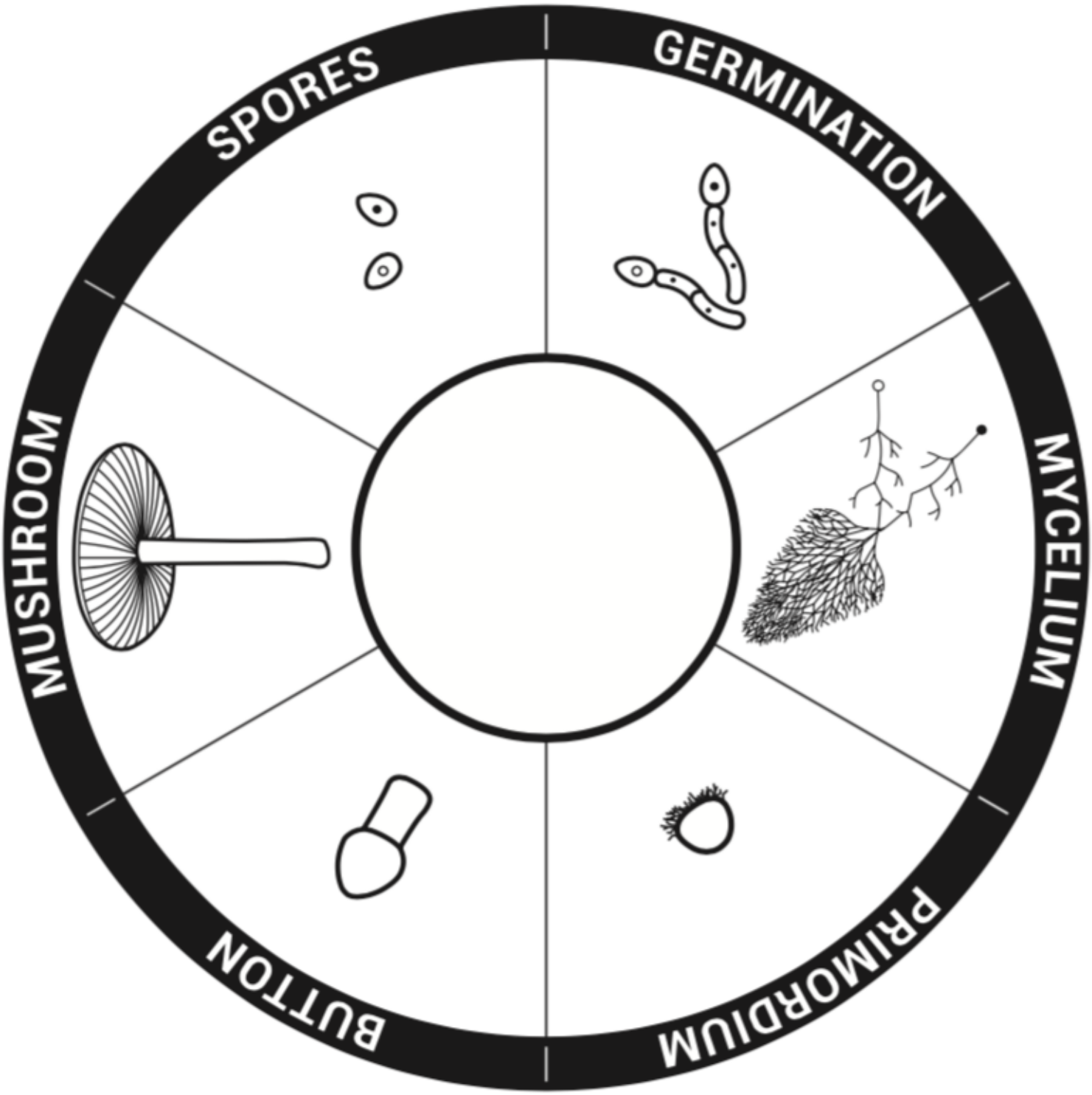

SPORES
GERMINATION
MYCELIUM
PRIMORDIUM
BUTTON
MUSHROOM

Oyster Mushroom Growth Experiment
Investigation Record Sheet (print A3 size)

Instructions: (This record sheet has been designed to record the mushroom growth from 3 cuts in 1 'log').

