

Add the
MIGHTY MUSHIE

What are Mushrooms? A Focus on Classification

TEACHER GUIDE

LESSON 1

YEAR 7-8

This resource has been developed by:



LESSON 1

What are Mushrooms?

➤ LEARNING AREA/ YEAR LEVEL

Science (Year 7–8)

➤ AUSTRALIAN CURRICULUM CONTENT

Investigate the role of classification in ordering and organising the diversity of life on Earth and use and develop classification tools including dichotomous keys (**AC9S7U01**)

Recognise cells as the basic units of living things, compare plant and animal cells, and describe the functions of specialised cell structures and organelles (**AC9S8U01**)

Analyse the relationship between structure and function of cells, tissues and organs in a plant and an animal organ system and explain how these systems enable survival of the individual (**AC9S8U02**)


Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships (**AC9S7I01, AC9S8I01**)

Select and use equipment to generate and record data with precision, using digital tools as appropriate (**AC9S7I03, AC9S8I03**)

Select and construct appropriate representations, including tables, graphs, models and mathematical relationships, to organise and process data and information (**AC9S7I04, AC9S8I04**)



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> LESSON OBJECTIVE

Students will learn about:

- Where mushrooms are located in the classification system.
- The difference between plant/animal cells and fungi/mushroom cells.
- The structure and function of parts of a mushroom.

ATTRIBUTION, CREDIT & SHARING



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Resources and Equipment

1. **Stimulus 1 – Classification**
2. Access to laptop/tablet
3. **Worksheet 1.1 – Animal, Plant and Fungi Kingdoms**
4. **Worksheet 1.2 – Mushroom Classification**
5. **Worksheet 1.3 – Animal, Plant, and Fungal Cell Anatomy**
6. *Optional – microscopes and slides of animal, fungi and plant cells*
7. Craft materials, e.g. pipe cleaners, pom poms, plasticine, butchers paper and coloured markers
8. Paper plates, scissors, glue, metal pin fastener, ruler, marker
9. **Stimulus 2 – Modelling the Life Cycle of *Agaricus bisporus***
10. **Stimulus 3.1 – Creating a Life Cycle of *Agaricus bisporus***
11. **Stimulus 3.2 – Making a Paper Plate Life Cycle**
12. Punnet of button mushrooms. One mushroom between two students
13. Class set of knives and chopping boards
14. Magnifying glasses
15. **Worksheet 1.4 – Mushroom Anatomy**
16. **Worksheet 1.5 – What are Fungi?**

NOTE: RISK ASSESSMENT IS THE TEACHER'S RESPONSIBILITY

Schools and teachers are responsible for risk amelioration in regard to risks and allergies associated with any kind of practical science work. Software such as www.riskassess.com.au can be used to complete risk assessments.

Background Information

Find more educational material at the [Phenomenon](http://www.phenomenon.edu.au) website. For more interesting listening with your class about mushrooms, listen to the following podcast: [Mushrooms: we know they can improve breakfast, but can they save the world?](#)

Lesson Guide

Students will:

- Learn how to classify different mushrooms using the scientific naming system.
- Create a Venn diagram to compare plants/animal cells to fungi/mushroom cells.
- Draw features of typical mushroom anatomy and label the diagram scientifically.
- Create a life cycle model of a mushroom showing its development over time.

Prior to the start of this lesson, ensure that there is a punnet of mushrooms that can be divided among the students.

➤ STARTER:

Play a game of 20 questions with the students. The object that they have to guess is a mushroom.

Key points for teachers:

- A mushroom is the fruiting body of fungi, not all fungi will produce a mushroom.
- Mushrooms are living.
- They are multicellular.
- They are hetero/saprotrophic.
- They have a cell wall made of chitin.
- They reproduce with spores.
- They are not a vegetable or a fruit.



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> MAIN:

a) Card sorting activity

1. Distribute copies of, or share digitally **Stimulus 1 – Classification**.
2. Images are black and white to reduce the distinguishing features and for clearer printing. The images contain organisms from three kingdoms: Fungi (lichens, mould, and mushrooms), Animals and Plants.
3. Organise students into groups and explain that they need to sort a selection of picture cards of organisms into groups based on a classification system that they decide. Students stick their images onto butchers paper or do a gallery walk around the classroom to view other students' classification systems.
4. After deciding on their system of classification, groups of students are then to share their systems of classification with the rest of the class.
5. Use a class discussion to summarise some of the distinguishing features of each of the three kingdoms.

