

The Fungus Among Us: Re-purposing Technology Lesson Plan

Sam Ansaldi

TE 831

Summary Box

Lesson title: **The Fungus Among Us!**

Prepared by: Sam Ansaldi

Subject area: Science

Technology used: Myco Free - Mycology App

Length of lesson: 3 Hours

Suggested grade level: Middle School (6-8) - High School (9-12)

Lesson Objectives: *The student will be able to*

- Learn basic mushroom anatomy and function
- Understand the diverse roles fungus plays in the environment
- Identify different species of local fungi in their natural environment with the use of a digital dichotomous key

Student NETS Standards Alignment:

- Student NETS 1a - Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Apply existing knowledge to generate new ideas, products, or processes
- Student NETS 1b - Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Create original works as a means of personal or group expression
- Student NETS 3d - Students apply digital tools to gather, evaluate, and use information. Process data and report results
- Student NETS 6a - Students demonstrate a sound understanding of technology concepts, systems, and operations. Understand and use technology systems
- Student NETS 6d - Students demonstrate a sound understanding of technology concepts, systems, and operations. Transfer current knowledge to learning of new technologies

Materials:

1. A smartphone with the availability to download the Myco Free app (available for windows, android, iphone)
2. Assorted varieties of fungus; caps, whole and deconstructed
3. Premade spore prints
4. Spore printing material (fresh mushroom caps, black & white construction paper, tape, clear glass

- bowl or equivalent) *Additional materials may be necessary. See [Spore Print Activity](#)
5. Visual aids of fungus worldwide (print or digital). If digital, a laptop with projector or a smartboard is needed
 6. Additional mushroom field guides (print or digital)
 7. Latex gloves or non-latex alternative

Lesson Procedure:

Beginning - Begin the lesson plan indoors where the students can sit and focus on the teacher.

If using digital aids have them projecting and ready prior to the students entering. Begin with a simple question that may not be so simple after all, “What is a fungus and what does it do?”

Start by mentioning types of fungi (yeasts, molds, mushrooms) and suggest for the sake of this lesson that we are going to focus on one specific type of fungi, mushrooms. Continue this introduction with the image of a mushroom displaying its labeled anatomy and introduce the following questions:

- How many varieties of mushrooms are there?
- What roles do they play in nature?
- What is a mushrooms lifecycle?
- How can you tell mushrooms apart?

During - It is at this point in the lesson that you delve a little deeper into some of the aforementioned questions and introduce the class to the technology they will be using for their own “mushroom hunt”. At this point the students should download the Myco Free app to their phones/tablets if they have not previously done so already. If every student does not have a cell phone/tablet capable of downloading apps do not worry. You only need a few students with these capabilities as the class will be broken up into groups later on during the lesson. Once downloaded, divide the class into their “hunting” groups (3-6 per group) and reintroduce the question, “How can you tell mushrooms apart and what roles do mushrooms play in nature?”

Have them open their Myco Free app, swipe to the welcome screen, and tap on “Identify”.

Once there, review the structure and parts of a mushroom (from earlier picture) and begin to explore the differences of each tab as a class.

- Location
- Edibility
- Hymenophore
- Hymenophore color
- Cap form
- Cap color
- Stem form
- Stem color
- Gills shape
- Gills color
- Ring
- Region
- Season
- Spore print

Begin with “Location” as this will bring insight into some of the roles mushrooms play in nature. “Location” on this app does not just restrict the mushrooms habitat to biomes, but it also isolates down to where in the mushrooms live in those biomes. Introduce mushroom roles:

- Saprophytic (decomposer/detritivore)
- Symbiotic (mutualistic)
- Parasitic

And finish with the “Spore print” tab as the class will be making their own spore print in the next activity. Emphasize the importance of learning how to identify mushrooms by their individual characteristics and relay to the students that they just learned how to use a digital dichotomous key (depending on the age and grade of the class you can determine the level of detail you would like to go into regarding dichotomous keys).

Spore Print Activity

The materials you will need for the spore print activity are as follows:

- Freshly cut mushroom caps (various species)
- Black & white construction paper
- Tape
- Clear glass bowl or equivalent

“Although many different species of mushrooms can accurately be identified by their external characteristics, some look so similar to each other that it actually takes the classification of an internal characteristic to determine what species it is. This huge deciding factor comes down to a small speck, smaller than a grain of sand. What is this small speck you may ask yourselves; well I’m glad you asked. These specks are spores! And these spores are responsible for a lot more than just identification.” Introduce the reproductive process of a mushroom (once again the amount of detail depends upon your familiarity with the topic and the age and grade of the class).

