



# Technology in Outdoor Education

D. Nickel, J. Perkins, D. Sweeney, T. Webb





# Why technology is useful in the outdoors

**Technology can be a useful addition  
to outdoor experiential learning,  
especially in the world of apps.**

There are apps out there that help with:

- Species identification and information
- Contributing to citizen science
- Surveying (adding to the global library of species in the world)
- Naming constellations and learning about space
- Learning about climate and weather patterns
- And more!

# Research (recommended readings)

Articles

## Digital technology and outdoor experiential learning

David Hills   & Glyn Thomas

Published online: 13 Apr 2019

<https://www.tandfonline.com/doi/abs/10.1080/14729679.2019.1604244?journalCode=raol20>

- How technology can undermine the aim of being outdoors, but how it can also create opportunities to *enhance* outdoor learning experiences.
- Pedagogical considerations, affordances of digital technology, and consequences of decisions.
- Critical examination of technology use in the outdoors.

<https://usergeneratededucation.wordpress.com/2013/04/18/taking-the-learners-and-technology-outdoors/>

- The benefits of outdoor education and the use of mobile devices in outdoor education
- Includes top ten apps for taking education outdoors  
(Project Noah, Journey North, WeatherBug, Creek Watch, What's Invasive!, Nature's Notebook, NatureFind, iNaturalist, Google Earth, Marine Debris Tracker)

# Top Ten Apps for Taking Education Outdoors *(according to Jackie Gerstein)*

<https://usergeneratededucation.wordpress.com/2013/04/18/taking-the-learners-and-technology-outdoors/>



**Project Noah** – Engage students in documenting local wildlife by uploading photos via mobile phone or tablet as part of a classroom or school-wide mission. A global community can help I.D. their “spottings” which in turn help scientists uncover and track wildlife populations.



**Journey North** – Your students can be citizen scientists, tracking wildlife migrations and seasonal changes in the environment around them. They can report their sightings from the field, view maps, take pictures and leave comments.



**WeatherBug** – Give your students access to the world’s largest network of real-time weather sensors for forecasts, alerts and more. Students can check weather conditions before heading out for field study or collect weather data over time and study how it impacts the local environment.



**Creek Watch** – Be stewards of your local watershed by using this app to snap photos of a local waterway and report how much water or trash there is. The app aggregates the data and shares it with local water agencies to help them track pollution and water resources.



**What’s Invasive!** – Help scientists locate invasive species by making geo-tagged observations and taking photos in their natural areas. The information students collect can help stop the spread of invasive species which destroy native habitats.



**Nature’s Notebook** – Observe and record plant and animal lifecycle events (also known as phenology), such as flowering and bird migration. The observations also help scientists understand how species respond to environmental changes.



**NatureFind** – Find nature areas near your school for your students to experience and learn in. Parks, zoos, botanical gardens and nature centers, among many others, can provide places for study across subject areas.



**iNaturalist** – Record nature observations and share them with the online community of naturalists. Students can also keep a log of the wildlife they discover and the biodiversity they experience while being outdoors.



**Google Earth** – Help students explore their natural environment from a bird’s eye view and compare and contrast it with habitats around the world. Layers, including roads, borders and places, provide additional perspective of the surroundings.



**Marine Debris Tracker** – Students can contribute to NOAA’s efforts to keep the nation’s coastlines and waterways free of trash by tracking debris in local waterways and submitting their data with the mobile app.



# Pros, Cons, & Risks

## Pros:

- Can enhance learning if used appropriately!
- Opportunities for students to make contributions as citizen scientists
- Encourages digital literacy (in an age of technology)
- Students can see and learn about places, plants and animals they've never seen before

## Cons:

- Requires that students have access to a mobile device or an ipad ... which not every student owns  
... if the school supplies it then it requires funds for that
- Increased screen time and reliance on technology

## Risks:

- Technology could *detract* from time outdoors if used inappropriately



A lush green forest with a small stream flowing over mossy rocks. The scene is filled with dense foliage, including ferns and evergreen trees, creating a vibrant and natural setting. The stream is the central focus, with water splashing over the rocks. The overall atmosphere is serene and peaceful.

