Mini Mushroom Growers

A fungi program for schools

Teacher Guide

Year 5 - 6

Use this Year 5 - 6 teacher guide in conjunction with the supporting resource pack to seamlessly explore and access all lesson materials.

Proudly brought to you by:

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Australian Mushroom Growers' Assoc.

Hort Innovation MUSHROOM FUND

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Overview

Welcome to the Mini Mushroom Growers program, brought to you by the Australian Mushroom Growers' Association. This Australian Curriculum Version 9.0 aligned resource has been designed for students from Foundation to Year 6 to explore the biological nature of fungi, understand the nutritional value of mushrooms, and gain hands-on experience in growing and cooking healthy food. The program centres on *Agaricus bisporus* mushrooms, being the primary mushrooms consumed by Australians: white button, swiss brown, portobello, flat and cup mushrooms.

Program resources for each stage, Foundation - Year 2, Year 3 -4, Year 5 -6 include: a teacher guide and corresponding student-facing slide deck of supporting resources. All lesson materials and links will be contained in the easy to navigate, sequential powerpoint which can seamlessly be used on interactive whiteboards or class devices. A student digital interactive has been designed to supplement the program and reinforce student's learning.

Lesson Structure

Each teacher guide consists of five comprehensive lessons to cater to varying student abilities, offering hands-on activities and engaging interactive resources. Lesson content can be tailored to meet the specific needs of students. Each of the lessons within the Mini Mushroom Growers program has been designed around the areas of - mushroom: *classification, nutrition, and consumption*. Whilst it is recommended to complete all five lessons in sequence, each can be taught in isolation.

The student-facing resource packs include lesson slides to assist with lesson preparation, and content is provided in a sequential, easy-to-follow format. Instructions on how to use the supporting powerpoint as a whole class, in small groups or with individual devices are included in each teacher guide. **Please download and view in powerpoint**.

The student digital interactive, based around the Mini Mushroom Growers program key messages will supplement the program's content and resources allowing students to learn, check their understanding and apply their learning. It is recommended that students complete the game after the lesson.

Summary Of Key Messages

The content of the Mini Mushroom Growers program has been based on current research and Australian mushroom industry-recommended findings:

Mushroom classification

Mushrooms are fungi and not a vegetable, and grow in a unique way.

Mushrooms are a superfood

Fungi have a unique combination of nutrients and are vital to our diets.

Mushroom consumption

Students grow, harvest and cook their own mushrooms.

Level	Year 5
Learning Area	Science
Strand	Content Descriptors
Science understanding: Biological sciences	AC9S5U01 Examine how particular structural features and behaviours of living things enable their survival in specific habitats.
Learning Area	Health and Physical Education
Personal, social and community health: Making healthy and safe choices	AC9HP6P09 Investigate different sources and types of health information and how these apply to their own and others' health choices.

Level	Year 6
Learning Area	Science
Strand	Content Descriptors
Science understanding: Biological sciences	AC9S6U01 Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions.
Learning Area	Health and Physical Education
Personal, social and community health: Making healthy and safe choices	AC9HP6P10 Analyse how behaviours influence the health, safety, relationships and wellbeing of individuals and communities.

Level	Year 5 and 6
Learning Area	**Design and technologies**
Knowledge and understanding: Technologies context Food and fibre production; Food specialisations	AC9TDE6K03 Explain how and why food and fibre are produced in managed environments.
	AC9TDE6K04 Explain how the characteristics of foods influence selection and preparation for healthy eating.
Learning Area	**Science**
Science inquiry: Communicating	AC9S5I06, AC9S6I06 Write and create texts to communicate ideas and findings for specific purposes and audiences, including selection of language features, using digital tools as appropriate.

Cross-Curriculum Links

Sustainability

Systems SS1: All life forms, including human life, are connected through Earth's systems (geosphere, biosphere, hydrosphere and atmosphere) on which they depend for their wellbeing and survival.

Systems SS2: Sustainable patterns of living require the responsible use of resources, maintenance of clean air, water and soils, and preservation or restoration of healthy environments.

Systems SS3: Social, economic and political systems influence the sustainability of Earth's systems.

General capabilities

- Critical and Creative Thinking
- Personal and Social Capability

Lesson Information

Assessment Options

Choose from the following options: as needed.

Assessment for learning

- Monitor understanding in class discussions and questioning.

Assessment as learning

- Teacher observations and teacher feedback through tracking sheets.