1. Examine the oyster mushroom 'log' where the cuts have been made to check for mycelium bumps. These will form pinheads which will turn into mushrooms. **Record your observations** daily for 2-4 weeks.
2. Once the pinheads emerge, measure them with a tape measure or ruler once per day, without touching the fruiting body and record the growth measurements (height and width) with comments.
3. In the final stages of the experiment, you can measure the fruiting body growth twice a day, if time permits as the mushrooms will grow very rapidly. If you take measurements twice a day, make sure they are from morning and afternoon and use only the last record for your daily checks.

Weight of mushroom log at the start of the experiment:	Weight of the mushroom log with fruiting bodies at the conclusion of the experiment:
Date:	**Date:**
Weight in grams:	**Weight in grams:**

Oyster Mushroom Growth Experiment Investigation Record Sheet							
Group Name:		**Team Members:**					
Each day record: comments, number of fruiting bodies emerging, cap width (cm), fruiting body height (cm)							
Comment example: *'mycelium more concentrated at the cut compared with day before'*							
Week 1	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Add Dates:							
Fruiting Bodies from cut 1	**e.g. Record:** Observational Comments: Number emerging: Cap width (cm): Fruiting body height (cm):						
Fruiting bodies from cut 2							
Fruiting bodies from cut 3							
Week 2	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Add Dates:							
Fruiting bodies from cut 1							
Fruiting bodies from cut 2							
Fruiting bodies							

from cut 3							
Week 3	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Add Dates:							
Fruiting bodies from cut 1							
Fruiting bodies from cut 2							
Fruiting bodies from cut 3							
Week 4	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Add Dates:							
Fruiting bodies from cut 1							
Fruiting bodies from cut 2							
Fruiting bodies from cut 3							

Group Name:		Date of mushroom harvest:	
Weight of Fruiting Clusters			
Fruiting cluster from cut 1	**Fruiting cluster from cut 2**	**Fruiting cluster from cut 3**	**Combined weight:**
Weight in grams:	**Weight in grams:**	**Weight in grams:**	**Weight in grams:**

Oyster Mushroom Log Growth Experiment
Investigation Record Sheet (print A3 size)

Instructions: *(This record sheet has been designed to record the mushroom growth emerging from 1 cut in 1 log).*

1. Examine the oyster mushroom 'log' where the cuts have been made to check for mycelium bumps. These will form 'pinheads' which will turn into mushrooms. **Record your observations** daily for 2-4 weeks.

2. Once the pinheads emerge, measure them with a tape measure or ruler once per day, without touching the fruiting body and record the growth measurements (height and width) with comments.

3. In the final stages of the experiment, you can measure the fruiting body growth twice a day, if time permits as the mushrooms will grow very rapidly. If you take measurements twice a day, make sure they are from morning and afternoon and use only the last record for your daily checks.

Weight of mushroom log at the start of the experiment:	Weight of the mushroom log with fruiting bodies at the conclusion of the experiment:
Date:	**Date:**
Weight in grams:	**Weight in grams:**

Oyster Mushroom Growth Experiment Investigation Record Sheet							
Group Name: **Team Members:**							
Each day record: comments, number emerging (*of fruiting bodies*), **cap width (cm), fruiting body height (cm)** ***Comment example:*** *'mycelium more concentrated at the cut compared with day before'*							
Week 1	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Add Dates:							
Fruiting Bodies from cut 1	**e.g. Record:** Observational Comments: Number emerging: Cap width (cm): Fruiting body height (cm):						
Week 2	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Add Dates:							
Fruiting bodies from cut 1							