**What apps do we recommend?**

# iNaturalist

Developed in 2008, as a Master's final project of students at UC Berkeley's School of Information.

## What you can do with the app:

- Upload photos and record observations
- Get help with identifications
- Collaborate with others to collect information
- Access observational data from other users
- Other users can back up your observations and ID's, so that they become "research grade" and contribute to science

**Primary goal:** *Connect people to nature*

**Secondary goal:** *Generate scientifically valuable biodiversity data*

Available as a free app for mobile phone or through website on computer.



*"iNaturalist is an online social network of people sharing biodiversity information to help each other learn about nature"* (<https://www.inaturalist.org/pages/what+is+it>)



Fido Wi-Fi 20:17 95%


deneenickel

17 Observations

- Atheniella** 1mo  
Vancouver Island, BC, CA 2
- Reindeer Lichen** 1mo  
Vancouver Island, BC, CA
- Partridgefoot** 2mo  
Fraser Valley E, BC, CA 1
- Portuguese laurel** 2mo  
Vancouver Island, Central Saanic... 1
- staghorn sumac** 2mo  
Vancouver Island, Central Saanic... 1
- common juniper** 3mo  
Kawkawa Lake, Hope, BC, CA
- orange hawkweed** 3mo  
Crowsnest Hwy, Hope, BC, CA 1
- tansy** 3mo  
Crowsnest Hwy, Hope, BC, CA 1
- everlastinas** 3mo

Explore Activity **Observe** Me More

Cancel Details

+  x

Default

**What did you see?**  
View suggestions

Notes...