Assessment of learning

- Collect work samples, assessment tasks, self and peer assessment.
- Use the student digital interactive to assess students' learning.

Differentiation

Differentiation will be embedded in each lesson to ensure:

- **Support** for students.
- **Structural changes** such as scaffolding to assist students.
- **Extension** to encourage students to build upon their learning.

Connecting Home and School

- Communicate with families that their child is participating in the Mini Mushroom Growers program.
- If applicable, add Mini Mushroom Grower themed tasks to class homework activities.
- Classroom lessons will be connected to real life experiences through key messages, vocabulary, conversation starters and fun activities.
- Share Recipes - Australian Mushroom Growers. Encourage families to visit the website for more recipes that you can cook with the family at home.

Lesson Overview

Lesson 1: Mushrooms are Fun-guys

Lesson Overview

In this lesson, students will learn that mushrooms (fungi) are different to plants and vegetables and belong to a separate biological kingdom.

Learning Intention

In this lesson, we will learn about fungi, the unique sixth biological kingdom, including *Agaricus bisporus*, their function in the ecosystem and the dangers of foraging.

Success Criteria (suggested)

I will know I am successful when I can:

- Explain that mushrooms are fungi and belong to a separate biological kingdom, distinct from plants and vegetables.
- Identify and name the key parts of a mushroom (e.g. cap, gills, stem).
- Describe the basic stages of a mushroom's lifecycle.
- Name at least two types of edible *Agaricus bisporus* mushrooms (e.g. white button, portobello).
- Explain why it is dangerous to touch or eat wild mushrooms.

Guiding Questions

- Are mushrooms plants?
- What do you know about mushrooms?
- Can you name an edible mushroom?

Vocabulary

- Cap
- Ecosystem
- Edible
- Forage
- Foraying
- Fungi
- Gills
- Hyphae
- Mushroom
- Mycelium
- Pinning
- Spawn
- Spores
- Stem
- Substrate
- Veil
- Volva

Differentiation

Support:

- Provide sentence starters or a graphic organiser for students to use when creating their mushroom lifecycle infographic.
- Provide a glossary with simplified definitions and images for the vocabulary words.
- Pair students with stronger literacy skills with those who need more support for research and discussion activities.

Challenge:

- Challenge students to research and present on a specific type of less common or unique fungi.
- Have students design their own experiment to test a variable affecting mushroom

growth (e.g., light, moisture, substrate type) if a mushroom growing kit is available.

- Dangers of Foraging – Foray, don't Forage! Students use CANVA to create marketing posters to educate peers on the dangers of foraging.

Resources

To complete all activities in this lesson, you will need:

- Year 5 -6 Supporting Resource Pack.
- Student pre survey.
- Sticky notes.
- Videos:
  - Fungi: Why Mushrooms Are Awesome | Biology for Kids
  - Time Lapse: Mushrooms Growing

Lesson 1: Content

Introduction

Student pre survey:

- As a class, complete the AMGA student pre survey.

Are mushrooms plants?

- Show students a real mushroom purchased from the supermarket or an image of a mushroom. Have students use the Think-Pair-Share strategy to answer the question: Are mushrooms plants?
- Ask the guiding question: What do you know about mushrooms? Record student responses on a class chart.
- Identify and name the parts of a mushroom.

Fungi: Why Mushrooms are awesome

- As a class watch the video Fungi: Why Mushrooms Are Awesome | Biology for Kids and write key facts on sticky notes. Discuss new findings and add these to the class chart.

Body

The lifecycle of a mushroom.

- Watch and discuss the video Time Lapse: Mushrooms Growing.
- Review the key facts on the powerpoint about the stages in the mushroom lifecycle.

What is Mycelium?

- As a class brainstorm 'What is Mycelium?' Record responses on a class chart.
- Investigate the important role mycelium plays in the mushrooms life cycle using the information on the powerpoint.
- Pose the question: What new information can we add to our class chart - 'What is Mycelium?'

Students use the template to create an infographic on the stages in the mushroom's life cycle and identify the important role

mycelium plays in the mushroom life cycle.

What is *Agaricus bisporus*?

- Pose the question to students: Can you name an edible mushroom?
- Introduce students to the term: *Agaricus bisporus*.
- In small groups, students research and create a fact card on one of the following types of mushroom: white button, cup, flat, Swiss brown or portobello.

Conclusion

Don't touch! Don't eat!

