

COOPER HEWITT



Smithsonian Design Museum



ACCESS CHECK

DURING OUR TIME TOGETHER:

- Mute yourself so everyone can hear the speaker.
- Choose how you participate.



WHAT TO EXPECT



Interactive work with a small cohort of fellow educators.



Easy materials: grab a pen or pencil and piece of paper.



Everyone can be an expert.

HELLO



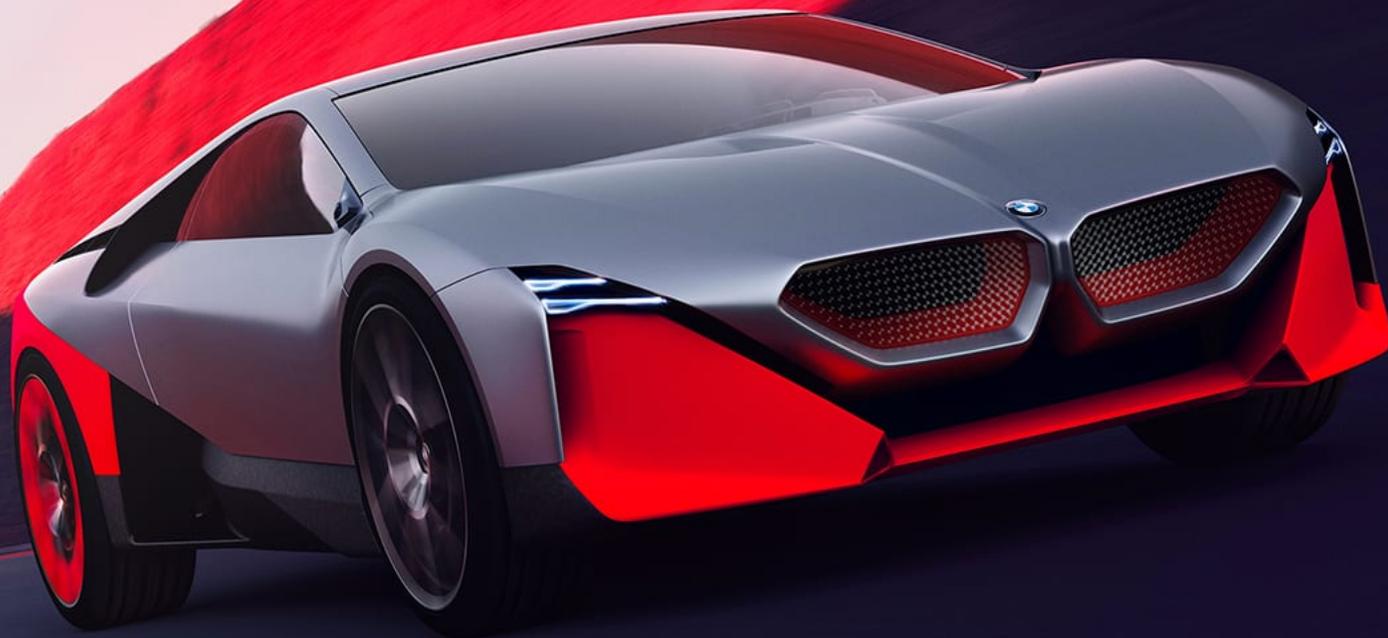
NIKE



SAMSUNG



BMW



WHAT DO THESE THINGS HAVE IN COMMON?



PEOPLE!



**RESEARCH IS
LEARNING ABOUT
PEOPLE.**

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SAMSUNG

A person with short, dark hair is seen from the back, wearing a light-colored sweater with dark horizontal stripes. They are looking at a large Samsung television mounted on a wall. The TV screen displays a grid of colorful thumbnails, likely from a streaming service. The room is dimly lit, with two desk lamps visible on either side of the TV, their screens glowing. The overall atmosphere is modern and tech-oriented.

SAMSUNG





BMW

BMW





DESIGN IS...

Design makes things better

Design makes things better

Design is about people (human-centric)

Design makes things better

Design is about people (human-centric)

Design finds new solutions

Design makes things better.