Oct 12, 2019 at 16:00

Vancouver Island, BC, CA  
Lat: [redacted] Long: [redacted] Acc: 112 m


Geoprivacy Open

Captive / Cultivated No

Projects


SHARE

< Details






Look up a species by name

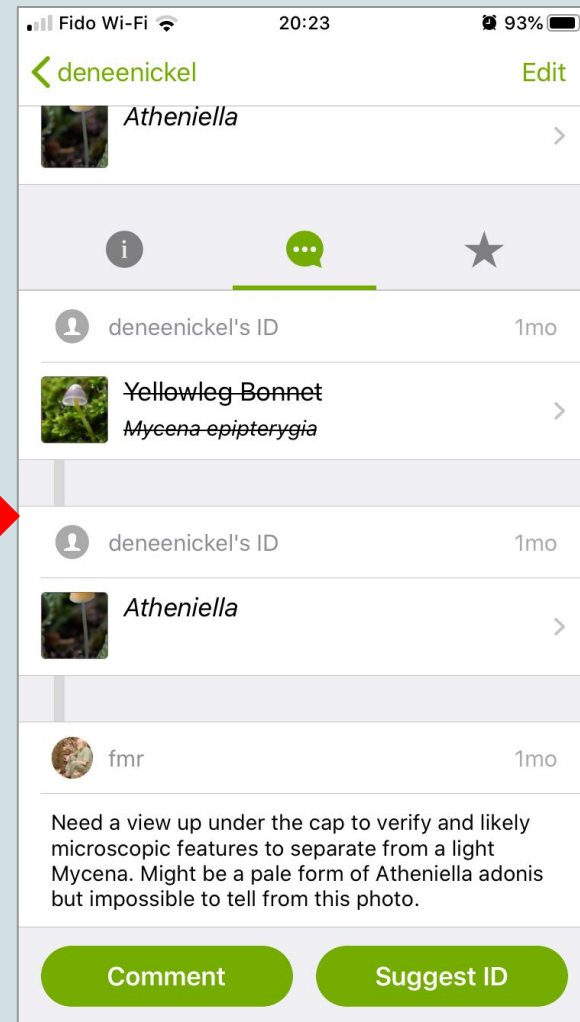
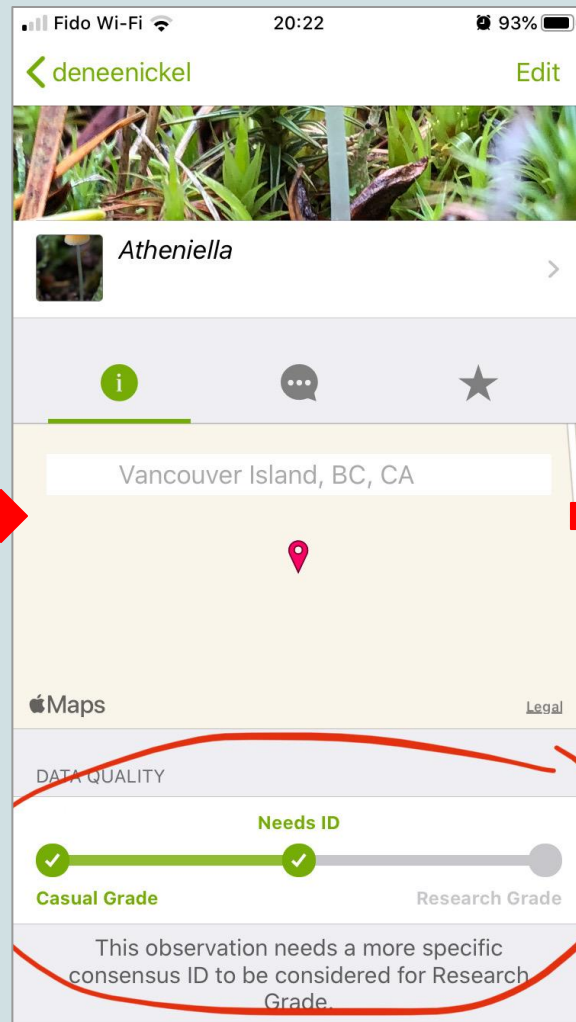
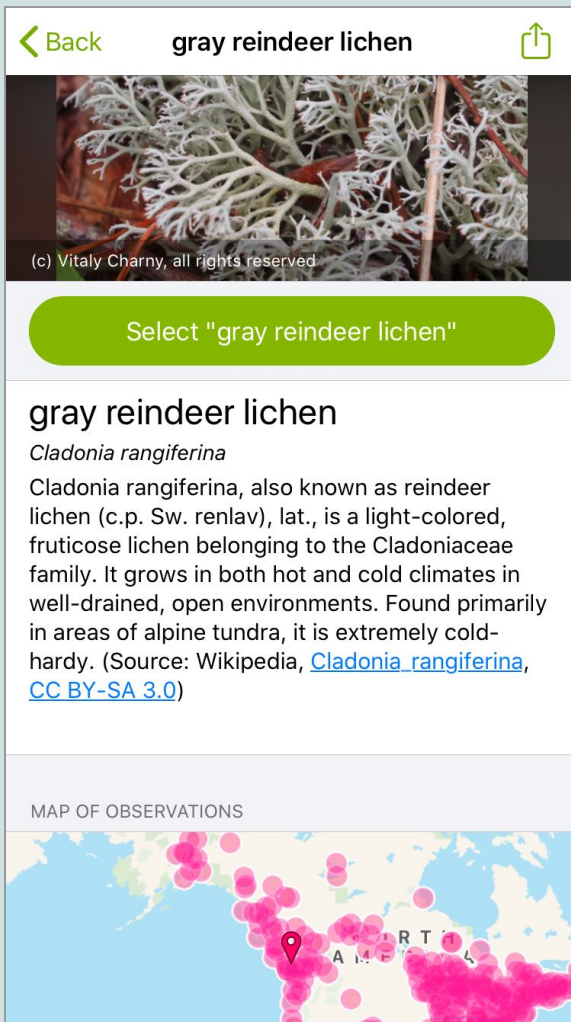
WE'RE PRETTY SURE THIS IS IN THE GENUS CLADONIA.

