



Natalie Kuldell
February 7th, 2012

[http://openwetware.org/wiki/20.20\(S12\)](http://openwetware.org/wiki/20.20(S12))

2020: Futurists

Freeman Dyson writes:

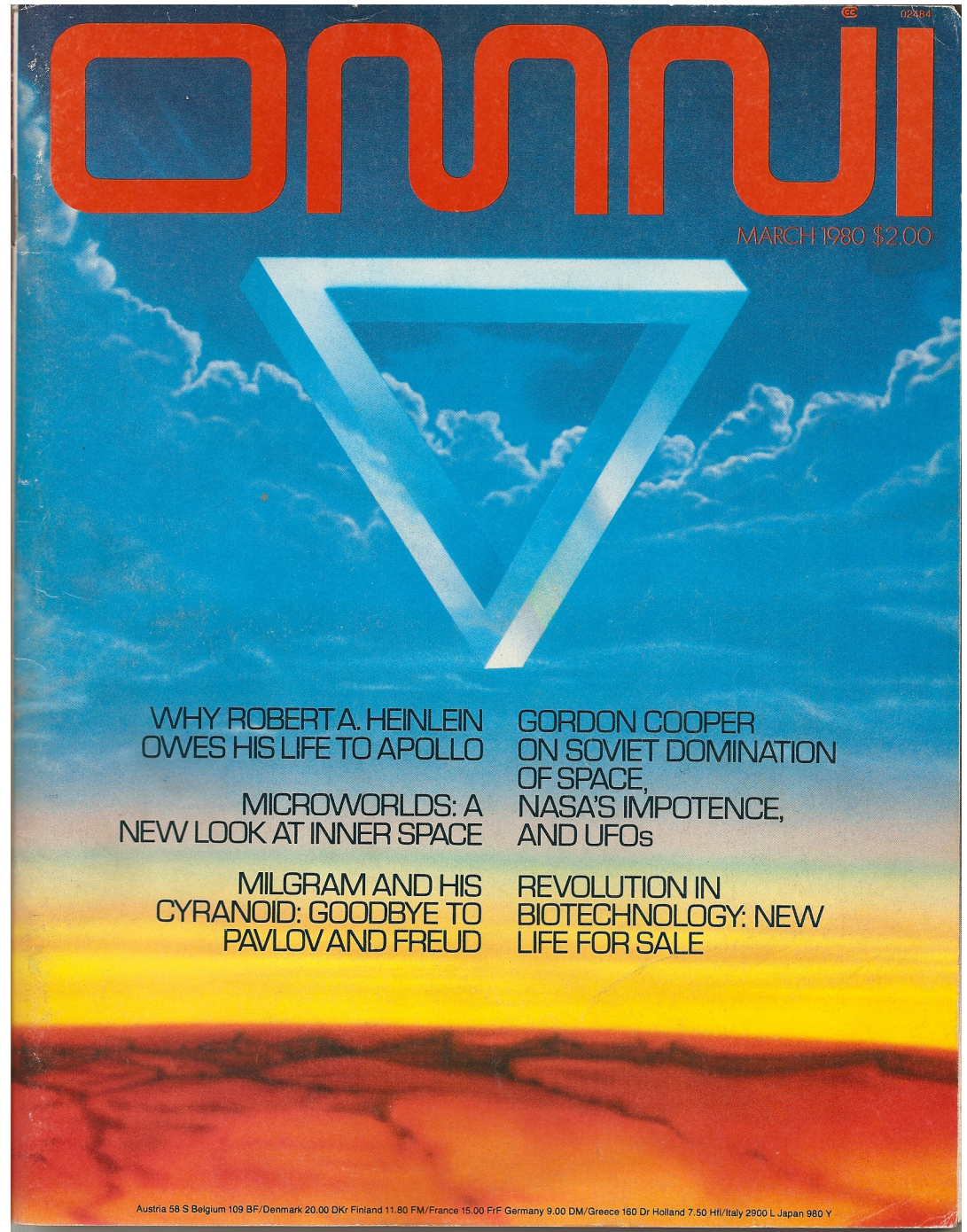
"Biotechnology will become as domesticated as computer games and children and housewives will create their new animal and plant species at home."



Quack? Genius?