Review the key messages around the dangers of foraging for mushrooms.

- **Not all mushrooms are safe to eat:** Explain that some mushrooms found in the wild can make you very, very sick, and some can even be deadly.
- **Only eat mushrooms from the shop:** Emphasise that the only mushrooms that are safe to eat are the ones bought from a shop.
- **Never touch or pick wild mushrooms:** Teach students to never touch or pick any mushrooms they see growing outside, even in their own garden. Explain that some dangerous mushrooms can cause problems just by being touched.
- **If you see a wild mushroom, tell a grown-up:** Encourage students to tell an adult if they see any mushrooms growing in the wild, so the adult can make sure everyone stays safe.
- **Mushrooms are special living things:** You can also briefly mention that while some wild mushrooms are dangerous for humans to eat, they are still important parts of nature for other animals and plants. Mushrooms that ARE safe to eat, are very healthy and delicious.

Fungi, the sixth biological kingdom

- Review the fascinating fungi facts on the powerpoint.
- In pairs students use the template to create a 'Kingdom Fungi ID card.' They will research, identify and illustrate the unique characteristics that classify fungi as their own biological kingdom, distinct from plants and animals. This task can be completed over several lessons.

Option: Spore prints activity

- Demonstrate or complete the activity with the class. Sit the cap of a cup or flat mushroom onto paper or aluminium foil overnight. Use a magnifying glass or microscope if available to view the dropped spores.

Lesson 2: Let's Visit a Mushroom Farm

Lesson Overview

In this lesson, students will learn how mushrooms grow in the wild versus how mushrooms grow on a farm.

Learning Intention

In this lesson, we will explore the technology used on a mushroom farm, review advancements in technology, and visit a mushroom farm virtually or in person.

Success Criteria (suggested)

I will know I am successful when I can:

- Identify different technologies used on a mushroom farm.
- Explain the problems these technologies solve.
- Describe what I have learned about mushroom production.

Guiding Questions

- How is technology used on a mushroom farm?
- What problems do these technologies solve, and are they always useful?
- What have you learned about mushroom production?

Vocabulary

- Agriculture
- Ag tech
- Climate change
- Consumer
- Enterprise
- Food supply chain
- Food tech
- Innovation
- Manufacturing
- Revolutionise
- Sustainability

Differentiation

Visit a mushroom farm. Contact the AMGA to discover if a local mushroom farm will host a farm tour.

Support:

- Provide scaffolds, sentence starters and one to one support for independent, group and research tasks.
- Students draw and label what they saw and learned on their mushroom farm visit.

Challenge:

- How do mushrooms grow in the wild, versus how do mushrooms grow on a farm? Students research and complete a T-chart with 'Growing in the wild' on one side and 'Growing on a farm' on the other, or a venn diagram to show their findings.
- Investigate: mushrooms in space. Why are scientists shooting mushrooms into space? Can Mushrooms Grow in Space?

Resources

To complete all activities in this lesson, you will need:

- Year 5 - 6 Supporting Resource Pack.
- Videos:
  - Farm to Plate: Educating Food Industry Professionals about Australian Mushrooms
  - Mushrooms - Making Mushroom Compost
  - Mushroom growing and picking
  - Mushrooms - Packhouse & Distribution
  - Australia for Agriculture 4.0
  - Why are scientists shooting mushrooms into space?
  - Can Mushrooms Grow in Space?

Lesson 2: Content

Introduction

Farm to plate

- Brain dump - 2 minute challenge. Have students write down everything they know so far about mushrooms in 2 minutes. They may include words, facts and diagrams. As a class, share what they have written to create a class written or digital brainstorm of prior knowledge.
- Students watch the video: Farm to Plate: Educating Food Industry Professionals about Australian Mushrooms
- Refer to the powerpoint to discuss the steps involved in growing mushrooms.

The three steps to mushroom production.

- Students are divided into 3 groups. Each group is to watch one of the videos on the key elements managed in mushroom farming. They will then report back to the class to explain their key element in the management of mushroom farming and how and why growers monitor this.

1. Making Mushroom compost (substrate) Mushrooms - Making Mushroom Compost (remind students that mushroom compost is called substrate).
2. Mushroom growing and picking Mushroom growing and picking
3. Mushroom packing and transporting Mushrooms - Packhouse & Distribution

Body

Technology in agriculture

- Review the key vocabulary that will be covered in the video. (see Powerpoint Lesson 2: Vocabulary)
- As a class watch the video Australia for Agriculture 4.0 and write key facts covered around technology in agriculture.
- On a sticky note students write any questions they have as they watch the

video.