Week 3	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Add Dates:							
Fruiting bodies from cut 1							
Week 4	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
Add Dates:							
Fruiting bodies from cut 1							

Group Name:	**Date of mushroom harvest:**
Weight of Fruiting Clusters	
Fruiting cluster from cut 1	
Weight in grams:	

How to set up an Oyster Mushroom Growing Experiment using an oyster mushroom 'log'

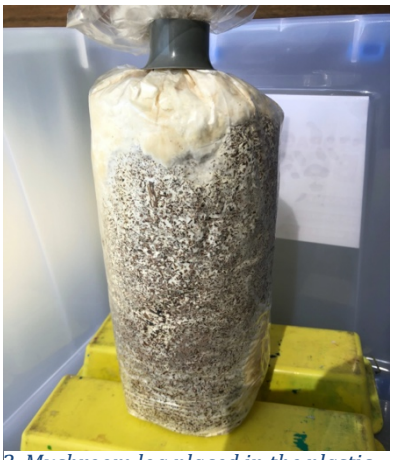
1. An oyster mushroom log. (30cmhigh)

2. Close-up of a mushroom log. The white mycelim is visible through the plastic cover.

1. Cut 3 relatively deep crosses dispersed around the log through the plastic cover. The oyster mushroom fruiting body will grow out from the cut in the plastic.

2. Set up a plastic box with lid to house the mushroom log with these requirements:

    a. The box needs to be at least 30 cm tall and 50 cm wide.
    b. Insert a raised platform like a plate to place the mushroom log on in a vertical position
    c. Fill the box with some water, making sure it is not higher than the platform and does not flood the plate and the log. Ensure the log does not fall into the water or get wet.
    d. Place the mushroom log onto the plate.
    e. Daily mist-spray spray the inside walls of the box (and continue this each day), making sure the log itself is not sprayed. This moisture will allow humidity to build up in the box.
    f. Make sure to provide some air to the fungi by lifting the box lid each day or leaving a small gap in the lid to allow some oxygen to enter.



3. Mushroom log placed in the plastic box vertically. Raised above the water.

Classification of Fungi
Teacher Information Sheet

Classification systems are used by scientists to attempt to organise and group organisms in nature. The **taxonomic classification** is comprised of a hierarchy of groupings of particular features with domain and ***kingdom*** as the highest and broadest rank and ***species*** as the lowest and most specific.

Taxonomic rank: domain, kingdom, phylum, class, order, family, genus, species

Fungi were some of the first organisms to have colonized Earth but were classified into their own kingdom only in 1969, showing just how little we know and care about this primary kingdom of organisms. The genus and species is often subject to change. This is because even though organisms, especially fungi, might look very similar and share the same features, molecular analysis of genetic material often proves otherwise.

The **morphology** of fruiting bodies, their spore print and spore morphology is the initial stage of fungi ID to a species level. The observable features of a fruiting body are used as a guide to identify and group different fungi species. This is a great entry level for students to begin to understand how fungi are classified.

In biology, a phylum comes third in the hierarchy of classification, after domain and kingdom. Organisms in a **phylum** share a set a characteristics that distinguishes them from organisms in another **phylum**. Unless previously known or examined through a microscope, it is difficult to determine which phylum a particular specimen belongs to.

The Kingdom of fungi is classified into **five major phyla**. This teaching unit is focused on exploring macro-fungi (fruiting bodies visible to the naked eye) that can be found in the natural environment. Macro-fungi are classified into two main phyla called **Basidiomycota** and **Ascomycota**. The 'Exploring Fungi' unit focuses on only these two phyla.

The major difference between the two groups is how the spores develop. From these two phyla alone, fungi can be further classified generally into at least 20 different groups. These two phyla contain groups of fungi with particular shapes, which are their distinguishing features eg. mushroom phallic or coral shapes.