2020: Historians



MARCH 1980 \$2.00

WHY ROBERT A. HEINLEIN
OWES HIS LIFE TO APOLLO

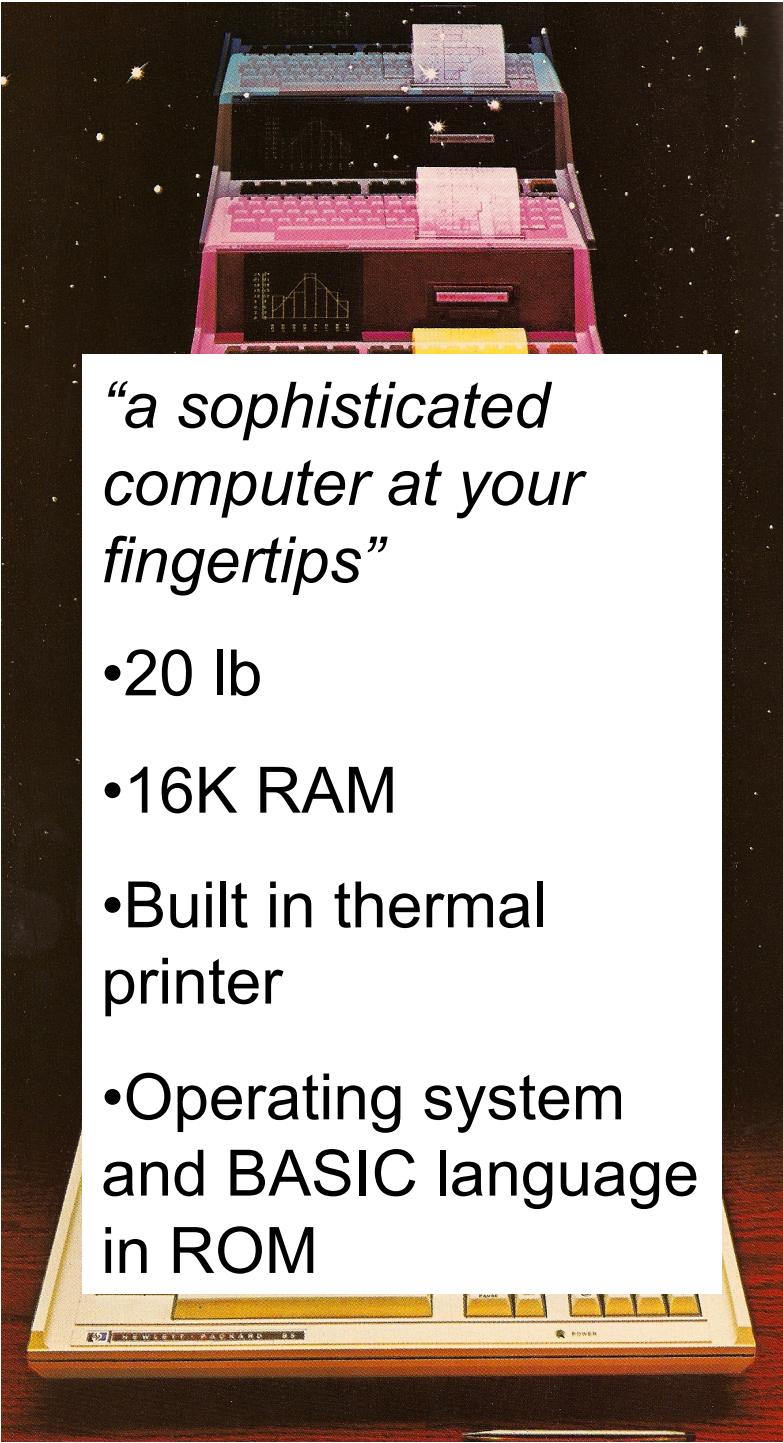
MICROWORLDS: A
NEW LOOK AT INNER SPACE

MILGRAM AND HIS
CYRANOID: GOODBYE TO
PAVLOV AND FREUD

GORDON COOPER
ON SOVIET DOMINATION
OF SPACE,
NASA'S IMPOTENCE,
AND UFOs

REVOLUTION IN
BIOTECHNOLOGY: NEW
LIFE FOR SALE

Austria 58 S Belgium 109 BF/Denmark 20.00 DKr Finland 11.80 FM/France 15.00 FFr Germany 9.00 DM/Greece 160 Dr Holland 7.50 Hfl/Italy 2900 L Japan 980 Y



*"a sophisticated
computer at your
fingertips"*

•20 lb

•16K RAM

•Built in thermal
printer

•Operating system
and BASIC language
in ROM

INTRODUCING HP-85.