 **Pixie Cup Lichens**  
*Cladonia*

HERE ARE OUR TOP TEN SPECIES SUGGESTIONS:

-  **gray reindeer lichen**  
*Cladonia rangiferina*  
Visually Similar / Seen Nearby
-  **Reindeer Lichen**  
*Cladonia portentosa*  
Visually Similar / Seen Nearby
-  **Star-tipped Reindeer Lichen**  
*Cladonia stellaris*  
Visually Similar





# BioBlitz



**“A BioBlitz is a communal citizen-science effort to record as many species within a designated location and time period as possible”**

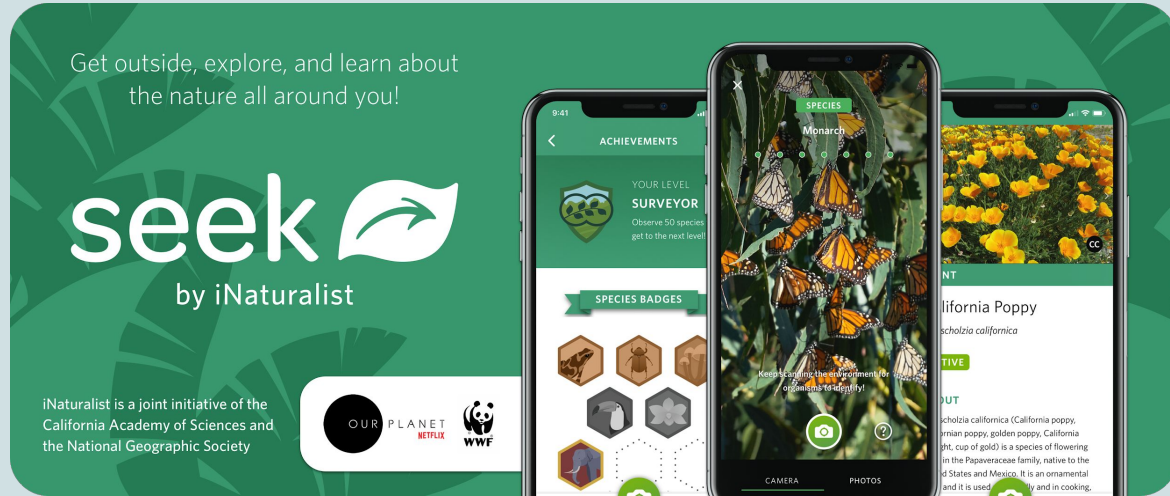
*iNaturalist* is a great platform for carrying out BioBlitzes!

These events are a fantastic way to engage the public in connecting with nature and contributing to science - using technology.

<https://www.inaturalist.org/pages/bioblitz+guide>

BioBlitz  
Canada 150





- An app by iNaturalist that allows the user to identify different flora and fauna (uses the “research grade” surveying data from the iNaturalist app to help with species identification)
- Quicker and more simple than iNaturalist, very useful for outdoor education classes if students have the app installed
- It’s free!
- Once something is identified, you can go to link for more information



## iTrack Wildlife

An incredible resource to facilitate interactive learning about animal tracks.

### Pros

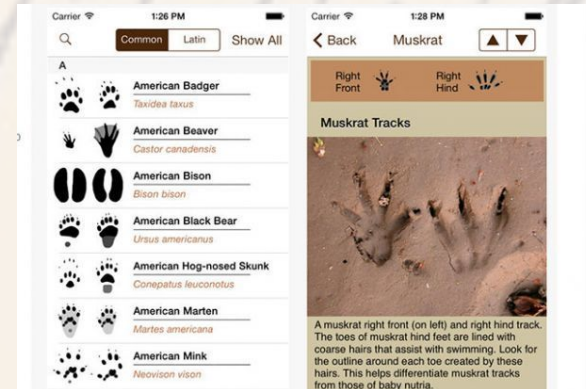
- All the animal tracks in one place
- Easy to use
- Gives names in english and latin and includes other interesting and relevant information about animals diet, behaviour, and habitat.
- Website contains photo galleries & resource list (<http://www.naturetracking.com/>)