- As a class, share and record the key facts and discuss student questions.

What harvesting technology is used on a mushroom farm?

- Research task: In groups, students use the video links to explore how technology improves mushroom growing, identify problems it solves, design their own solution and present their findings in a digital slide. (N.B. Extra class time will be needed on this task).
  - Tilting shelves
  - Draw system
  - MycoSense
  - Robots Picking Mushrooms

Conclusion

Let's visit a mushroom farm.

- Students visit a mushroom farm virtually or in person.
- Following the farm visit students write down three things they observed about how mushrooms are grown. They then connect each observation to something they learned in class about mushrooms. Students share one observation and connection with the class verbally or in a short written reflection.

Lesson 3: There's Mush-room for Sustainability

Lesson Overview

In this lesson, students will learn about sustainability in mushroom production, and why 'Fungi are a Future Food'.

Learning Intention

In this lesson, we will explain the link between mushroom production, sustainability and food security.

Success Criteria (suggested)

I will know I am successful when I can:

- Explain the link between mushroom production, sustainability, and food security.
- Describe the concept of a circular economy and its four stages: reduce, reuse, recycle, and regenerate.
- Identify how circular farming practices are applied in mushroom production.
- Discuss how mushrooms can contribute to food security.

Guiding Questions

- What challenges do we face around food security?
- How does a circular economy benefit our planet?
- How could mushrooms assist with food security?
- How are fungi being used in other ways?
- Why are mushrooms a sustainable food source and a future food?

Vocabulary

- Future food
- Recycle
- Reduce
- Regenerate
- Reuse

Differentiation

Support:

- Pair students up with a supportive 'buddy' during activities.
- Allow students to use diagrams or orally present their work rather than through written text.

Challenge:

- Students design a short marketing campaign to encourage others to eat more mushrooms, highlighting their sustainability and 'future food' qualities.
- Research and investigate other ways fungi are being used.

Resources

To complete all activities in this lesson, you will need:

- Year 5 - 6 Supporting Resource Pack.

- Videos:
  - 14 Introduction to Food Security
  - Built With the Cleanest Technology on Earth: Nature
  - The Fungi in Your Future
  - The Mylo Driver Bag features the world's first mushroom-based leather!

Lesson 3: Content

Introduction

Food Security

- As a class brainstorm what the term 'Food Security' may mean.
- Unpack the United Nations definition of food security. Focus on explaining and discussing the key terminology in the definition.
- Students individually complete the PMI chart (Plus, Minus, Interesting) as they watch the video 14 Introduction to Food Security, then share their findings with the class.
- Class discussion: What challenges do we face around food security?

Body

Sustainable food production

- Pose the question: Why do we need sustainable food production?
- As a class, encourage students to draw links between their learnings about Food Security and sustainable food production.

Circular economy.

- Introduce students to the idea of a circular economy by explaining its four stages: reduce, reuse, recycle and regenerate. Discuss examples of these four stages.
- Pose the question: How does a circular economy benefit our planet?
- As a class, brainstorm how the four stages (reduce, reuse, recycle, and regenerate) link and apply to circular farming or circular agriculture.

Circular agriculture.

- Review the elements of circular farming and how it links to mushroom farming
- Look at an example of best practice in mushroom farming (Great video resource coming soon. Reach out to schools@amga.asn.au for link).
- Identify and discuss examples of circular farming from the video.

Using the Think-Pair-Share strategy students discuss: How could mushrooms assist with food security? Encourage students to make connections between what they have learnt about food security and circular farming.

Circular mushroom farming.

- In groups students create posters to show the circular story of sustainable *Agaricus*

bisporus production. Include: composting, sustainable farm practices and substrate.

Conclusion

- In small groups, students discuss why mushrooms are a sustainable food source and a future food.
- Each group orally presents their points to the class, highlighting key facts about mushroom sustainability and their benefits as a future food.

Optional activity: How are fungi being used in other ways?

- Students are divided into 3 groups. Each group is to watch one of the videos on how fungi are being used in other ways. They will then orally share their findings with the class.

1. Built With the Cleanest Technology on Earth: Nature - scientists are researching how mycelium could be used to create new materials, like metal and plastic.
2. The Fungi in Your Future - making leather out of mushrooms.
3. The Mylo Driver Bag features the world's first mushroom-based leather! - creating high end fashion out of mushrooms.