A NEW WORLD OF PERSONAL-PROFESSIONAL COMPUTATION.

Imagine the new world that would unfold before you if you had a powerful, portable, completely integrated computer system at your personal disposal. And at an affordable price. That's exactly what Hewlett-Packard has just created.

THE HP-85: A PERSONAL COMPUTER FOR PROFESSIONALS.

At the lab, on your desk or in your study this 20-pound, self-contained system provides professional computing power when and where you need it. That means no more waiting for data to be remotely processed and returned.

A COMPLETE COMPUTER SYSTEM IN ONE SMALL PACKAGE.

You get all this in the HP-85:
Interactive graphics under keyboard control.

16K RAM Memory standard.

Standard typewriter keyboard with separate numeric key pad and eight user-definable special function keys.

High resolution CRT display with powerful editing capability.

Built-in thermal printer produces a hard copy of the display on command.

Built-in tape cartridge drive. Each cartridge provides 217K bytes of storage capacity.

Operating system and BASIC language, permanently stored in ROM.
**A SOPHISTICATED COMPUTER
AT YOUR FINGERTIPS.**

Hewlett-Packard has combined these sophisticated capabilities with advanced design to give you a system that is easy to use yet uncompromised in its power.

A key to this achievement is Hewlett-Packard's choice of BASIC

for the HP-85's language. BASIC is easy to learn and lets you solve complex problems in an English-like, conversational style.

Sixteen graphic commands have been added to the HP-85's extended BASIC to give you easy control of its amazingly versatile graphic capabilities. You can draw graphs, label axes, set the scale of the X and Y axes independently, plot data and control the graphics display either from the keyboard or in programs.

Other advanced capabilities include software security, flexible string commands, an internal clock, programmable beeps—more than 150 commands and statements to give you the power you need to solve your problems swiftly and easily.

DESIGNED FOR TODAY AND TOMORROW.

Whether you're in science, engineering, industry or business, the HP-85 you need today can easily be expanded or customized to meet your needs tomorrow.

You can double RAM capacity to 32K or expand ROM firmware to 80K with optional modules that plug right into the HP-85.

It's easy to enhance the system's capability by adding powerful HP peripherals like a high-speed, full-width line printer, full-size plotter, or flexible disc drives.

You can also streamline your problem solving with HP Application Pacs which offer preprogrammed solutions in a wide variety of disciplines on prerecorded magnetic tape cartridges.

The HP-85's versatility, expandability and sophisticated simplicity all grew out of Hewlett-Packard's underlying principle of excellence

by design. Excellence by design means rigorous quality control and testing as well as a worldwide maintenance support network.

When you buy the HP-85, you're not just buying a computer system, you're buying the confidence that the Hewlett-Packard name brings and the knowledge that the HP-85 can expand with your changing needs.

For the address of your nearest HP dealer, CALL TOLL-FREE 800-648-4711 except from Alaska or Hawaii. In Nevada, 800-992-5710. For details on the HP-85, send the attached coupon, or write: Hewlett-Packard, 1000 N.E. Circle Blvd., Corvallis, OR 97330, Dept. 272C.



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Dept. 272C
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619/20

*“a scientist clad in white
spools threads of DNA onto a
glass rod. He is about to treat
it with enzymes, then insert it
into E. coli, endowing the
microbe with powers nature
never gave it.”*



From a chilled beaker, a scientist clad in white gently spools spaghetti-like threads of DNA onto a glass rod. He is about to treat it with enzymes that will clip away all but a chosen gene, then insert it into the genetic material of a bacterium called *Escherichia coli*, endowing the microbe with powers that nature never gave it.

Not long ago experiments with recombinant DNA stirred visions of strange, artificial diseases against which humanity would have no natural defense; such experiments provoked sharp controversy over whether scientists should be allowed to tamper with life itself. Today most of the fears have died down, and biotechnology is filling the heads of businessmen with visions of immense profits.

In the past ten years or so, dozens of new companies have begun to harness the life processes and put them to work in industry. Quietly, almost unnoticed in a world dazzled by innovative electronic products, these firms are fomenting a technological revolution that promises to shake the foundations of medicine, agriculture, food processing, energy production, and the chemical and pharmaceutical industries.