### Cons

- Slight cost to install
- Limited use

### Curricular Connections

- Habitat
- Animal behaviour
- Language arts - storytelling
- Art





# Merlin

From the Cornell Lab



Free Bird Identification App

Can answer a few questions to get suggested birds  
OR

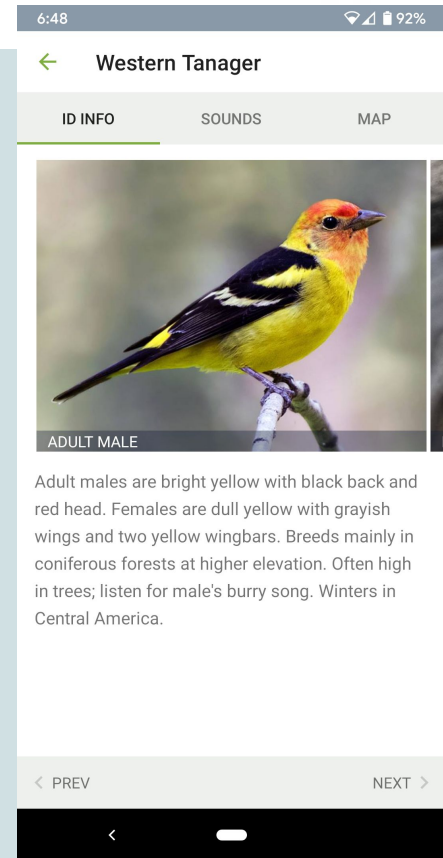
Can upload a photo to the app for identification

The Cornell Lab also has learning games:

<https://academy.allaboutbirds.org/learning-games/>

Live webcams from nests and feeders:

<http://cams.allaboutbirds.org/>



# Marine Debris Tracker

“An open data citizen science movement”

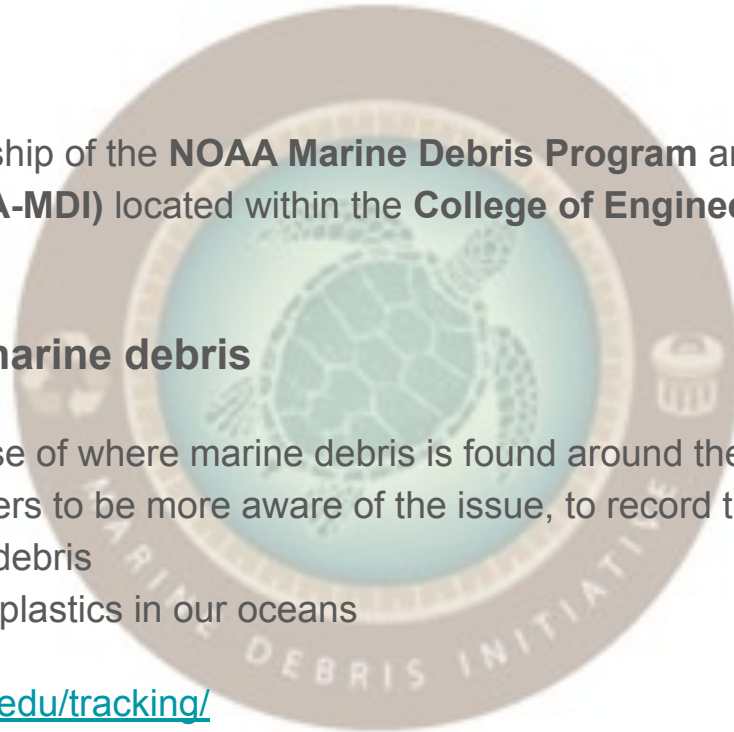
Originated in 2010

Started through a joint partnership of the **NOAA Marine Debris Program** and the **Southeast Atlantic Marine Debris Initiative (SEA-MDI)** located within the **College of Engineering** at the **University of Georgia**.

## A platform for tracking marine debris

- Contributes to a database of where marine debris is found around the world
- Creates incentive for users to be more aware of the issue, to record their observations, and to collect/clean up marine debris
- Relevant to the issue of plastics in our oceans