Design is about people (human-centric)

Design finds new solutions

Design creates desire/enthusiasm

**WHAT KINDS OF
THINGS ARE
DESIGNED?**

OBJECTS ARE DESIGNED



TOOLS ARE DESIGNED



SPACES ARE DESIGNED



INTERFACES ARE DESIGNED

NOOKstudy

Contemporary Business... NOOKstudy User Guide ArtHistoryNotes.pdf biology.pdf week1_lecture_notes.pdf

figure 1.2
DEDUCTIVE REASONING: HOW ERATOSTHENES ESTIMATED THE CIRCUMFERENCE OF THE EARTH USING
 day when sunlight shone straight down a well measured the length of the shadow cast by a 800 kilometers (km) away. 2. The shadow's sides of a triangle. Using the recently developed Eratosthenes calculated the angle, α , to be 7° angle α is $1/50$ of a circle, then the distance well (in Syene) must be equal to $1/50$ the had heard that it was a 50-day camel if a camel travels about 18.5 km per day and well as 925 km (using different units of measure, of course). 5. Eratosthenes thus deduced the circumference of the Earth to be $50 \times 925 = 46,250$ km. Modern measurements put the distance from the well to the obelisk at just over 800 km. Employing a distance of 800 km, Eratosthenes's value would have been $50 \times 800 = 40,000$ km. The actual circumference is 40,075 km.

philosophy, and it is used to test the validity of general ideas in all branches of knowledge. For example, if all mammals by definition have hair, and you find an animal that does not have hair, then you may conclude that this animal is not a mammal. A biologist uses deductive reasoning to infer the species of a specimen from its characteristics.

Inductive reasoning
 In inductive reasoning, the logic flows in the opposite direction, from the specific to the general. Inductive reasoning uses specific observations to construct general scientific principles. For example, if poodles have hair, and terriers have hair, and every dog that you observe has hair, then you may conclude that all dogs have hair. Inductive reasoning leads to generalizations that can then be tested. Inductive reasoning first became important to science in the 1600s in Europe, when Francis Bacon, Isaac Newton, and others began to use the results of particular experiments to infer general principles about how the world operates. An example from modern biology is the action of homeobox genes in development. Studies in the fruit fly, *Drosophila melanogaster*, identified genes that could cause dramatic changes in developmental fate, such as a leg appearing in the place of an antenna. When the genes themselves were isolated and their DNA sequence determined, it was found that similar genes were found in many animals, including humans. This led to the general idea that the homeobox genes act as switches to control developmental fate.

Hypothesis-driven science makes
 Scientists establish which general principles are true from

figure 1.3
HOW SCIENCE IS DONE. This diagram illustrates how scientific investigations proceed. First, scientists make observations that raise a particular question. Then, they generate a number of potential explanations (hypotheses). However the

These hypotheses that have not yet been disproved are retained. They are useful because they fit the known facts, but they are always subject to future rejection if, in the light of new information, they are found to be incorrect.

also be *iterative*, that is, a hypothesis can be revised or abandoned with new data. For instance, geneticists Beadle and Tatum studied the nature of genetic information to arrive at their "one-gene/one-enzyme" hypothesis (chapter 15). This hypothesis states that a gene represents the genetic information necessary to make a single enzyme. As investigators learned more about the molecular nature of genetic information, the hypothesis was refined to "one-gene/one-polypeptide" because enzymes can be made up of more than one polypeptide. With still more information about the nature of genetic information, investigators found that a single gene can specify more than one polypeptide, and the hypothesis was refined again.

Testing hypotheses
 We call the test of a hypothesis an **experiment**. Suppose that a room appears dark to you. To understand why it appears dark, you propose several hypotheses. The first might be, "There is no light in the room because the light switch is turned off." An alternative hypothesis might be, "There is no light in the room because the lightbulb is burned out." And yet another hypothesis might be, "I am going blind." To evaluate these hypotheses, you would conduct an experiment designed to eliminate one or more of the hypotheses. For example, you might test your hypotheses by flipping the light switch. If you do so and the room is still dark, you have disproved the first hypothesis. Something other than the setting of the light switch must be the reason for the darkness. Note that a test such as this does not prove that any of the other hypotheses are true; it merely demonstrates that the one being tested is not. A successful experiment is one in which one or more of the alternative hypotheses is demonstrated to be inconsistent with the results and is thus rejected. As you proceed through this text, you will encounter many hypotheses that have withstood the test of experiment. Many will continue to do so; others will be revised as new observations are made by biologists. Biology, like all science, is in a constant state of change, with new ideas appearing and replacing or refining old ones.