Answers 

b) Classification of fungi

1. Distribute copies of, or share digitally **Worksheet 1.1 – Animal, Plant and Fungi Kingdoms**.
2. Watch the following multimedia clip '[Kingdoms of Life](#)' from the chapter on animals and plants (1:50–5:12) to distinguish between animals, plants and fungi. As the video is playing, students add features to each of the kingdoms.
3. Once finished, add common and unique features to the Venn diagram.

Answers 

c) Binomial nomenclature

1. Distribute copies of, or share digitally **Worksheet 1.2 – Mushroom Classification**.
2. Students are to conduct research to complete the table for the scientific name of three types of mushrooms. Search using the 'mushroom type' + 'scientific name'.
3. *Note: Genus and species should always be italicised. The first letter of Genus is a capital, species is all lowercase.*
4. Once completed, ask students what they notice about the naming system.
 - The difference only occurs at the 'family taxa'. Higher up the taxonomy they are the same.

Answers 

d) Cell classification

1. Distribute copies of, or share digitally **Worksheet 1.3 – Animal, Plant and Fungal Cell Anatomy**.
2. Students use the '[Cell anatomy](#)' game to discover the anatomy of animal, plant, and fungal cells. Students then complete the worksheet to note some common and unique cell features.
3. Two alternative activities that students could conduct to investigate the features of animal, plant and fungal cells, include:
 - Using a class set of microscopes with slides of animal, plant and fungal cells, students observe cell features and make notes in their journals/notebooks about the common/unique features.
 - Colouring and labelling activity for animal, plant and fungal cells. Worksheets for these can be downloaded from the following weblinks:
 - [Animal](#)
 - [Plant](#)
 - [Fungal](#)

Answers 

e) Life cycle of *Agaricus bisporus*

1. Students learn about the life cycle of a button mushroom. Two possible activities that students can conduct:
 - Use **Stimulus 2 – Modelling the Life Cycle of *Agaricus bisporus*** as a guide to make a model life cycle using craft materials.
 - Cut and stick the images and keywords from **Stimulus 3.1 – Creating a Life Cycle of *Agaricus bisporus*** onto a paper plate by following the instructions from **Stimulus 3.2 – Making a Paper Plate Life Cycle**.

f) Mushroom anatomy

NOTE: RISK ASSESSMENT FOR THIS SECTION IS THE TEACHER'S RESPONSIBILITY

Software such as www.riskassess.com.au can be used to complete risk assessments.

1. Distribute copies of, or share digitally **Worksheet 1.4 – Mushroom Anatomy**.
2. Students complete a scientific diagram of a mushroom. This can be recorded in student notebooks/journals or students can use **Worksheet 1.4 – Mushroom Anatomy**.

WHAT ARE MUSHROOMS? A FOCUS ON CLASSIFICATION

3. Provide one mushroom per pair of students, with a knife and a chopping board.
4. In pairs, students cut a single mushroom in half down the middle. Students use a magnifying glass or microscope to observe all the features of the mushroom:
 - Cap
 - Gills
 - Stem
 - Volva
 - Veil
5. Scientific drawings need to:
 - Be large and clear.
 - In pencil.
 - Not be sketched or shaded.
 - Include a title.
 - Include a scale.
 - Include the Latin name of the specimen, underlined.
 - Include labels.
6. Examples of mushroom anatomy can be found on pages 19–22 of the following resource from the ‘[Exploring Fungi Unit](https://www.aeee.org.au/wp-content/uploads/2020/06/Exploring-Fungi-Resources-8_13.pdf)’ produced by the Australian Association for Environmental Educators: https://www.aeee.org.au/wp-content/uploads/2020/06/Exploring-Fungi-Resources-8_13.pdf.
7. Once completed, hand out copies or display digitally the answers to **Worksheet 1.4 – Mushroom Anatomy**. Students annotate their drawings with the anatomical names of the various parts of the mushroom.

