

## Research Context and Challenge

### EPIC Bioscience: Collections Data in Education

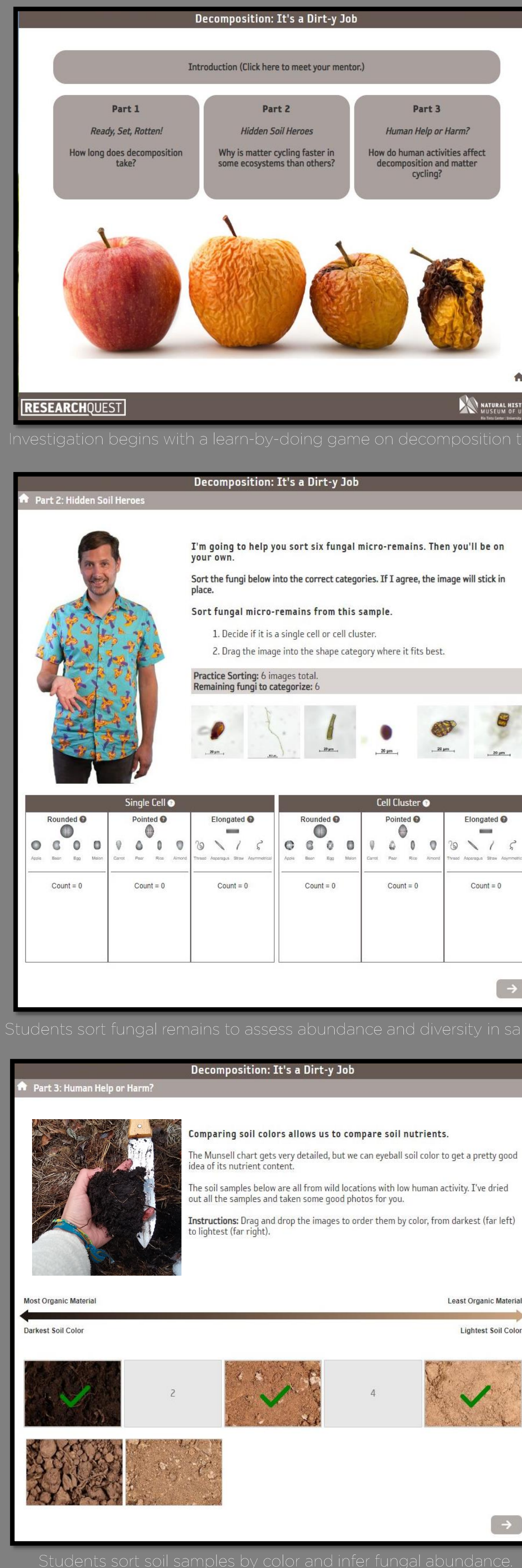
- Digitized museum collections = tremendous untapped educational potential to engage students with specimens.
- EPIC Bioscience = series of interactive, online science investigations aligned to NGSS for middle school learners.
- Students gather data and analyze data from museum specimens to address biodiversity loss & climate change.

### Target Investigation - Decomposition: It's a Dirty Job

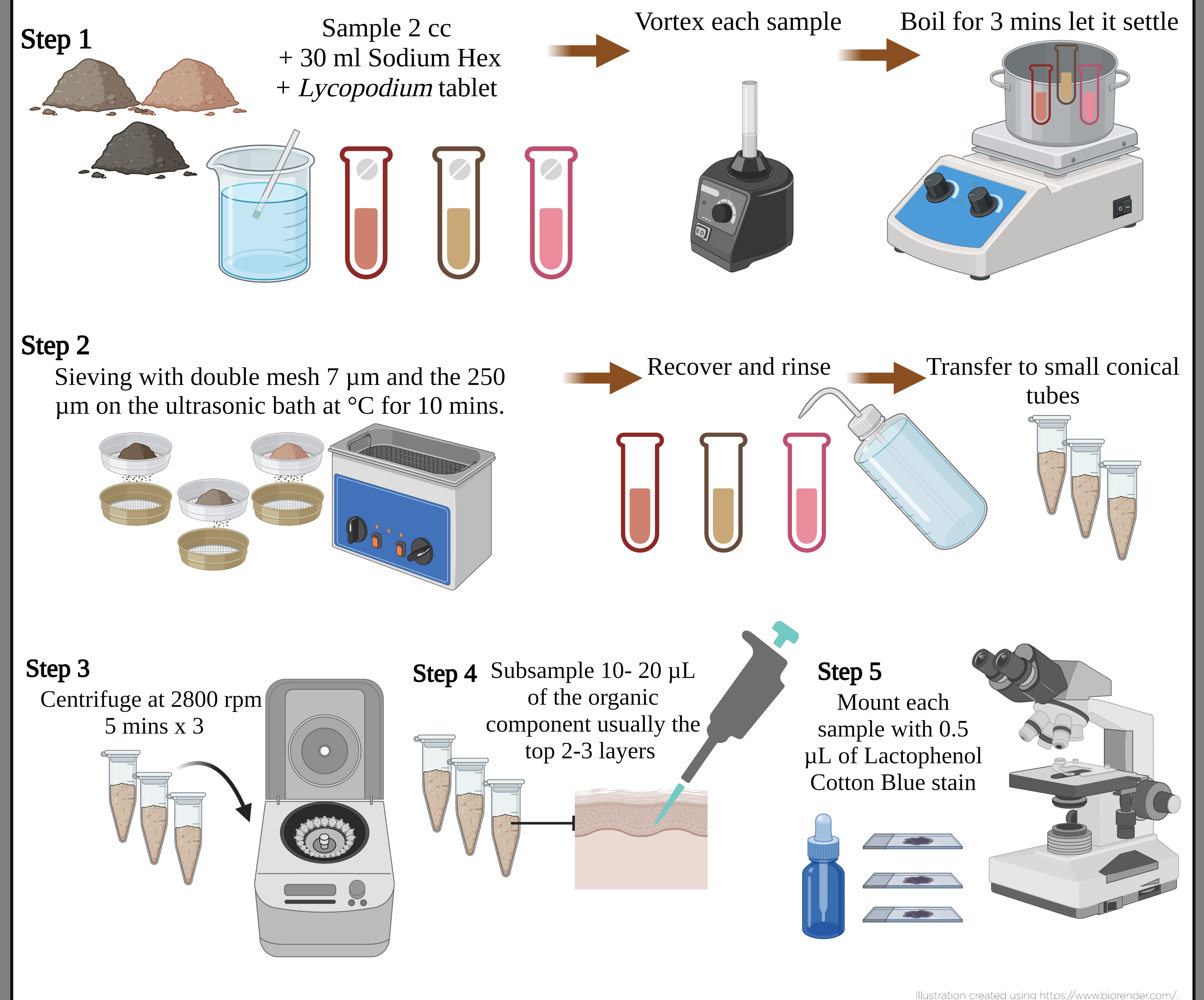
- NGSS MS LS2-3:** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- Phenomenon:** Different rates of decomposition of organic matter across environmental gradients.
- Specimens:** Soil fungal remains.
- Rationale:** Fungi is an unexplored kingdom (~1% known to science!) compared to others that dominate middle school curriculum. Fungi provide a unique entry point into exploring matter and energy cycling.
- Guiding Question:** Why do different materials decompose at varying rates across environments?