Establishing controls
 Often scientists are interested in learning about processes that are influenced by many factors, or **variables**. To evaluate alternative hypotheses about one variable, all other variables must be kept constant. This is done by carrying out two experiments in parallel: a test experiment and a control experiment. In the test experiment, one variable is altered in a known way to test a particular hypothesis. In the control experiment, that variable is left unaltered. In all other respects the two experiments are iden-

Using predictions
 A successful scientific hypothesis needs to be not only valid but also useful—it needs to tell us something we want to know. A hypothesis is most useful when it makes predictions because those predictions provide a way to test the validity of the hypothesis. If an experiment produces results inconsistent with the predictions, the hypothesis must be rejected or modified. In contrast, if the predictions are supported by experimental testing, the hypothesis is supported. The more experimentally supported predictions a hypothesis makes, the more valid the hypothesis is. As an example, in the early history of microbiology it was known that nutrient broth left sitting exposed to air becomes contaminated. There were two hypotheses proposed to explain this observation: spontaneous generation and the germ hypothesis. Spontaneous generation held that there was an inherent property in organic molecules that could lead to the spontaneous generation of life. The germ hypothesis proposed that preexisting microorganisms that were present in air could contaminate the nutrient broth. These competing hypotheses were tested by a number of experiments that involved filtering air and boiling the broth to kill any contaminating germs. The definitive experiment was performed by Louis Pasteur, who constructed flasks with curved necks that could be exposed to air, but that would trap any contaminating germs. When such flasks were boiled to sterilize them, they remained sterile, but if the curved neck was broken off, they became contaminated (figure 1.4).

Germ Hypothesis
 Preexisting microorganisms present in the air can contaminate the nutrient broth.

Spontaneous Generation Hypothesis
 Living organisms can be generated spontaneously from nonliving organic molecules in broth.

Flask is sterilized by boiling the broth. Unbroken flask remains sterile. Broken flask becomes contaminated after exposure to germ laden air.

Results: Airborne Germs Will Enter the Broth and Grow

figure 1.4
EXPERIMENT TO TEST SPONTANEOUS GENERATION VS. GERM HYPOTHESIS. Pasteur built swan-necked flasks to prevent airborne contamination. When the flask is heated, it

WELLS FARGO

Show Balances
 ON

Family Che...3365
 \$1,788.04 Avail.

Savings • 7782
 \$4,193.93 Avail.

View All
 13 More Accounts

Cash Tracker
 Target \$200
 \$120

Return Your Card

\$60 Cash
 Family Checking • 3365
 No Receipt

Deposit Checks
 Savings • 7882
 Print Receipt

Get Cash

Deposit Checks
 Without Envelope

Balances & Statements

We noticed you moved.
 Need New Checks?

Order them here

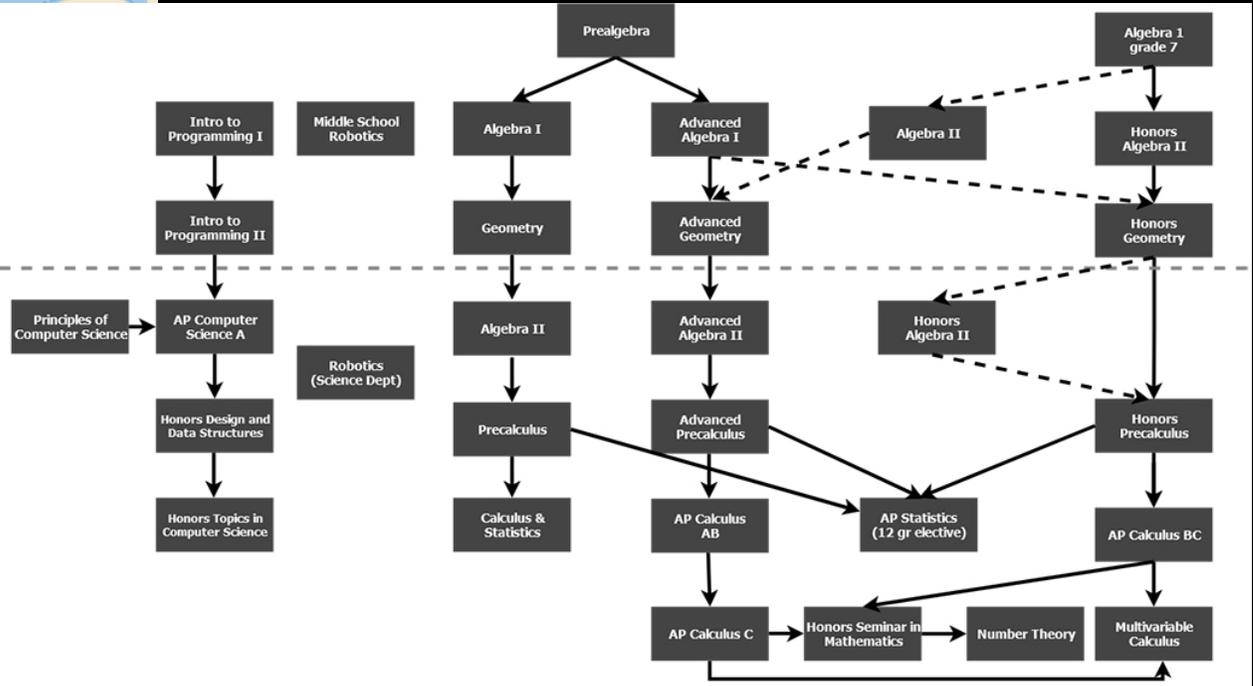
More Choices
 Balances
 Transfer
 Buy Stamps
 and More