Answers 

> **PLENARY:**

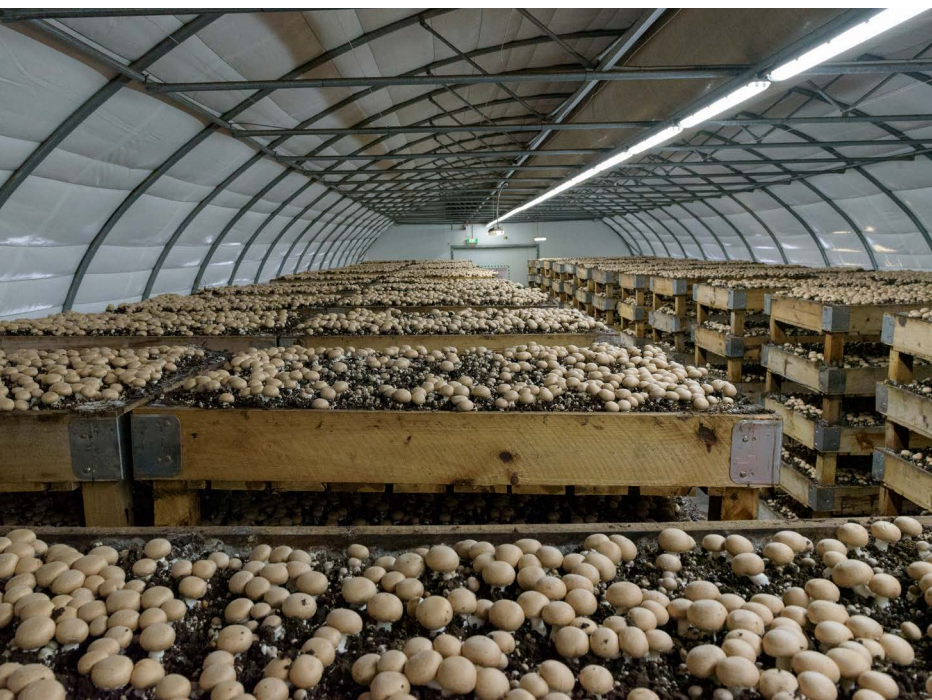
g) Summary

1. Distribute copies of, or share digitally **Worksheet 1.5 – What are Fungi?**
2. Students conduct their own research to answer the questions on **Worksheet 1.5 – What are Fungi?**, or they can write their answers to these in their Science journals.

Answers 

Student Resources

1. Stimulus 1 – Classification
2. Worksheet 1.1 – Animal, Plant and Fungi Kingdoms
3. Worksheet 1.2 – Mushroom Classification
4. Worksheet 1.3 – Animal, Plant, and Fungal Cell Anatomy
5. Stimulus 2 – Modelling the Life Cycle of *Agaricus bisporus*
6. Stimulus 3.1 – Creating a Life Cycle of *Agaricus bisporus*
7. Stimulus 3.2 – Making a Paper Plate Life Cycle
8. Worksheet 1.4 – Mushroom Anatomy
9. Worksheet 1.5 – What are Fungi?



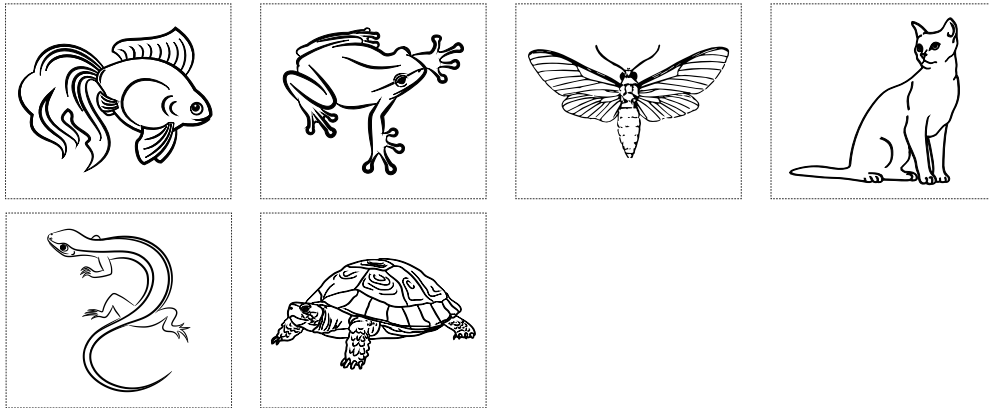
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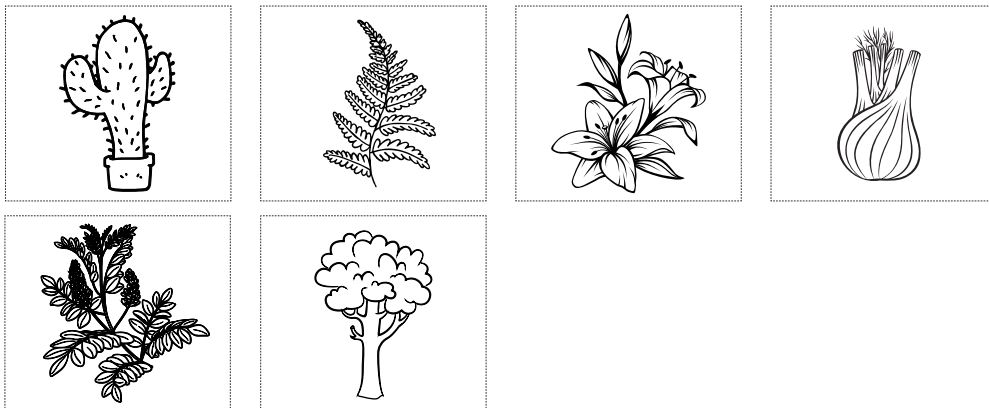
Answers

