

Resources for remote teaching in ecology and environmental science
UCI Ecology & Evolutionary Biology – Ecology Group
April 2020

Smithsonian Museum of Natural History

- **Virtual tours:** <https://naturalhistory.si.edu/visit/virtual-tour>

Monterey Bay Aquarium

- **Exhibits, tours:** <https://www.montereybayaquarium.org/>
- **Tidepooling expedition to Pt. Lomos:**
<https://www.montereybayaquarium.org/stories/tidepooling-adventure>

Aquarium of the Pacific

- **Online Academy:** <http://www.aquariumofpacific.org/news/aquariumacademy/>
- **Lectures:** <https://www.youtube.com/playlist?list=PLofT2LwTg3TXKaJOAOjk55BaQ-VID5GI9>

PBS Learning Media

- **Videos, interactive tools, lessons for teaching science**
- <https://www.pbslearningmedia.org/subjects/science/>
- **e.g., interactive lesson on ocean circulation in the North Atlantic:**
<https://www.pbslearningmedia.org/resource/buac17-912-sci-ess-iloceanoverturn/ocean-circulation-in-the-north-atlantic/>

National Park Service

- **Virtual hikes, tours, and programs**
- <https://www.nps.gov/subjects/npscelebrates/find-your-virtual-park.htm>
- **e.g., virtual visits at** <https://www.nationalparks.org/connect/blog/take-virtual-visit-national-park>
- **Crater Lake:** https://findyourpark.com/get-inspired/crater-lake-national-park-360-tour?_ga=2.243234880.353053738.1587589288-2091226420.1587589288

Glass invertebrates at the Harvard Museum of Comparative Zoology

- **~430 glass models of marine and terrestrial invertebrates, including sea anemones, jelly fish, octopus, sea cucumbers, marine worms and land snails**
- **Main page:** <https://mcz.harvard.edu/blaschka-glass-invertebrates>
- **Video:** <https://vimeo.com/99769917>
- **3D virtual models:** <https://sketchfab.com/ARC-3D/collections/the-blaschka-marine-invertebrates>

National Oceanic and Atmospheric Administration (NOAA)

- **National Marine Sanctuaries**
 - **Virtual dives:** <https://sanctuaries.noaa.gov/vr/>
 - **Webinars (e.g., coral restoration, heatwaves):**
<https://sanctuaries.noaa.gov/education/teachers/webinar-series.html>

- Florida Keys Coral Nursery: <https://sanctuaries.noaa.gov/vr/florida-keys/coral-nursery.html>
- Sea Grant Education at Home Resources: <https://seagrant.noaa.gov/educationathome>
 - e.g., California Sea Grant: <https://caseagrants.ucsd.edu/extension-outreach/at-home-education-resources>

JoVE (Journal of Visualized Experiments)

- Lab manual in introductory biology: <https://www.jove.com/science-education-library/41/lab-bio>
- Some modules are open access, including “Evolutionary Relationships” and “Extinction”
- All JoVE Education videos are free to access (requires you to create an account) until June 15

STEM Learning UK

- Online modules, including a collection on Science & Plants for Schools: <https://www.stem.org.uk/elibrary/collection/2923>
- e.g., surveys of virtual quadrats: <https://www.stem.org.uk/resources/elibrary/resource/83457/online-ecology-one-measuring-abundance-and-random-sampling>

The Nature Conservancy

- Virtual field trips: <https://www.nature.org/en-us/about-us/who-we-are/how-we-work/youth-engagement/nature-lab/virtual-field-trips/>

Zooniverse

- “People-Powered Research”
- Crowdsourcing data collection
- e.g., “Invader ID” – tracking marine invertebrates – at <https://www.zooniverse.org/projects/serc/invader-id>
- e.g., “Notes from Nature – Capturing California’s Flowers” to investigate phenological change in wildflowers at <https://www.zooniverse.org/projects/md68135/notes-from-nature-capturing-californias-flowers>

Google

- Google Earth Engine: <https://earthengine.google.com/>
- Google Earth Pro: <https://www.google.com/earth/>
- Google Arts & Culture: <https://artsandculture.google.com/>
 - National Parks: <https://artsandculture.google.com/project/national-park-service>
 - Digging Dinosaurs, e.g., <https://artsandculture.google.com/exhibit/mary-anning-history-s-pioneer-of-palaeontology%C2%A0/RwLC8g-VfbBAJA>
- Access Mars (virtual exploration of Mars w/ NASA & JPL): <https://accessmars.withgoogle.com/>

National Phenology Network: <https://www.usanpn.org/usa-national-phenology-network>

- Resources for higher education: <https://www.usanpn.org/nn/education/higher>

- **Example lesson plan on exploring phenology data:** <https://www.usanpn.org/nn/Phenology-Data-Exploration>
- **Data visualization tools:** <https://www.usanpn.org/nn/connect/visualizations>

Rocky Mountain Biological Laboratory

- **Case Study - phenological responses of birds and plants to climate change:** <https://www.digitalrmbll.org/case-studies/the-biology-of-climate-change/>

Google Sheet compiling online resources for field learning in ecology and environmental sciences:

- https://docs.google.com/spreadsheets/d/16K6bGTf-wGjxi6aGi_v6vLQSpSogI1zq3tXLHWweg/edit#gid=1066503162

Google Sheet compiling online resources for field learning in geosciences (Julie Libarkin @GeoEdResearch):

- **Includes a tab for online labs & field trips**
- https://docs.google.com/spreadsheets/d/1-R6THvCicAjGrWRspCN915SiztdZ95ziwiF8BmQrYc/htmlview?urp=gmail_link

Teach the Earth

- **Teaching Geosciences Online:** https://serc.carleton.edu/teachearth/teach_geo_online/index.html

Environmental data-driven inquiry & exploration (EDDIE)

- **Modules for teaching about macrosystems and environmental data**
- <https://serc.carleton.edu/eddie/modules.html>