SYSTEMS ARE DESIGNED



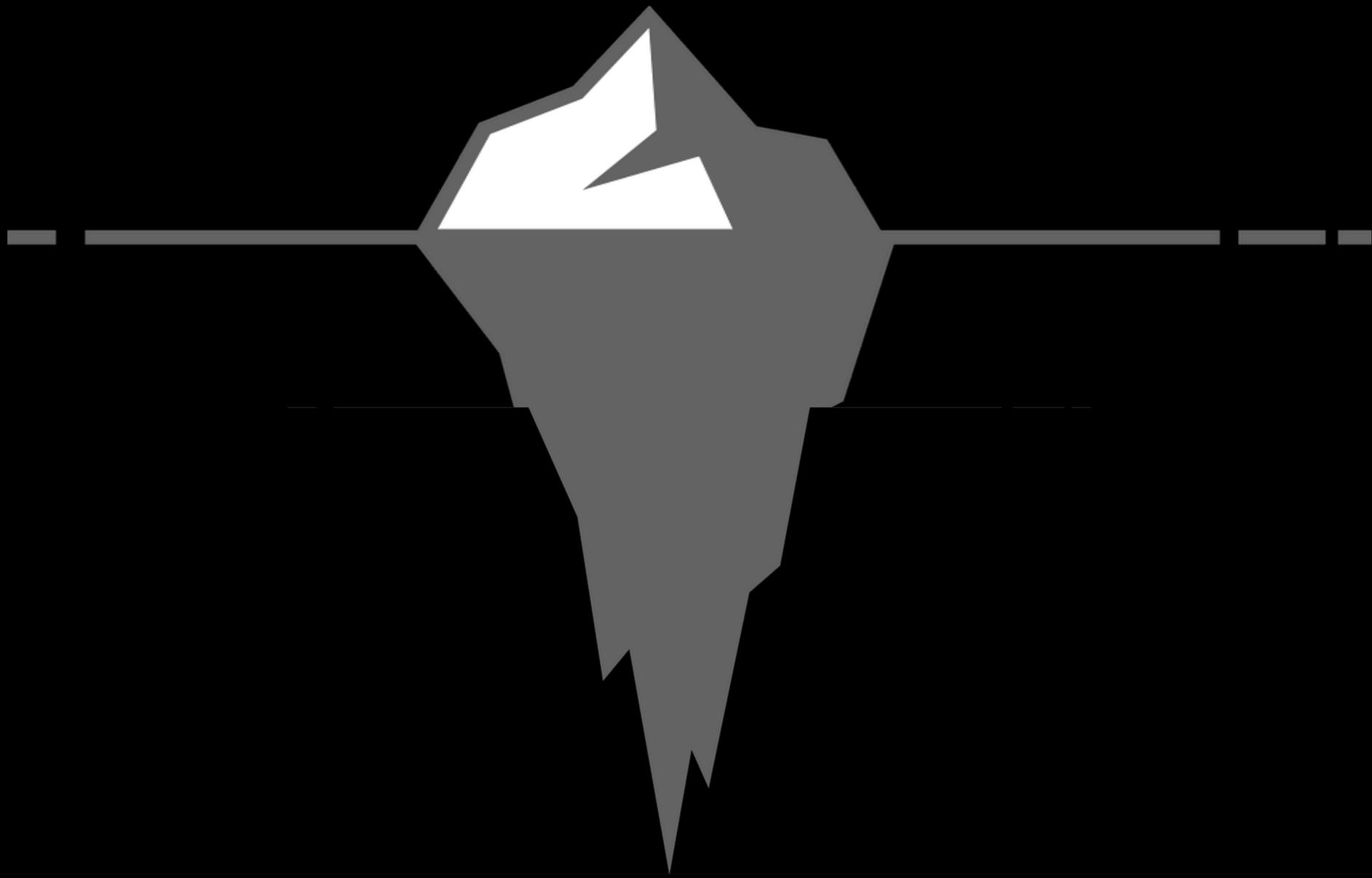
Middle School

Upper School



EXPERIENCES ARE DESIGNED







DEFINE



EMPATHIZE



BRAINSTORM



PROTOTYPE



TEST



LAUNCH!

DEFINE

New Dialogs

Human Insights

FRESH IMPULSES
(POROUSITY)

IN

[VISIONARY MOBILITY]

ALLIANCES: startups can't afford us → an investment for Alliance Partners, with lower rates.

POROUSITY
what kinds of visionary processes, technologies + aesthetics are being invented? what can we learn

VISIONARY MOBILITY
· ecosystem thinking
· new biz models
· new living exp.
· new partnerships
GAME CHANGER

ADD
D

SHOW ME HOW



(Zeitgeist)

market

**How might we create a
classroom experience
that makes students
feel ?**



DEFINE



EMPATHIZE



BRAINSTORM



PROTOTYPE



TEST



LAUNCH!

EMPATHIZE



BREAKOUT SESSION # 1:

What do you miss most about a physical classroom?

On the other hand, what has been a pleasant surprise about virtual teaching?

**10 MINUTES
NO NOTETAKING NEEDED**

**LET'S IMAGINE A
BETTER EXPERIENCE
FOR OUR STUDENTS**

ON YOUR OWN: Make a list of students' key classroom needs (at least 10) using the prompt:

**A great classroom
experience means students
feel**

**15 MINUTES
TAKE A BREAK AS YOU NEED!**

BREAKOUT SESSION # 2:

Share the **top three needs** you can directly impact as an educator.

**5 MINUTES
NO NOTETAKING NEEDED**



DEFINE



EMPATHIZE



BRAINSTORM



PROTOTYPE



TEST



LAUNCH!

BRAINSTORM



Scenario
Johan is on a business trip and cannot pick up the kids from school in the afternoon. He can be reached by phone however in the the family wants to contact him. Anna also has a particularly busy morning and really needs Ellen and Toby to get themselves to school.