STIMULUS 1 – Classification

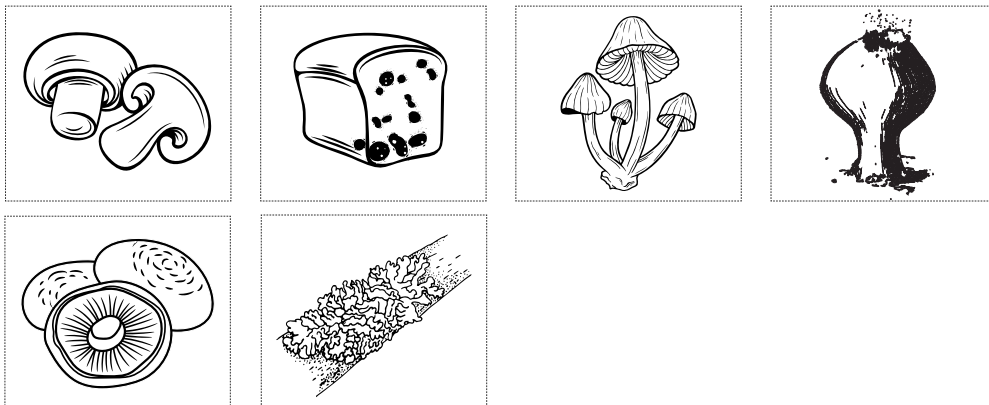
Animal kingdom:



Plant kingdom:



Fungi kingdom:



Answers

WORKSHEET 1.1 – Animal, Plant, and Fungi Kingdoms

Animal kingdom features:

Multicellular, heterotrophic, most reproduce sexually

Plant kingdom features:

Multicellular, autotrophic

Fungi kingdom features:

Can be multicellular or unicellular, heterotrophic, saprotrophic

WORKSHEET 1.2 – Mushroom Classification



Swiss brown



Oyster mushroom



Fly agaric

	Swiss brown	Oyster mushroom	Fly agaric
Kingdom	Fungi	Fungi	Fungi
Phylum	Basidiomycota	Basidiomycota	Basidiomycota
Class	Agaricomycetes	Agaricomycetes	Agaricomycetes
Order	Agaricales	Agaricales	Agaricales
Family	Agaricaceae	Pleurotaceae	Amanitaceae
Genus	<i>Agaricus</i>	<i>Pleurotus</i>	<i>Amanita</i>
Species	<i>bisporus</i>	<i>ostreatus</i>	<i>muscaria</i>

Answers (continued)

