



# ORGANISM

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# GENES

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There are many problems that can be solved through genetic engineering. Combine the species with some of the genes included on the back page to solve each problem! As a thought exercise, where could you find these strains or genes in nature?

**Problem 1:** Your lights have gone out! You could use a generator, but don't like the smell of diesel. Design a bacteria to put in a water light up your life with your favorite color, green.

**Problem 2:** You found out Styrofoam takes hundreds of years to degrade and want to save the planet. What could you do to develop a replacement?

**Problem 3:** Your plants are growing tumors! Chemotherapy doesn't exist for plants, so a genetically engineered alternative must be created.

**Problem 4:** Cows have too much flatulence, and this contributes to global warming. How can you use genetic engineering to stop the quantity of methane gas created by bacteria in the cow's digestive tract?

**Problem 5:** Several years from now, you're in college and broke. You don't like bubbly beer so you want to design an organism to create beer without the bubbles.

**Problem 6:** Antibiotics have stopped working. Being the genius scientist or engineer you are, develop an alternative solution to save the human race! Common pathogens use a gene V2 to transmit harmful DNA to humans.

**Problem 7:** The ocean is filling up with plastic islands the size of Texas and whales are angry.

**Problem 8:** Third world countries need cheap protein sources. Find a way to solve this issue using a common food crop.

GENES	DESCRIPTION
A1	Allows FLB and FLY to work in tandem, requires X to work
A3	Creates sugar from CO2
A4	Degrades plastic in the presence of Y, into a compound toxic to marine life
A5	Turns toxic compounds into CO2 and water inside the cell
A7	Blocks network connections in the presence of water
A8	Creates a digestible protein from essential amino acids
C1	Produces a component to destroy ANY gene
C1	Synthesizes histidine, isoleucine, leucine (3 essential amino acids)
C2	Synthesizes lysine, methionine, phenylalanine (3 essential amino acids)
C3	Synthesizes threonine, tryptophan, and valine (3 essential amino acids)
D1	Produces a component to silence ANY gene
F1	Creates a strong network in the presence of Y, network can allow DNA transfer between similar species!
F2	Gene creates alcohol in yeast, with CO2 as a byproduct
FLB	Blue Fluorescent Gene
FLY	Yellow Fluorescent Gene
G1	Survival gene for digestive tracts
H1	Survival gene for human blood stream
I1	Imports toxic compounds into cell

GENES	DESCRIPTION
IM1	Immune system booster
M3	Creates energy for cell from methane in presence of Y
P1	Gene passing pathogenicity to Plants
P2	Gene passing pathogenicity to Humans
Q	Gene sensing surrounding and producing Y (indicate what you're sensing)
QS	Quorum sensing gene, senses high population density
S1	Produces X from Salt
S2	Helps organism tolerate alcoholic environments
S3	Helps organism tolerate aquatic environment
V1	Transmits DNA to plants
V2	Transmits DNA to humans

ORGANISM
Fart Bacteria (Methanobrevibacter ruminantium), contains M1, M2
Firm Fungi (Ganoderma lucidum)
Ocean Bacteria (Prochlorococcus marinus)
Plant Transfer Bacteria (Agrobacterium tumefaciens)
Plant Transfer Bacteria (Agrobacterium tumefaciens), Potato
Simple Bacteria (E.coli)
Simple Bacteria (E.coli)
Yeast (Saccharomyces cerevisiae), contains F2

