WELCOME

SPRING 2023 SERIES

MASTER CLASS

USC ROSSIER SCHOOL OF EDUCATION

Master Class Series on

Science Denial and Racism Denial

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University Professor, Provost Professor of Education and Business, Clifford and Betty Allen Chair in Urban Leadership, USC Race and Equity Center Founder and Executive Director

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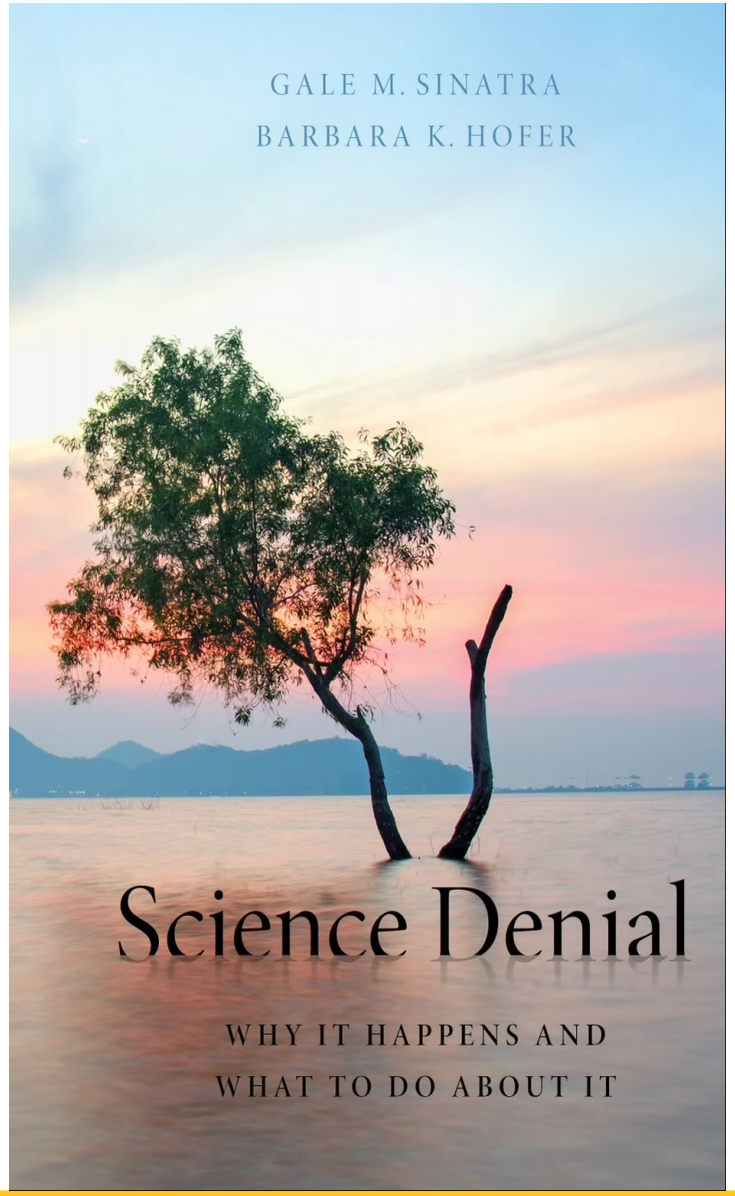
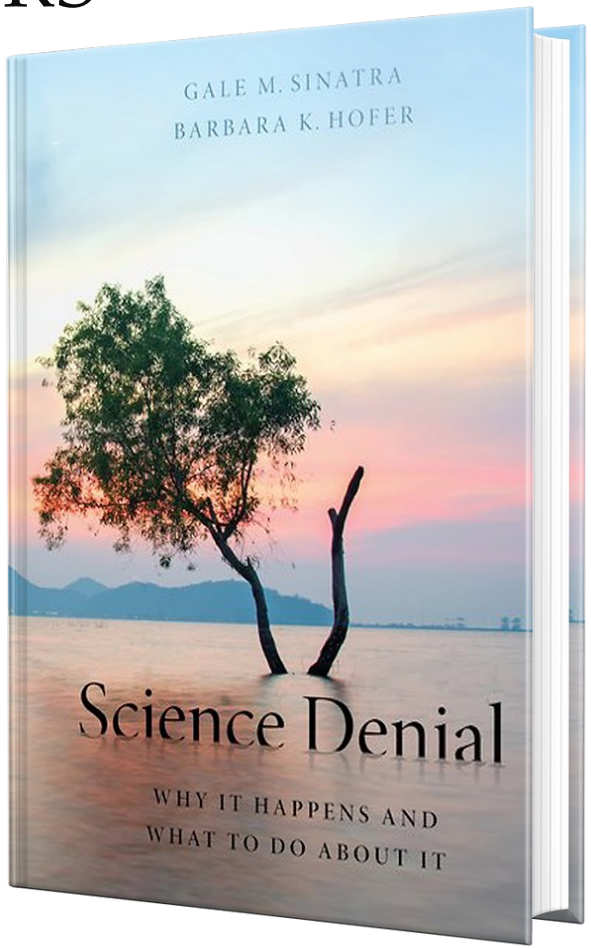