Basidiomycota

Basidiomycetes, fungi belonging to the phylum **Basidiomycota**, disperse spores from external structures on their fruiting bodies. They are filamentous fungi composed of hyphae, reproducing sexually via the formation of specialized club-shaped end cells called basidia that normally bear external spores (usually four) on microscopic structures with little horns from which the spores emerge. These specialised spores are called basidiospores.
Basidiomycota includes these groups of fungi: **mushrooms, puffballs, stinkhorns, bracket fungi, polypores, jelly fungi, boletes, chanterelles, earth stars, smuts, bunts, rusts, mirror yeasts.**

Ascomycota

Ascomycetes are fungi in the phylum **Ascomycota**. Ascomycetes **disperse spores from within their fruiting body**. They produce their spores in asci, long shaped encapsulation of spores, called ascospores, much like a pea pod containing individual peas. The majority of fungi belong to the Ascomycota phylum. It is the largest phylum with over 64,000 species.
Ascomycota includes these groups of fungi: **morels, truffles, brewer's and baker's yeast, club and cup fungi.**

Species

A **species** is often defined as the largest group of organisms in which any two individuals of the appropriate sexes or mating types can produce fertile offspring, typically by sexual reproduction.

Innovating with Fungi Experiment Procedure

For each group provide:

- gloves for all students when handling the mycelium
- a bucket with shredded paper
- a spray bottle filled with water
- an oyster mushroom log cut into 3 or 4 sections
- one bowl or container for each student in the group to mix the ingredients in
- a container/mould

Oyster mushroom logs with completed forms. Made from following these experiment steps.

Experiment Steps:

- Get some shredded paper and put it into a bowl
- Then spray the shredded paper with water, just enough so it is moist
- Break up the oyster mushroom log into small bits and mix with the moist paper thoroughly so there is at least 50:50 ratio of paper to broken mycelium bits
- Spray the mix a bit more to make sure it is moist enough, but not dripping wet
- Pack the mould tightly into the moulding container. This is essential as the mycelium has to have contact with the paper in order to grow on and consume it
- Once it is packed, make sure it is closed in a container with a lid if or wrapped in plastic
- With any leftover mixture, try to form balls and wrap them in a plastic bag
- Once the forms are created take photos of them as a record
- Leave the moulds in a cupboard for a week

Monitoring the Experiment:

- Check the moulds once a week by opening the lid, if they are in enclosed containers to give the mycelium some air

- Take photos to document

- Students record what they see and answer these questions:
    - *Can you see mycelium (the white threads) taking over the structure*
    - *How is the mycelium growing?*
    - *What is it feeding on?*
    - *Why does it need water?*

- After several weeks the moulds should become covered with mycelium and should easily pop out of the mould as solid objects

- Bake these objects for at least 2 hours at 120 degrees Celsius or leave them in the sun for several days. Ensure they do not get wet. Never leave them outside overnight as they might get eaten by animals.

- If dried properly, the objects will be very hard to touch and if kept dry, will survive for a long time

- Ask students these questions:
    - *Why does the mycelium have to be completely dried?*
    - *What would happen if it wasn't?*
    - Think about what eventually happens to logs in the forest. *Do they get completely decomposed or eaten by the mycelium?*

