOND THE FIXES, AFTER THE ALTERATIONS, COMES THE MOST COMTROVERSIAL OF ALL THE APPLICATIONS OF GENETIC ENGINEERING, HUMAN CLONING.

(cloning and genetic therapies will raise for us issues that are huge in terms of what's acceptable and what's not acceptable. Because we're now talking about messing with genetic makeup of people. We can sort of talk about tomato plants or the hybrid seed corn or whatever because if some of those get thrown out in the process it's no big

deal, relatively speaking. But if we start creating embryos that aren't potential people, then what does that mean and what does it say to us about the value of human life.)

CLONING HUMANS HAS UP TO THIS POINT BEEN BANNED IN THE U.S., EUROPE, AND JAPAN. BUT EARLY IN THE YEAR 2001, ENGLAND DECIDED TO ALLOW LIMITED RESEARCH INTO THE CLONING OF HUMANS. ABOUT THE SAME TIME, A DOCTOR IN KENTUCKY CAME FORWARD TO SAY HE PLANNED TO PURSUE THE OPTION IN ORDER TO HELP INFERTILE COUPLES. AS THE TECHNOLOGY RACES FORWARD, OUR SOCIETY STRUGGLES TO KEEP UP WITH THE TOUGH ETHICAL QUESTIONS THAT ARE RAISED. WHAT WOULD "BEING A CLONE" MEAN? (what does it mean to be a

human being and what is that made up of? I think most people would suggest that individuals are their genetic makeup, whatever the influences of their environment have how they have impacted them, and then how they see themselves how do they self identify as who they are. So you could clone a michael jordan and 20 years from now when he's a grown person, he would have the genetic makeup of the michael jordan that we know, but because he was raised by a different family, the impact of his environment may mean that he hasn't even seen a basketball, and he may see himself as an individual and his gifts in an area that are different than the original michael jordan saw as his gifts. So the fact that we clone someone means that we reproduce their genetic makeup, it doesn't mean that we reproduce that same individual. )

WHAT DO YOU THINK OF CLONING? IF

	<p>YOU COULD....WOULD YOU CLONE YOURSELF? WOULD YOU CLONE A PARENT OR A SIBLING OR YOUR BEST FRIEND?</p> <p>(kids discuss pros/cons of cloning)</p> <p>XXXXX SOTS XXXXXXXXXXXXXXXXXXXX</p> <p>(these are not issues that we should give to the scientists, the ethicists, the academics. These are issues that we as a people, and that means every one of us, needs to struggle with. How do we feel about sitting next to someone in school that didn't come into this world the same way we did. aNd how will we embrace that? Will we celebrate it or will we struggle with it? Will we diminish it? I think the struggle is important so we get the endresult that's the most important direction to proceed.)</p>
ONCAM HOST	<p>SO WHETHER YOU'RE TALKING ABOUT TWEAKING THE GENES IN A TOMATO, OR</p>

CLONING A HUMAN BEING, THERE ARE MANY VIEWPOINTS TO BE CONSIDERED. THIS TECHNOLOGY IS ALREADY IMPACTING YOUR EVERYDAY LIFE, THROUGH THE FOOD YOU EAT, and THE MEDICINES YOU TAKE. WE'VE ONLY BEGUN TO TAP INTO THE PROMISE OF GENETIC ENGINEERING, BUT WITH THAT PROMISE COMES RESPONSIBILITY.

(Brother Dave - these kinds of questions are new questions and come from new discovery, and while we respect and encourage discovery, the consequences of discovery and the potentials of discovery needs us to look deeply into the issue.

While we respect the promise we also question the promise.)

(Chuck Link – before we use this tech we have to take time to debate , consider it, have regulation of it, have people informed about it, have open

	<p>discussion so everybody concerned can make good decisions before it moves out into society)</p> <p>(I think it's beyond our comprehension what's potentially available, what's potentially out there.</p> <p>)</p>
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