Science Denial: Why it happens and what to do about it

Oxford University Press (2021)

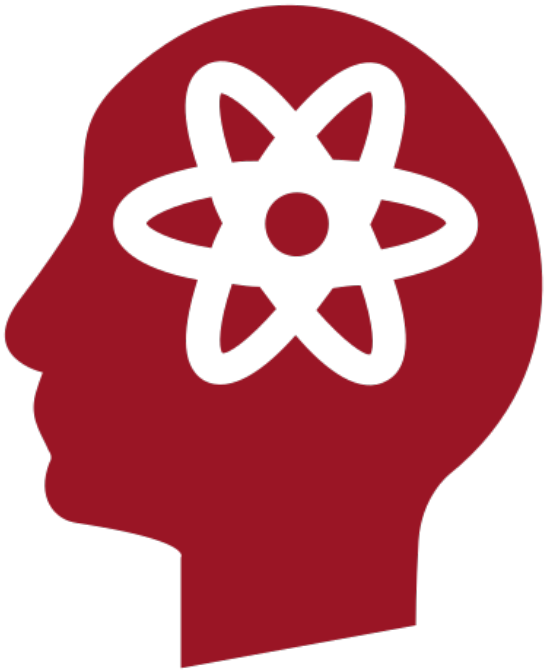
Psychological Factors

1. Social Identity
2. Mental Shortcuts
3. Epistemic Cognition
4. Motivated Reasoning
5. Emotions & Attitudes



What can we do about it?

What can individuals do?



- **Cultivate a scientific attitude** and nurture science appreciation in others.
- **Improve search skills** and evaluation of scientific claims and sources.
- **Be aware of cognitive biases** and motivations in your own reasoning.
- **Learn to listen** to others with curiosity, compassion, and openness.
- **Vote** for those who value, support, and fund science and who base policy decisions on evidence.

What Can Educators Do?

- Enhance your own **science understanding**.
- Teach about the **nature of science**.
- Foster **scientific thinking** in all students.
- Teach **real world** applications of science.
- Let students **choose** areas of inquiry.
- Be **aware** of strong prior beliefs, attitudes, and identity.
- Recognize students' **emotions**.
- Foster **digital science literacy**.

Addressing Science Denial

1. Confront Misconceptions/Misinformation

2. Teach Sourcing Scientific Information Online

3. Make Science Relevant, Place-Based, and Engaging

DEBUNKING

1. Download the Debunking Handbook (see QR code)
2. Misinformation is sticky
3. Try to prevent misinformation
4. Can debunk
5. Explain why the misinformation is false

FACT SANDWICH

FACT	Lead with the fact if it's clear, pithy, and sticky—make it simple, concrete, and plausible. It must "fit" with the story.
WARN ABOUT THE MYTH	Warn beforehand that a myth is coming... mention it once only.
EXPLAIN FALLACY	Explain how the myth misleads.
FACT	Finish by reinforcing the fact—multiple times if possible. Make sure it provides an alternative causal explanation.