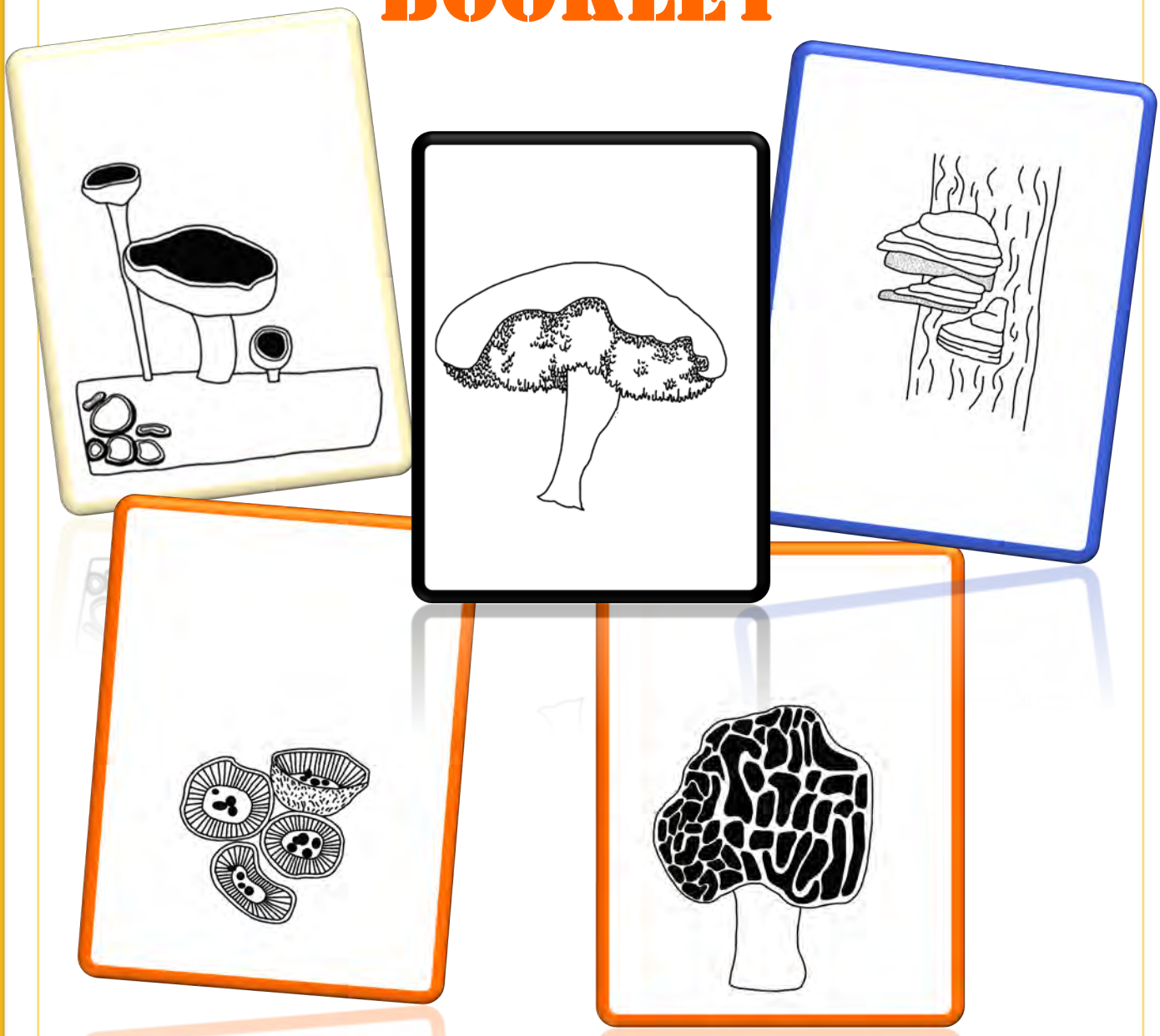
- If the mycelium failed to grow ask students what they think may have happened? ie. *lack of moisture, too dry, not enough paper=not enough food, too much moisture = lack of oxygen*

- Ask students to reflect on the conditions all organisms need to grow and thrive: food, water, shelter, oxygen, warmth etc., specifically in relation to fungi in the environment

- Students may decide to engage in additional research to explore future applications of fungi after experiencing this fungi innovation

Name: Class:

FUNGI MISSION BOOKLET



TOP SECRET

YOUR FUNGI MISSION

Your Brief:

Fungi are mostly hidden out of sight *('out of mind')*, so little is known about the lifecycle and classification of fungi. Many people think that fungi are **only** the fruiting body that pops up from time to time…

Yet as you now know, fungi, especially their mycelium plays a VERY important and beneficial role in our ecosystems. They are also fascinating to study!