Lesson 4: Mushrooms are a Superfood

Lesson Overview

In this lesson, students will learn that fungi have a unique combination of nutrients that are different to fruits and vegetables.

Learning Intention

In this lesson, we will learn how the nutritional properties of mushrooms impact our health, and why mushrooms are the only non-animal source of Vitamin D.

Success Criteria (suggested)

I will know I am successful when I can:

- Explain at least three reasons why mushrooms are good for our bodies.
- Identify how mushrooms help our immune system.
- Describe why Vitamin D from mushrooms is important for our health.

Guiding Questions

- What makes some foods 'superfoods'?
- How do vitamins and minerals help our bodies?
- Why is it important to have a strong immune system?
- How can we get Vitamin D from food?

Vocabulary

- Antioxidants
- Chitin
- Digestion
- Ergothioneine
- Fibre
- Gut health
- Immunity
- Minerals
- Nutrients
- Vitamins

Differentiation

Support:

- Offer sentence starters or a word bank for discussions and written responses.
- Pair students with stronger literacy skills with those who need more support for research and activity completion.

Challenge:

- Students create card games where they match the nutrient to the health benefit.
- Challenge students to research other 'superfoods' and compare their nutritional benefits to mushrooms.

Resources

To complete all activities in this lesson, you will need:

- Year 5 - 6 Supporting Resource Pack.
- Videos:

  - Vitamins and Minerals for Kids | Learn the difference
  - Your Ultimate 2-Minute Guide to Tanning your Mushrooms
- Sticky notes.

Lesson 4: Content

Introduction

What are superfoods?

- Pose the question: What makes some foods 'superfoods'?
- Discuss as a class that superfoods are foods packed with nutrients that help our bodies stay healthy.

What are vitamins and minerals?

- Watch and discuss the video: Vitamins and Minerals for Kids | Learn the difference. What new things did you learn about vitamins and minerals?
- Discuss as a class what vitamins and minerals are and why our bodies need them.

Body

Your immune system

- Introduce what the immune system is and how mushrooms are a unique superfood that offers many health benefits.
- Discuss the ways mushrooms help our immune system.

Mushrooms and vitamin D.

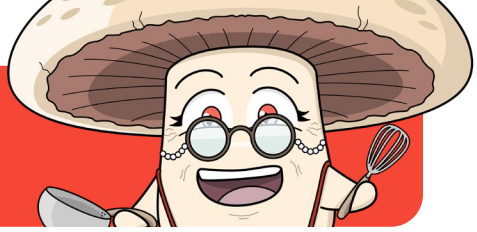
- As a class, discuss what vitamin D is and why it is important.
- Students are given a sticky note to record 3 key facts about mushrooms and vitamin D as they watch the video Your Ultimate 2-Minute Guide to Tanning your Mushrooms.
- Students share their key learnings and create a class information chart.

The ABCDE Health Benefits of Mushrooms

- Identify and discuss the nutritional benefits of mushrooms using the 'ABCDE' framework - antioxidants, B vitamins, Chitin, vitamin D and ergothioneine.
- Discuss the link between the nutritional benefits of mushrooms and a strong immune system.

Conclusion

- Mushrooms quiz: Complete the interactive quiz as a class to review key learnings about mushroom nutrition and immunity.
- In groups, students design and present an infographic poster or digital slideshow on one of the ABCDE health benefits of mushrooms. Encourage them to include information on how mushrooms can be paired with other foods for even more nutritional benefits.
- Discuss how students can add more mushrooms to their meals at home to boost their health and immunity. Encourage them to share what they've learned with their families.



Lesson 5: Mini Mushroom Chefs

Lesson Overview

Students will dive deeper into flavour pairings, mushroom varieties, and texture to design a dish that suits a specific meal occasion. They'll collaborate to create a recipe book or cooking video.

Learning Intention

In this lesson, we will learn to understand flavour, including umami, by exploring mushroom varieties and textures. We will collaboratively design a unique mushroom dish for a specific meal occasion.

Success Criteria (suggested)

I will know I am successful when I can:

- Describe the nutritional benefits of including mushrooms in a healthy diet.
- Work collaboratively with peers to prepare and present a mushroom-based dish.

Guiding Questions

- What is umami?
- How can pairing mushrooms with other foods increase the nutritional benefits of a dish?