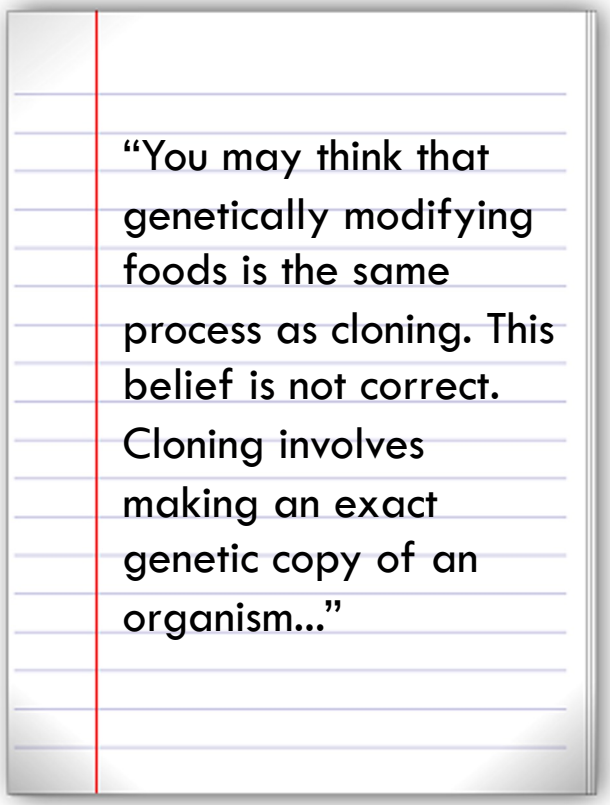
REFUTING

- Three-Part Structure
(Kendeou, Walsh, Smith, & O'Brien, 2014; Tippett, 2010)

1. State misconceptions
2. Refute misconceptions
3. Explain scientifically valid position

- Refutation texts can shift attitudes and knowledge about GMFs. (e.g,. Heddy et al., 2017)

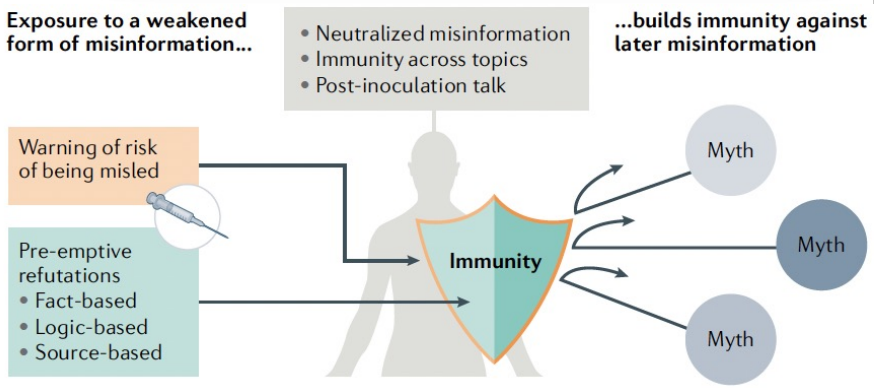
- Danielson et al. (in submission) Meta-analysis



PREBUNKING

1. Stop misinformation before it starts by exposing people to a severely weakened dose of misinformation
2. Preemptively it by creating “cognitive antibodies” in an attempt to inoculate message recipient
3. Includes a forewarning plus a refutation
4. May also explain a misinfo techniques (cherry picking data)

You may hear in the next few weeks that the masks cause language delays in young children This is not correct. Yes, some delays have been observed, but this is an example of spurious correlation. Delays are expected due to school shutdowns and other pandemic related interruptions. . .



Ecker et al. (2022) Nature

DON'T BE AFRAID OF BACKFIRE EFFECTS

"The ironic strengthening or intensification of an original belief in misinformation that is the subject of an attempted correction"

-Lewandowsky, Ecker, Seifert, Schwarz & Cook (2012)

"On balance, recent evidence provides no reason to avoid debunking for fear of a backfire effect. Debunking is likely to be at least partially effective, except for some limited circumstances when people's worldviews are being challenged."

Debunking Handbook (2020)

KEY POINTS FOR CONFRONTING MISINFORMATION

- Prebunk/Debunk/Refute.
- Reduce uncertainty.
- Create personal relevance.
- Connect to current issues.
- Trigger positive/reduce negative emotions.
- Empower action.

Addressing Science Denial

1. Confront Misconceptions/Misinformatic

2. Teach Sourcing Scientific Information Online

Online sources can be **difficult** to evaluate if they are:

Valid

Online sources can be **difficult** to evaluate if they are:

Accurate

Online sources can be **difficult** to evaluate if they are:

Biased

Need to teach sourcing

6 STEPS to sourcing Science

(Herrick, Sinatra & Lombardi, 2023)

https://www.nsta.org/science-teacher/science-teacher-januaryfebruary-2023/plausible

STEP 1:

STOP.
STEP BACK.
READ.

Don't just click and share, especially if headline confirms prior belief

STOP.
STEP BACK.

ASK YOURSELF.

- Is this information *trustworthy*?
- How do I know?

SCAN ARTICLE.

STEP 2:

BECOME YOUR OWN FACT CHECKER.

CHECK SOURCE.