You have been given this **Fungi Mission** to educate others about the significance of fungi. Your task is to **communicate** something important about fungi you find interesting and want others to know and understand. This is the only way we can begin to value and protect fungi in the environment.

You could share information about: *the roles fungi have in ecosystems, explain how fungi are classified using observable features, share the lifecycle of fungi, research local fungi further or research innovations using fungi…* The list goes on.

There are many creative ways you can represent and communicate what you know to others; *make a model, record a video, make a poster, diorama, a PowerPoint presentation, write a song or poem, share an experiment, interview a mycologist…*The list goes on!

When completed you are invited to share your Fungi Mission project at a class showcase. Your classroom will be transformed into a **Fungi Conference** and you will be invited to attend as a **guest mycologist** to share your research!

Here's your chance to educate and inspire others to value and begin to discover the hidden world of fungi!

YOUR FUNGI MISSION OUTLINE:

In Brief:

- You are a guest mycologist at a conference
- You are showcasing your fungi knowledge and additional research in the specialist area of your choice
- You have 3 to 5 minutes to present your piece

Step 1:

- Review your current knowledge
- Decide **what** you want to share
- Consider if you need to do more research on your topic

For example you could share information about:

the roles fungi have in ecosystems, how fungi are classified using observable features, the lifecycle of fungi, your own research of local fungi, research into innovations using fungi, or suggest other ideas in consultation with your teacher

Step 2:

- Decide **how** you want to share your information to present at the conference

For example you could:
record a video, make a model, make a poster, create a diorama, create a PowerPoint presentation, share findings from an experiment, create a play, create a dance/drama/movement piece with a spoken word explanation, write a poem or song, interview a mycologist

Step 3:

- Have a meeting with your teacher to discuss your ideas
- Refer to the assessment criteria and planning document to make sure you've included all the things you need!

STEP 1: WHAT I KNOW

What are the most important things you have learnt about fungi?

Why do you think other people need to know about fungi?

STEP 1: WHAT I KNOW

Why are fungi important in an ecosystem?

What aspect of fungi most interests you?

STEP 1: WHAT I WANT TO FIND OUT

What would you like to research further?

As you do your research, record where you found your information

- List the websites, books and other sources below:

STEP 1: WHAT I WANT TO SHARE

Write down your main idea and any key facts that you want to communicate at the Fungi Conference…

ASSESSMENT CRITERIA/ RUBRIC

Name/s:					
Assessment Type: Individual / Pair / Group					
Presentation Style: Diorama / PowerPoint / Model / Poster / Poem / Video / Experiment / Interview / Dance/ Drama/ Play/ Movement Piece / Other:					
	A	**B**	**C**	**D**	**E**
Science inquiry skills: **<u>Communicating</u>** Represent and communicate observations, ideas and findings using formal and informal representations **ACSIS060** **ACSIS071**	Communicates scientific understandings about fungi, clearly and to a high standard. Provides scientific explanations for observations and ideas. Uses correct scientific language.	Communicates scientific understandings about fungi effectively.	With support, communicates scientific understandings about fungi. Suggests explanations for observations. Uses scientific and everyday language and representations.	Makes a statement about fungi. Uses everyday language.	No evidence
Science understanding Biological Science **ACSSU044** **ACSSU072** **ACSSU073**	Shares a comprehensive understanding about an aspect of mycology. Demonstrates integration of unit learning and an extension of biological science understanding through additional research.	Explains an understanding about an aspect of mycology. Demonstrates integration of unit learning and some extension of understanding through additional research.	Shares scientific understandings about mycology learnt during the unit. Adequately restated a scientific understanding learnt during the unit. Attempted to engage in research.	Was able to share scientific understanding about mycology with significant support.	No evidence
Teacher Comments:					