<https://marinedebris.engr.uga.edu/tracking/>



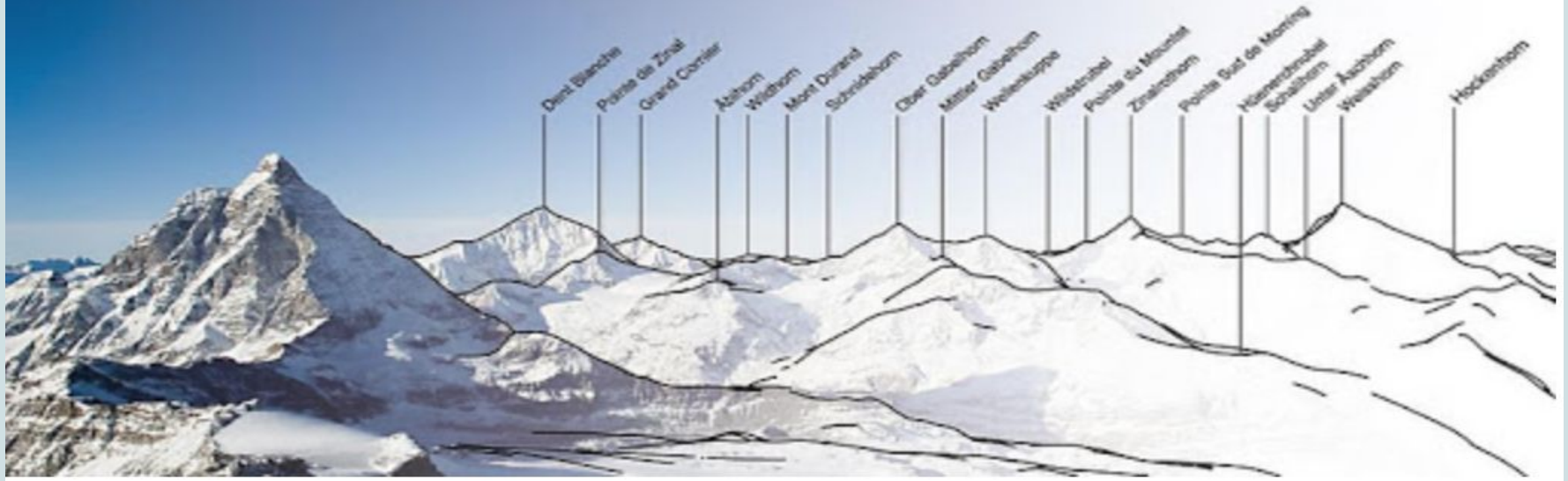


# Seaweed Sorter

**Created by researcher, Patrick Martone (UBC) - a seaweed expert!**

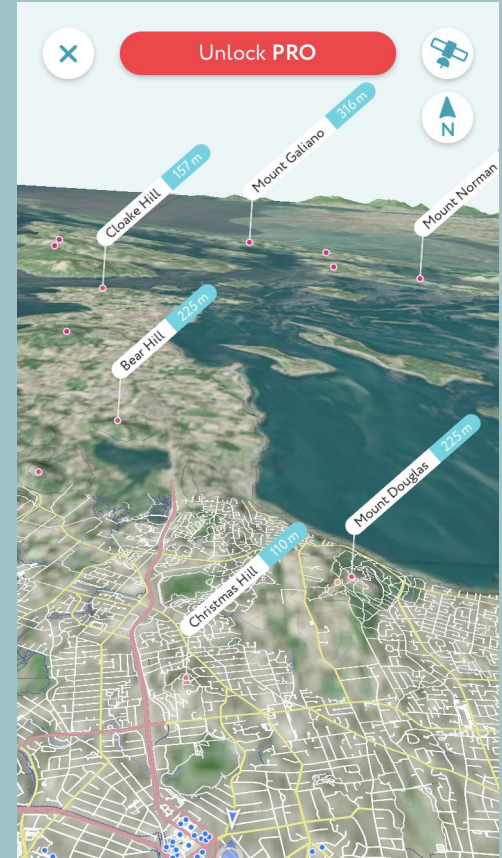
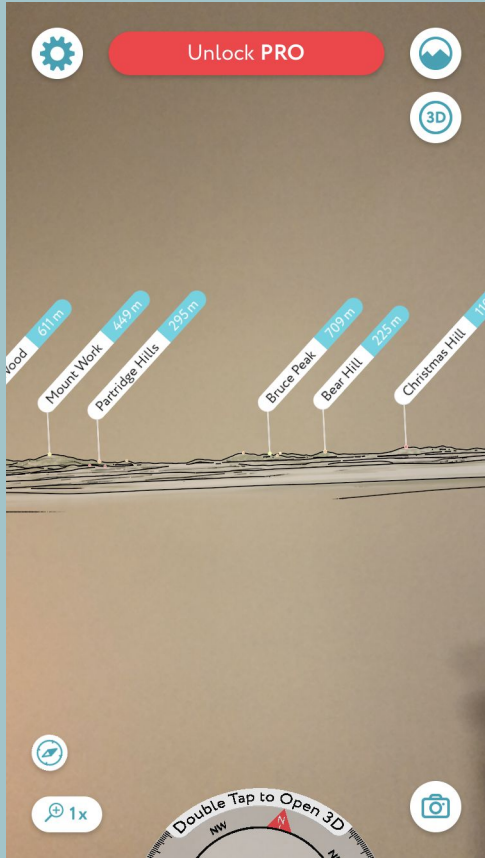
- Makes identifying seaweeds more simple!
- This app could be relevant to this area (close to marine environment) and for science projects with older ages.