OPEN NEW WINDOW.

Who is the Author?

- An expert?
- Reputable?
- Trustworthy?
- Objective?
- Politically motivated?
- Trying to sell you something?

Read Laterally.
***Not* Vertically.**

LATERAL READING

1. Open up a new window
2. Search for information about the source
3. Pay attention to the domain and URL
4. Read the "About Us" section
5. Search for information about the claim
6. Who else is supporting this claim?
7. Who is supporting the alternative claim?

STEP 3:

EVALUATE EVIDENCE AND CONNECTION TO THE CLAIMS

Does evidence support the claim?

Consider alterative claims.

Evaluate both the original claim and the alternative claim.

Which has more support?

MOTIVATED REASONING

Motivations can **BIAS** understanding

Motivations can lead to decisions based on ***preference***

We are ***more critical*** of science when we don't like the findings

What should we do? **Ask yourself.**

What are my motivations for assuming this is true?

STEP 4: REAPPRAISE YOUR PLAUSIBILITY JUDGMENT ABOUT THE CLAIM

Ask, Is the original claim plausible?

Re-evaluate.

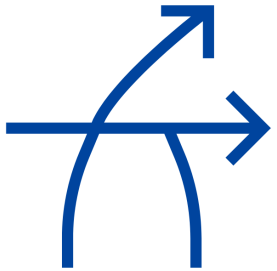
Shift plausibility judgment if necessary.

STEP 5:

MAKE A *TENTATIVE* JUDGMENT

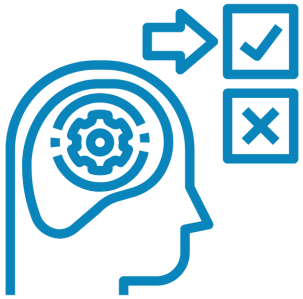
KEEP IN MIND.

- Science changes with new evidence.
- 100% certainty is unlikely.



MAKE A JUDGMENT.

- Based on current evidence.



BE OPEN TO RE-EVALUATING.

STEP 6: SHARE ONLY IF VERIFIED

Once you have verified, share.

Share not just what you know but how you know.

Contextualize information.

Addressing Science Denial

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MAKE SCIENCE ENGAGING

Make science Place Based

TAR AR: BRINGING THE PAST TO LIFE IN PLACE-BASED AUGMENTED REALITY SCIENCE LEARNING

USC Rossier School of Education

LA BREA TAR PITS MUSEUM

USC Institute for Creative Technologies

Dr. Gale Sinatra

Dr. Emily Lindsey

Dr. William Swartout

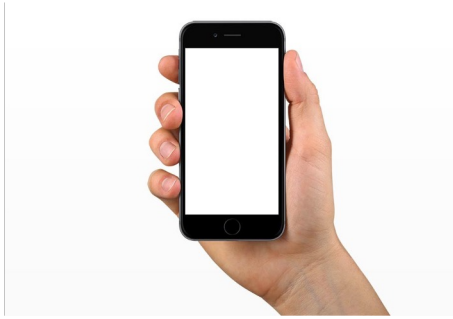
Dr. Benjamin Nye

AR @ La Brea

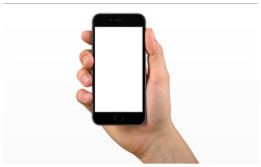
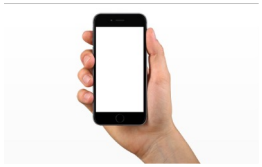
WIRED SUBSCRIBE