Vocabulary

- Bitter
- Senses
- Savoury
- Texture
- Umami

Differentiation

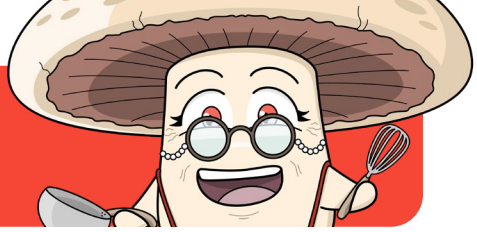
- Host a mushroom breakfast for the school to celebrate 'Mini Mushroom Growers.'
- Host a 'Mushroom Festival' – inviting parents and other year levels to visit the classroom to see the mushrooms growing, view the mushroom learnings and enjoy a mushroom dish prepared by the students.

Support:

- For the Cooking activity, provide pre-measured ingredients and step-by- step visual instructions to make it easier for students to participate safely and successfully.
- Pair students who may need extra support with peers who can offer assistance and encouragement during activities.

Challenge:

- Design a mushroom dish for the school tuckshop: Visit the school tuckshop to learn about healthy eating rules, and design a dish to sell. Make posters to promote the dish.



- Investigate the unique nutritional properties of different Agaricus bisporus mushroom varieties.

Resources

To complete all activities in this lesson, you will need:

- Year 5 - 6 Supporting Resource Pack
- Videos:
  - How to Sauté Mushrooms
- Websites:
  - Recipes - Cooking with kids
  - Recipes - Cooking at home
- Participation certificates

Lesson 5: Content

Introduction

What is umami?

- Pose the question: What is umami?
- Students individually research and define the term umami. Identify an example of a food with an umami taste.
- Create a class definition and a list of examples of umami foods.
- Explain that there are five different tastes our tongues can recognise: sweet, sour, umami, bitter and salty. Display the names of the five different tastes and have students identify foods that belong to each of the taste groups.

Tasting station

- Set up a tasting station with cooked *Agaricus bisporus* mushrooms and examples of foods that represent different tastes (e.g. sweet: strawberries, grapes; savoury: cheese, a small piece of plain cracker; salty: salty crackers; bitter: a tiny piece of lemon peel - be cautious with bitter tastes for young children and check for any allergies, **Do not include any foods that any student in the class is allergic to**).
- Students record and describe the foods and compare the taste of the cooked mushrooms to these other familiar tastes.
- Have students hypothesise why certain foods have specific tastes and discuss how different tastes interact e.g. If I eat something sour how does that affect the taste of the next food I eat?

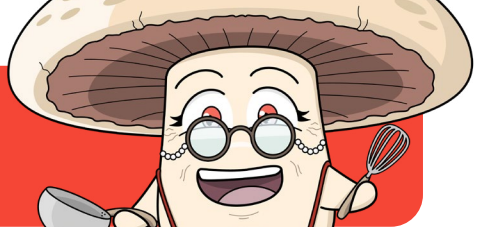
Body

Mushroom Pairings

- Pose the question: How can pairing mushrooms with other foods increase the nutritional benefits of a dish?
- Explore and discuss the benefits of pairing mushrooms with other foods and how adding mushrooms to our diet, not only increases the flavour of what we eat but also adds extra nutrients.

Create a mushroom dish.

- In small groups students 'create a new flavoursome, highly nutritious mushroom



dish'. Discuss with the students the task requirements and which specific meal occasion the dish is for, how they can take into account flavour pairings, different mushroom varieties that can be included.

- Include an optional 'Chef's challenge' to the task: How can the dish be adapted to catering to a particular dietary restriction e.g., vegetarian, gluten-free.
- Students create a marketing plan for their healthy dish which highlights the nutritional components they have learnt about.

Conclusion

Class cook up

- With adult supervision groups cook their mushroom recipes for an end of unit mushroom feast.
- Following the cook up, students develop a marketing plan for their dish, including a name, a brief description highlighting its nutritional benefits, and a target audience.

Optional:

- With adult supervision students cook simple mushroom recipes from the AMGA website. Recipes - Cooking with kids.
- Encourage families to cook and try mushrooms at home. Create a simple family mushroom recipe from the Recipes - Cooking at home website - draw or write about it.

Participation certificates

- Congratulations! You are now a Mini Mushroom Grower.
- Print off certificates for the students.

Teacher feedback survey

- Use the links on the resource pack to complete the AMGA teacher feedback survey and the student post-survey.