# PeakFinder



- This app identifies the names of peaks around you
- Simply hold up your smartphone camera and your screen will label the peaks (like the photo above)
- This can be useful for taking students on outdoor trips as well as for orienteering

# Peak Visor...like Peak Finder but it's Free!







## Globe Observer

- Data collection for weather, mosquitoes, tree height, and land cover
- Can discuss satellite imagery, citizen science, weather patterns, tree growth and height, lifecycles (mosquitos), land use and natural resources.

<https://www.nasa.gov/feature/langley/globe-observer-app-puts-the-power-of-citizen-science-in-a-smartphone>

### Pros

- Contribute to citizen science community
- Interact with environment
- Includes instructions and formalized process of learning how to engage in authentic scientific practice

### Cons

- Have to make an account with

### Curricular Connections

- Insect & Plant life cycles
- Geography
- Weather
- Math



<https://www.nisenet.org/catalog/globe-observer-app>



## NASA app

<https://www.nasa.gov/nasaapp>

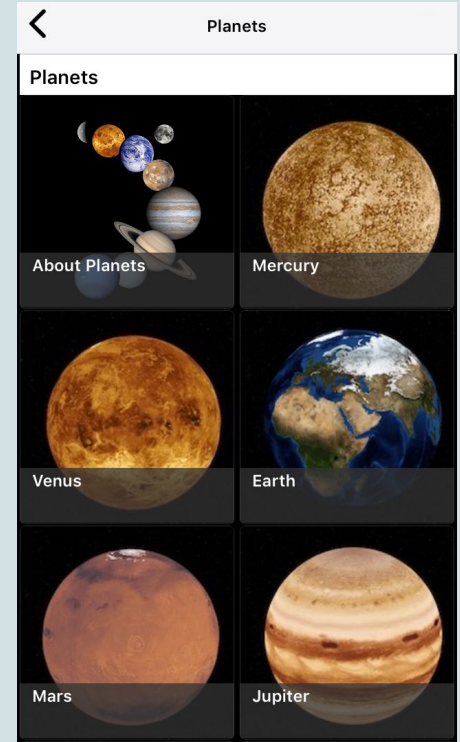
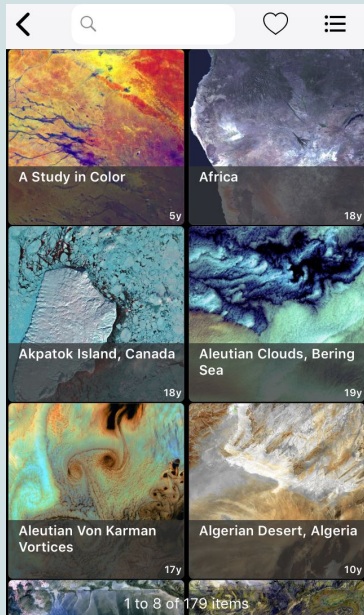
Simple but full of amazing content.

Contains detailed information about the galaxy, solar system, and NASA.

Access to live streaming of people in space and find space related podcasts.