ARIELLE PARDES GEAR 09.21.18 07:00 AM

FOR MUSEUMS, AUGMENTED REALITY IS THE NEXT FRONTIER



Tar AR: Conditions

	Low interactivity	High interactivity
Handheld Touch		
Headset		

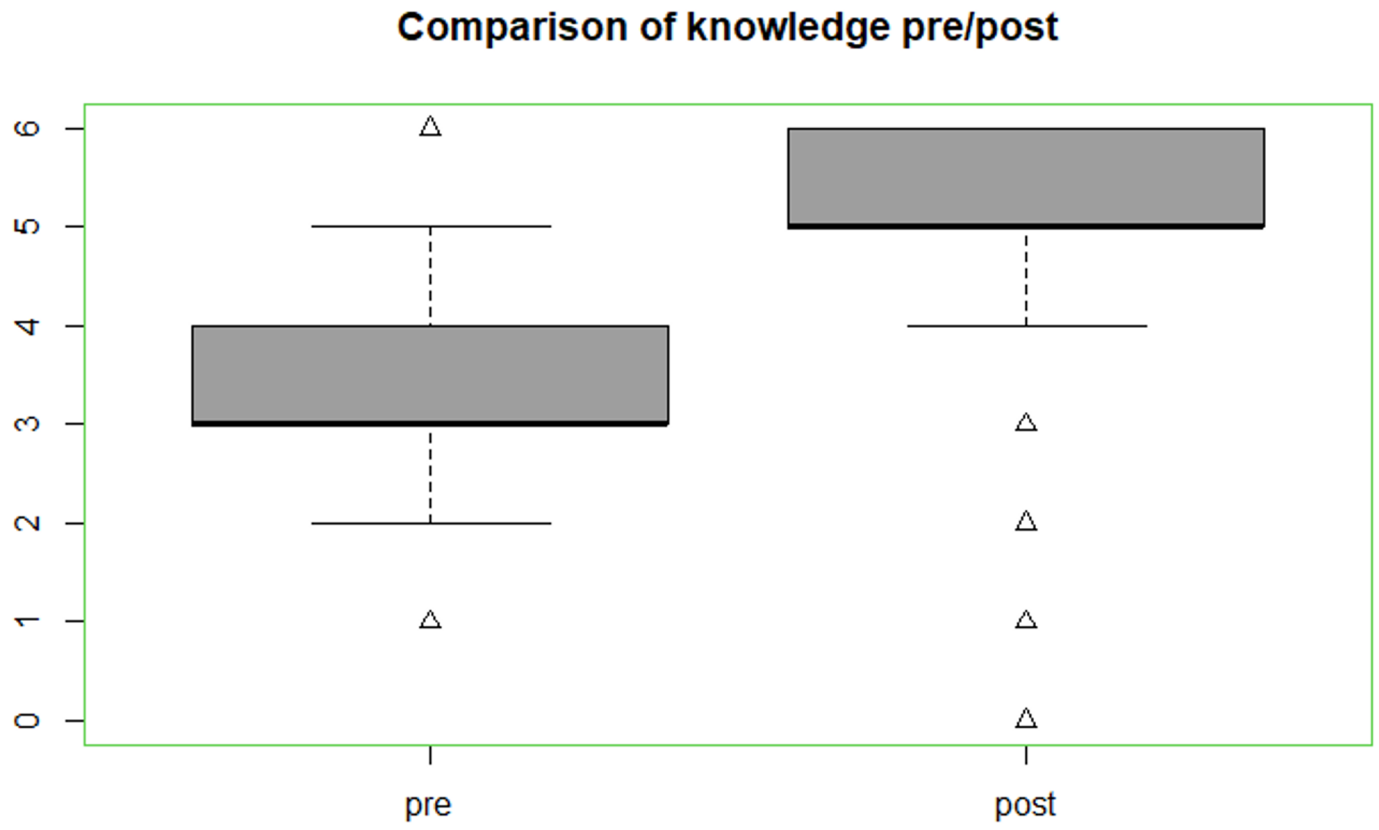
Control/Baseline: Sign

Tar AR: Pit 91

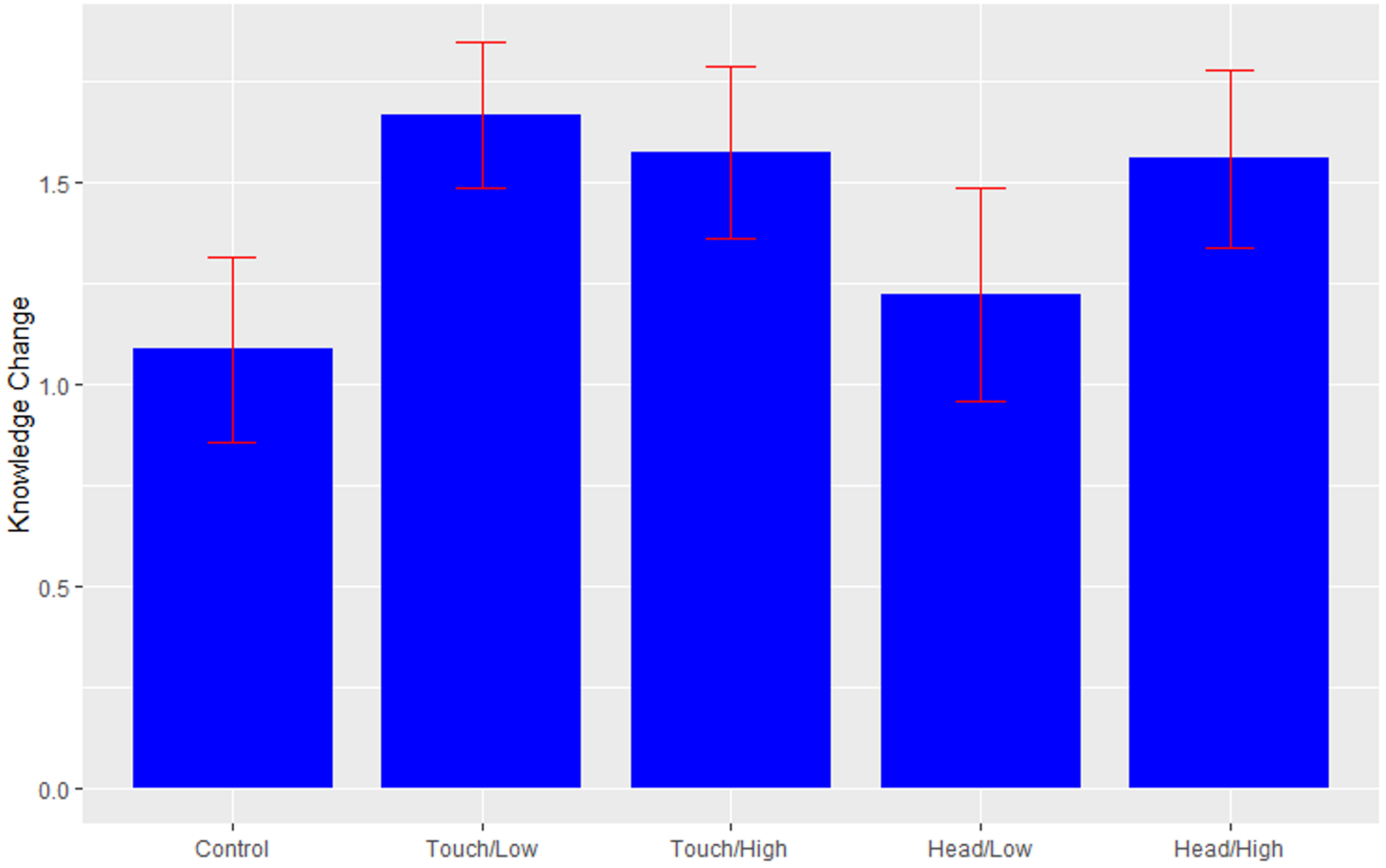

How do paleontologists use fossils to reconstruct La Brea's habitat?

TAR AR: THE FIELD EXPERIENCE

Field experience knowledge change