➤ WORKSHEET 1.3 – Animal, Plant, and Fungal Cell Anatomy

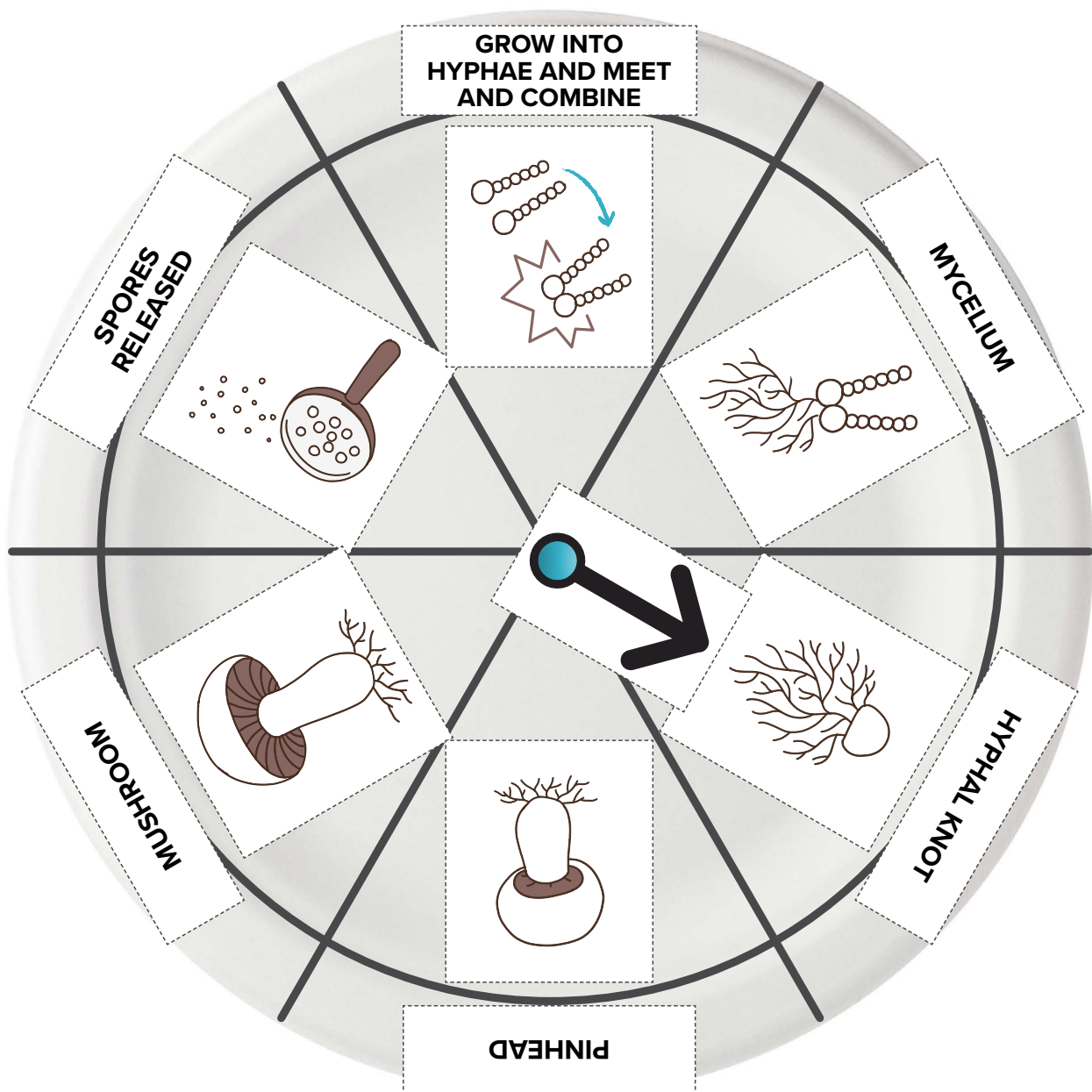
Animal	Nucleus	Control centre of cell
	Cell membrane	Separates the cell
	Mitochondria	Powerhouse of the cell

Plant	Nucleus	Makes ribosomes
	Cell membrane	Made of cellulose, gives cell structure
	Mitochondria	Powerhouse of the cell

Fungus	Nucleus	Breaks down chemicals
	Cell membrane	Made of chitin, gives support
	Mitochondria	Growth centre of tube cell