“Now that we have learned just how important spores are lets do your very own spore print.” Show premade examples of spore prints and explain how to do the activity.

1. Cut a piece of black construction paper in half lengthwise and place it over half of a white sheet
2. Tape the black piece to the white on the top and bottom of the page, not the middle or area where your mushroom will touch
3. With latex gloves on, select a variety of mushroom caps that will fit under one of the provided bowls. Depending on the size of the caps this could be anywhere from 1-3.
4. Cover the caps with your bowl and place in an area where they will not be disturbed

* Spore prints can take anywhere from an hour to a day to show up. If your class will be returning to the same room the next day this method with the bowl will work just fine. If however, they will not be returning to this location a “take home” spore print may be used instead of the traditional method.

1. Repeat steps 1 & 2 from above then tape the paper onto a rigid piece of cardboard cut to size
2. Repeat steps 3 & 4 from above, however instead of a bowl cover the caps with a disposable plastic cup (large size, 12-16oz) and tape the cup to the paper. This method will still produce an accurate spore print as long as the cap is not shaken too much during transit.

“Now as these spore prints rest lets test your identification skills and go mushroom hunting!” For this activity the class will be split into their “hunting” groups, each member given a pair a

latex gloves and brought outside to whichever type of habitat or habitats you have available at your disposal in which mushrooms can be found. “For this activity I would like your groups to explore this/these areas for different species of mushrooms and use your Myco Free app (digital dichotomous key) to help identify them.” The students must use all the categories under the “Identification” tab to help them determine what the mushrooms species could possibly be.

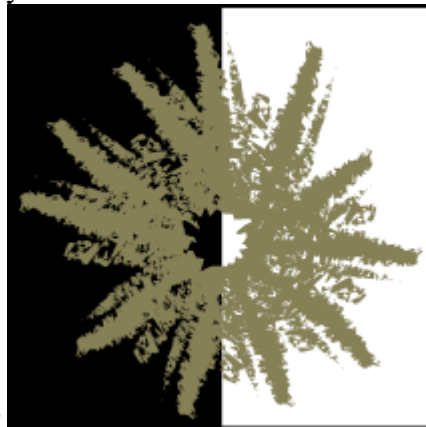
Then using the camera icon the students will take a picture of the mushroom and tag its location on the map. That tag will automatically record where you are geographically, add the date the picture was taken and at what time. It will also allow you to title the mushroom pic and give you the opportunity to describe your location and add any necessary comments. If done correctly, the picture of the mushroom will be transferred to the “Gallery” tab, where all of the pictures they took can be viewed, and it will also be available under the “Locations” tab under a descriptive heading of their choice. Once in the “Locations” tab their pictures and information can be accessed individually along with the map location of the mushroom. Make sure to tell the students that when identifying the mushrooms they must always be wearing latex gloves and they cannot remove the mushroom from its location or destroy/harm it in any way. The identifications must be done by what they can see of the mushroom without disturbing it.

After - Once the “hunting” activity is completed gather the students back into the classroom where they created their spore prints and go over the information they collected by group, (because this is a free app it is limited to the amount of species in its index, additional resources may be necessary if identifying less common species).

- How many different varieties did they find?
- How accurate is their identification?
- Where there any species that they were unable to identify?
- Compare location markers between groups to determine species densities and preferred biomes

At this point the students should have a solid understanding of mushroom basics (identification markers, anatomy, role of mushrooms in their environment, habitat diversity) and an introduction to the use of a digital dichotomous key.

“Thank you very much for allowing me to give you a glimpse into the mysterious world of fungus. Fungi are often organisms that are routinely passed by and underappreciated, so next time you see one, stop and take a glance, you just might make that fungi’s day. And besides when you think about it its never a bad idea to acknowledge a life form that helps feed us, outnumber us, and can easily cause our extinction. Sweet dreams!”



Additional Resources:

Reflection

What technology did you choose for this lesson and why did you choose it?

The technology that I chose to use for this lesson was an app titled *Myco Free*. *Myco Free* is a mushroom identification and location mapping app that uses a digital dichotomous key in order to aid in the identification of different mushroom species. The app itself is available on multiple platforms including windows, android and iPhones. It is also a very interactive app which was one of my deciding factors for using in with this program. Not only does this app introduce the students to the use of a detailed, digital dichotomous key but it allows the students to use this key to aid additional features such as the ability to take and save photos of mushrooms to their "Gallery" tab, map the location of their findings, and customize their information even if it is of a species that is not included in the apps index.