### **Curricular connections**

- Geography, land use and exploration
- The moon & tides
- The night sky
- Art



## Skype A Scientist

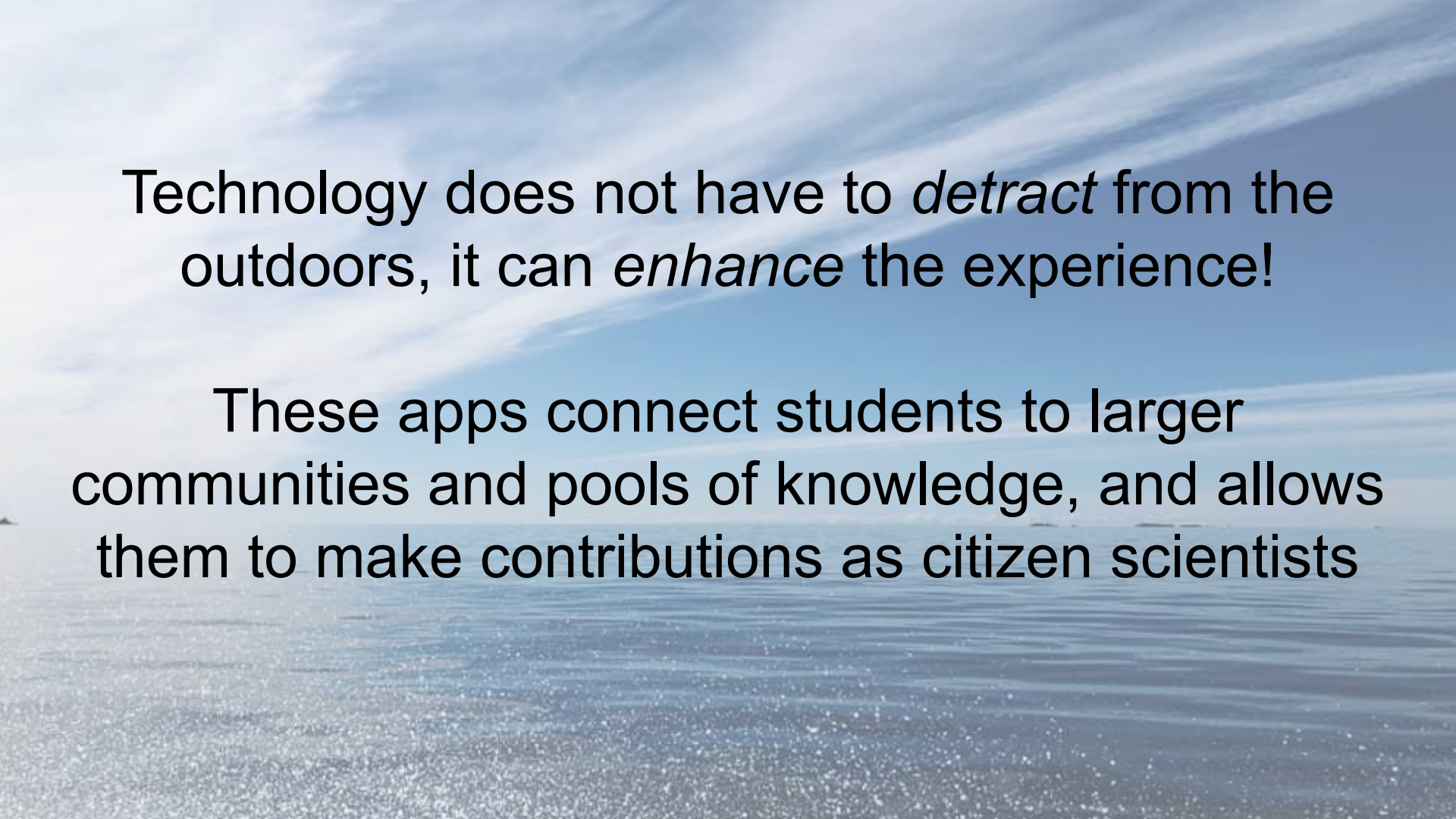
<https://www.skypeascientist.com/>

- Your class connects via webcam with a scientist
- Hundreds of scientists to choose from

Also have live sessions on youtubes and can watch previously held sessions

<https://www.youtube.com/skypeascientist>





Technology does not have to *detract* from the outdoors, it can *enhance* the experience!

These apps connect students to larger communities and pools of knowledge, and allows them to make contributions as citizen scientists

**Questions?**