Johan (Dad)
Father
Johan works in a car factory nearby. He grew up in a small town where he was a bit of a trouble maker. He is a bit of a mess but he is a really good father. He is a bit of a mess but he is a really good father. He is a bit of a mess but he is a really good father.

Universitet

Campusängarna



Instructions

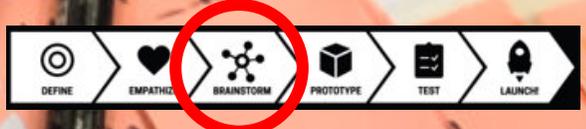
- 1 Take person cards
- 2 Each person must draw their preferred journey on the map that would get Ellen and Toby to school, and Anna to work.
- 3 **STAY IN PERSONAL!** What problems arise from these chosen paths? How do Toby and Ellen feel in Anna on time? ...
- 4 Respond to these needs or choose an action card for inspiration...

EXPANDED ACCESS TO PLACES

Rental

2 WEEKS TRIP CARD WAS NOT ABLE USE

Don't buy insurance Super-mon issue



BRAINSTORM WORKSHEET

How might we create a classroom experience that makes students feel _____?

1. Fill in the center blank with one of your key student needs from the Top 3 Feelings chart at right
 2. Fill in the left-hand column below with a solution that would address this need.
Imagine new Objects, Tools, Places, Interfaces, systems, or Experiences that solve the problem.
 3. Fill in the right-hand column with a description of how it would work or how it would benefit students
-

Choose the top three feelings you can impact as an educator:

- 1.
- 2.
- 3.

A visual display that can create different scents

will make students feel *focused* by

using familiar classroom smells to engage more of their senses

will make students feel _____ by

will make students feel _____ by

will make students feel _____ by