Field experience knowledge change by condition



TAR AR: BRINGING THE PAST TO LIFE IN PLACE-BASED AUGMENTED REALITY SCIENCE LEARNING

THANKS!

Snap to unlock

Ground Sloth

by Nicholas Dominici

Snap to unlock

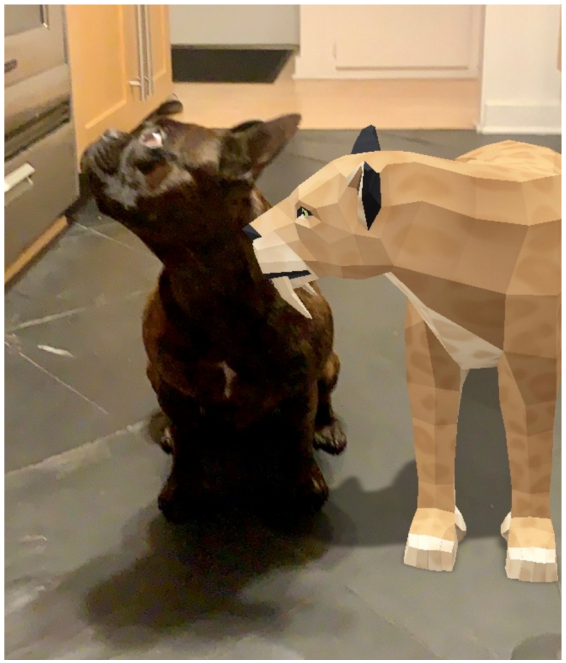
Sabertooth

by Nicholas Dominici

Snap to unlock

Direwolf

by Nicholas Dominici



THANK YOU!

CLASS 5 WEDNESDAY, MARCH 22

LOCATION: UNIVERSITY CLUB

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