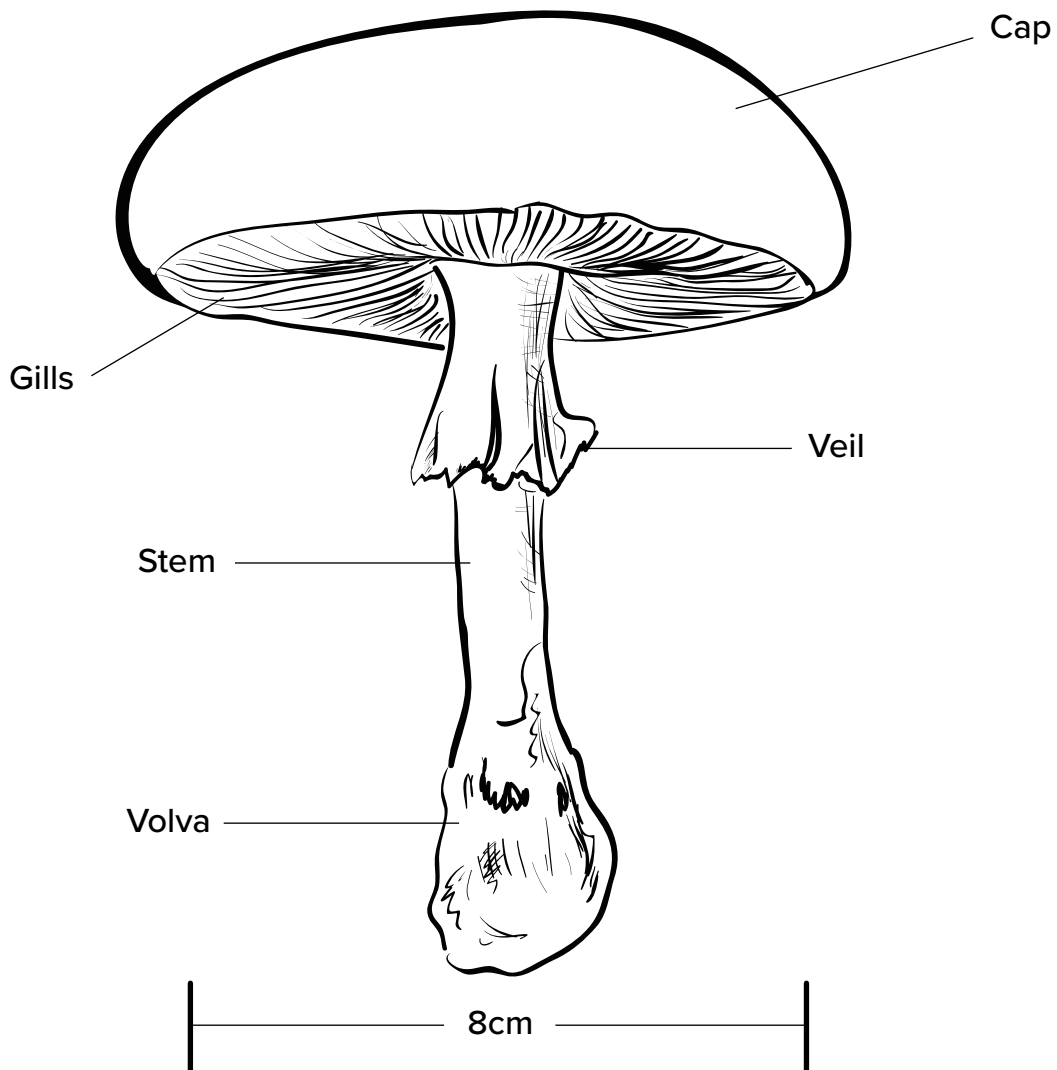
Answers

STIMULUS 3.2 – Making a Paper Plate Life Cycle



Answers (continued)

➤ WORKSHEET 1.4 – Mushroom Anatomy



Answers (continued)

➤ WORKSHEET 1.5 – What are Fungi?

1. **Heterotrophic** means that fungi need to assimilate their food from another source.
Saprotrophic means that the food is digested externally. Fungi can do this in one of three ways: decomposing dead material, feeding on living hosts, or living mutualistically with another organism.
2. Fungi can exist as yeasts, rusts, smuts, mildews, mushrooms, and moulds.
3. Fungi reproduce with spores. They can reproduce sexually or asexually.
4.
 - **Hyphae** are the basic body in the filamentous form of fungi.
 - **Mycellium** is the vegetative part of the fungi and is a visible collection of hyphae.
 - **Mushrooms** are the fruiting bodies of some types of fungi.



References

- Cognito. (2021). Kingdoms of Life - Animals, Plants, Fungi, Protocists, Bacteria and Viruses #1 [YouTube Video]. In YouTube. <https://www.youtube.com/watch?v=Xzy4Ze93G3g&t=110s>
- Cell Anatomy Viewer Game – Play | Ask A Biologist. (n.d.). [Askbiologist.asu.edu](https://askbiologist.asu.edu). <https://askbiologist.asu.edu/cell-viewer-game/play.html>
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