### Collections Challenge - New Lab Method Needed

- Identify full range of preserved fungal spores and micro-remains sedimentary samples Image fungal spores and remains at high-resolution to support sorting by spore shape and morphological characters.

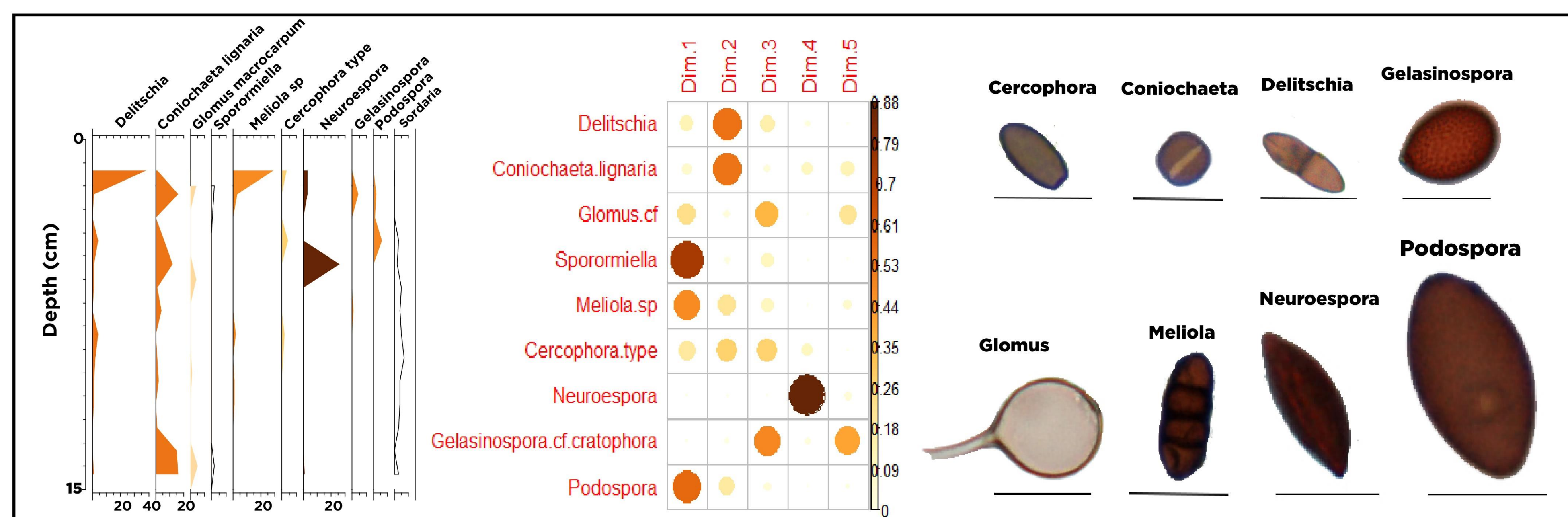


## New Lab Method: Capture Fungal Remains



## Tested samples & Key Findings

We tested our method in sedimentary superficial samples of North and South America.



San Diego Lagoon (Samaná, Colombia) fungal remains that serve as an indicator of disturbances. Some of these are linked to landscape herbivores around the lake.

## Conclusions

- Using museum collections as a resource to educate middle school students provides them with the opportunity to use research-driven approaches, including gathering data, analyzing results, and forming conclusions on global phenomena. There is unlimited potential for museum-education crossover to benefit museum stakeholders, community learners, and laboratory researchers.
- Traditional protocols to prepare Non-Pollen Palynomorphs (NPP's) in palynology can degrade fungi. The new laboratory protocol allows for the recovery of fungal remains based on the physical separation of the sediment components, using fewer non-toxic reagents and reducing the overall lab expenses. This, in turn, makes the method more accessible in countries with limited equipment and reagents accessibility, such as Colombia.