What was the role of TPACK, SCOT, SAMR, and/or TIK in helping you shape/create/implement your lesson?

Out of all of the theories that came into play during the creation of my lesson plan, TPACK contributed the most. When looking at the uses of technological, pedagogical, and content knowledge in curriculum planning the teacher must consider them a whole; one not utilized to its optimum potential without the others. Technology is a factor of 21st century teaching regardless of the teacher's individual views regarding technology. Even if the teacher isn't utilizing it in the classroom the students are taking advantage of it at home, and everywhere in between. You must know the content you teach just as much as the way in which you teach it. Without this marriage material cannot be effectively taught to a group of students. Now factor in students living in the 21st century and you have a technological component that aids the teacher in the pedagogical ways the material is being delivered, helps the students and teachers locate information contributing to the overall content knowledge of the material, and adds an endless open door of effective ways for students to learn, produce, create, and deliver the information presented to them. This remarkable education trifecta is the way I created this lesson plan. The knowledge of the information and the delivery method that I used to teach it were both positively affected by the addition of the technological app I chose. It allowed the students an opportunity to explore and play with a new technology on a familiar device which kept them interested and engaged during the lesson.

What was the response of learners to this lesson? What were the affordances? What were the constraints?

When it came to a class learning about fungus (not traditionally a very stimulating topic of study), the group I had was wonderful. I taught this lesson to a group of 10th graders as a supplement to their traditional biology curriculum and was met with an overwhelmingly positive response. The students in the class had already been introduced to some aspects of fungi so the beginning of my lesson was more of a review for them than an introduction. The digital visual aids that I used (various internet searched pictures of fungi and a YouTube clip on bioluminescent mushrooms <http://www.youtube.com/watch?v=XCOiem0pLMU>) brought a lot of intrigue to the lesson at an early start. I tried to keep the energy of the class up by adding in hands on elements and technological interactivity so the students would really feel like they were involved with their learning as opposed to just listening to someone lecturing at them. The affordances of teaching this lesson to slightly older students was that most, if not all of them, had Smartphone's capable of downloading the *Myco Free* app. Utilizing this technology on a student's Smartphone as opposed to an institutions computer or iPad

has advantages associated with it, and a few disadvantages as well. First of all they are portable. You don't have to worry about lugging a clunky piece of electronic equipment through the woods and around the fields. Plus the students that have the phones are already most likely familiar with their device making the familiarizing process with the controls on the new app very easy. The downfall to this is that you need students that have these types of phones and are willing to use them in the field. A phone can get dropped, be exposed to water damage, or even just have large amounts of data usage charged to their plan. Plus you run the risk of the app displaying differently on different devices complicating the uniformity of the task and the ease of assistance troubleshooting possible technological problems. When it comes to location availability its lucky that mushrooms can grow pretty much anywhere. Even if you don't have access to large fields or patches of woods you should still be able to find some sort of fungal growth, even in an urban environment.

What other ways might this technology be re-purposed (in addition to your own classroom/content, this can be related to other topics or subject matter areas)?

Repurposing this technology might be a little difficult as it focuses on one specific topic set, mushrooms. However, you might be able to utilize its gallery and location charting feature to create a photo digital journal, an invasive species tracking program, or cross-reference fungal locations and densities to different biomes to help establish an environmental health baseline.

How did this lesson support your professional development and teaching practice(s)?

My field of study and teaching revolves around the sciences of the natural world. Whenever I have the opportunity to teach about these natural biological components I have the benefit of learning additional materials within my field, however this has been one of the few times that I have been able to merge those old school materials with new school technology. Teaching environmental science is all about unplugging students from their hectic multitasked lives and introducing them to a vibrant living ecosystem existing right under their nose. And for many years I felt like the only way to accomplish that was to separate the life of modern technology with that of the natural world. However I have come to realize that technology is not the enemy. You don't have to separate yourself from technology in order to appreciate the outdoors, you just have to find ways that the two can be used together, and that is exactly what this lesson taught me. There are so many occurrences happening in the world of science that without technology we would never know about, let alone see even a fraction of them. This integration of technology into my teaching has been a very positive experience and I will continue to utilize its benefits whenever possible.