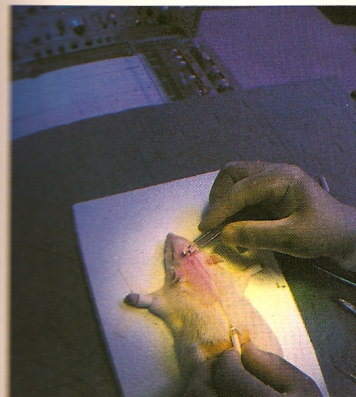
Already included among biotechnology's success stories are bacteria engineered to produce human insulin, drug-delivery systems that

THE GENE TRUST

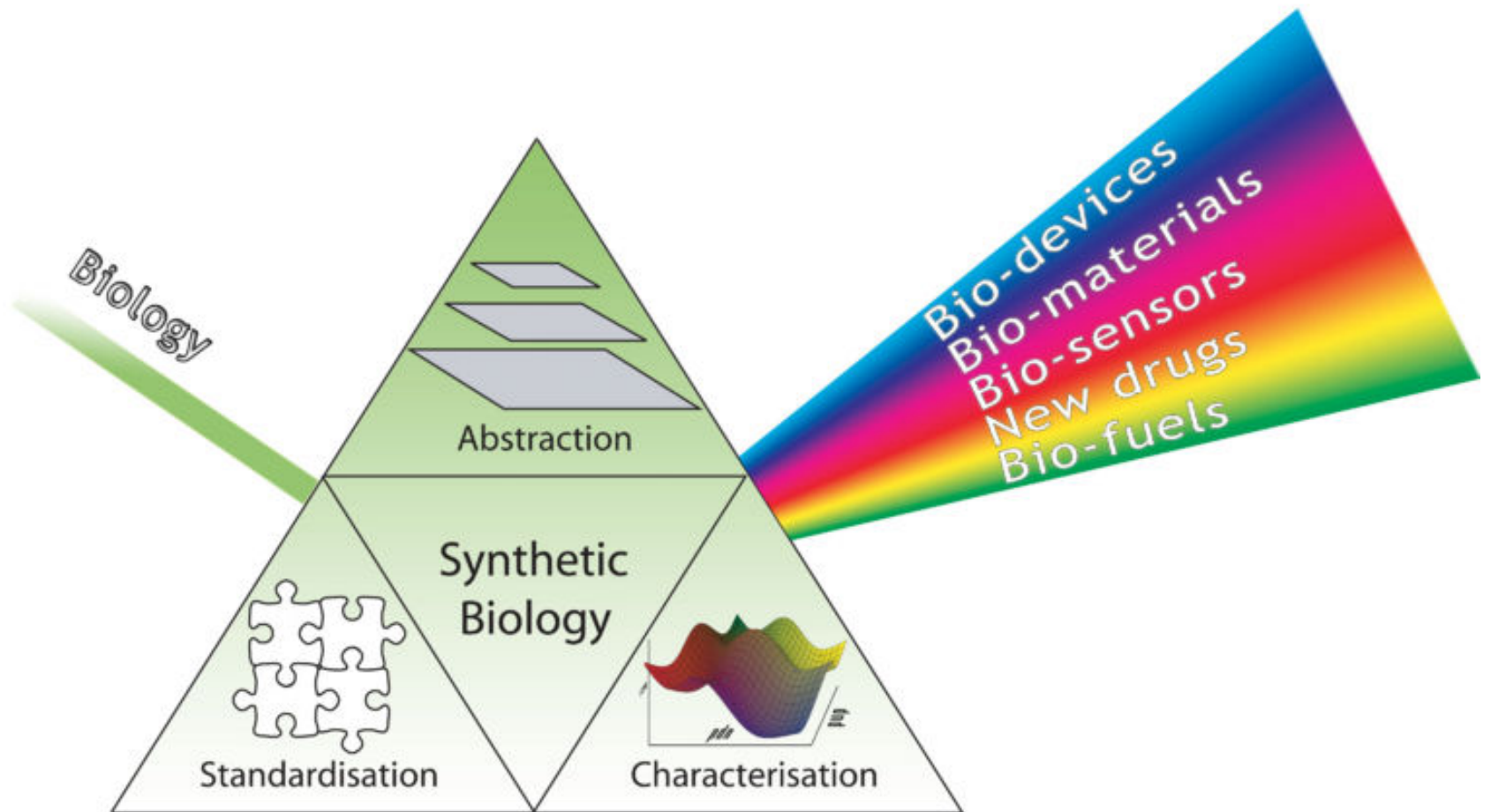
BY KATHLEEN AND
SHARON McAULIFFE

*Science and business
join forces to exploit the
machinery of life*

PHOTOGRAPHS BY
DOUGLAS KIRKLAND



What's new: Application of engineering principles to biology

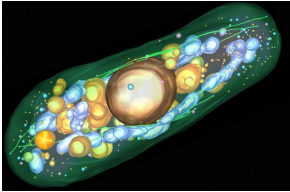


What you'll work on...



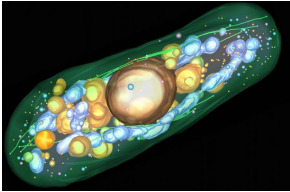
1. design a plausible and compelling synthetic biological system
2. develop a detailed design plan and construction roadmap
3. evaluate ownership, commercial, ethical aspects of the project

What you'll learn (I think)...



Understand the operation of genetic programs in prokaryotes and eukaryotes.

What you'll learn (I think)...

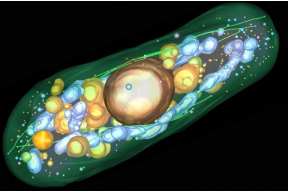


Understand the operation of genetic programs in prokaryotes and eukaryotes.



Describe key enabling technologies that support the engineering of biology, including synthesis, abstraction and standardization.

What you'll learn (I think)...



Understand the operation of genetic programs in prokaryotes and eukaryotes.

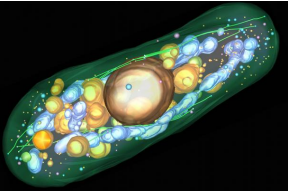


Describe key enabling technologies that support the engineering of biology, including synthesis, abstraction and standardization.



Develop awareness of issues of human practice that impact & result from the development and application of biological technologies.

What you'll learn (I think)...



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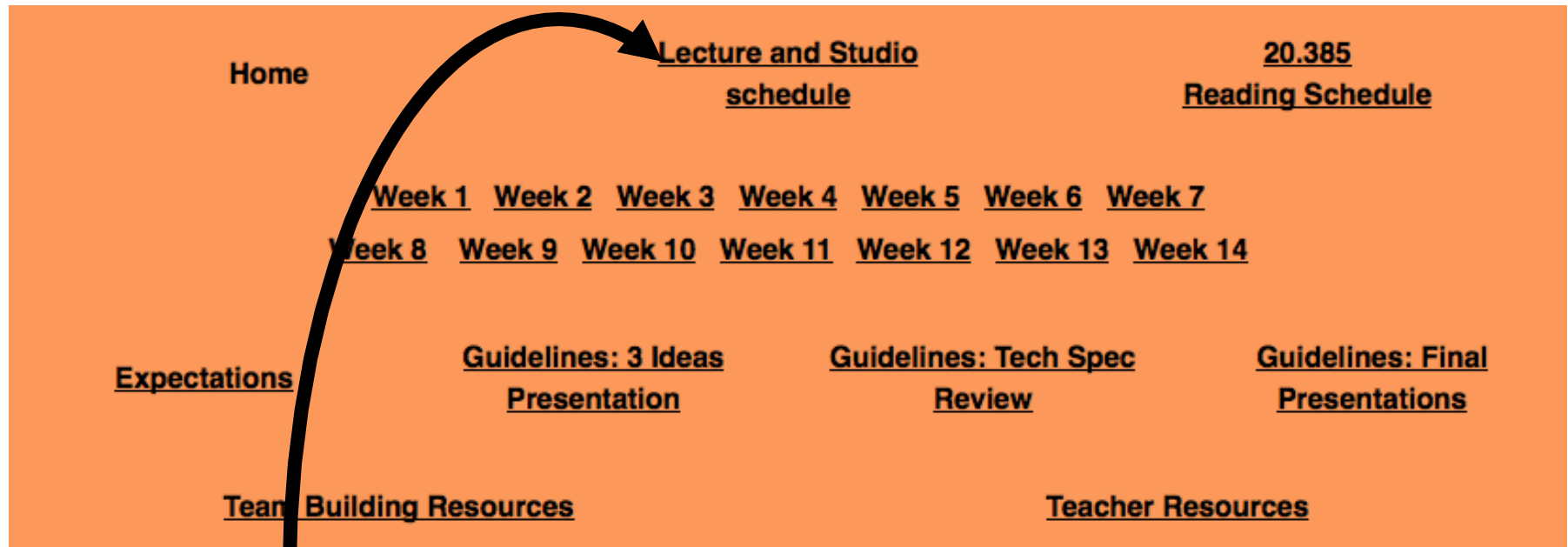
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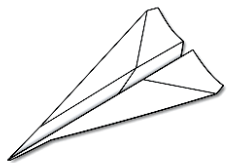
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3-3-3



Tuesdays/Thursdays

11-12:30



Start with challenge/puzzle/activity

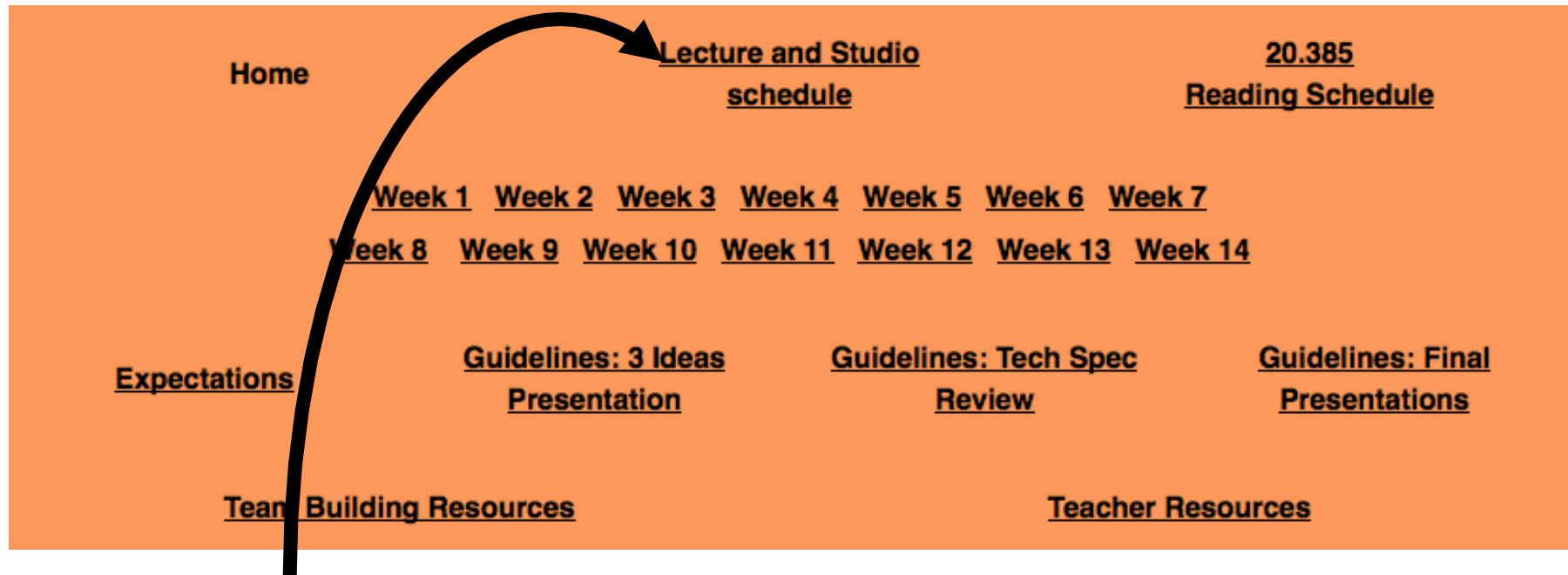


Follow-up with group discussion



Occasional homework





- ❧ How can biology be made easier to engineer?
- ❧ What are the consequences of success?
- ❧ How has nature solved physical challenges?
- ❧ In what ways does nature innovate?



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Wednesdays 2-5

Challenge	What is the challenge to address?	Importance of challenge?	Impact of solution?
Project name	Your title here	Possible competing technologies?	Knowns and unknowns?
Device-level diagram	Your design here	Model for system operation?	Buildable? Cost? Time? Safety? Security?
		Plan for validation and debugging?	
Parts-level diagram	Parts list here	Sourcing?	Buildable? Cost? Time? Safety? Security?
		Description and annotation of function?	

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Project

- 3 ideas presentation
- Tech spec review
- Final presentation

65%, team grades

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Project

- 3 ideas presentation
- Tech spec review
- Final presentation

65%, team grades

Blog Entries

30%, individual grades

Instructor Leverage

5%, individual grades

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any ???s

Let's get building!!!

the end