STUDENT WORKSHEETS

WORKSHEET 1A: SUSTAINABILITY - WATER CONSERVATION

Group members:

Your mission is to become the ultimate experts on how water conservation is used by carrot farmers. As a group you will be required to complete this worksheet in preparation for the class presentation and discussion.

Objective: Explore how water conservation affects carrot production.

Instructions: Each person in your group should look at one of the suggested research sites and take some notes. Then answer the questions as a group.

Water Use in Carrot Farming

In Australia, carrot production requires a significant amount of water. Efficient water management is crucial, especially in areas prone to drought. Techniques like drip irrigation help save water while ensuring that carrots receive the moisture they need.

Resources

- WaterWise: helping farmers reduce the water footprint of high value crops - CSIRO: https://www.csiro.au/en/research/natural-environment/water/WaterWise
- Drip Irrigation Systems in Australia: https://kg2.com.au/drip-irrigation-systems-in-australia/
- Drip Irrigation Systems. Netafim: https://www.netafim.com.au/drip-irrigation/
- Irrigating carrots for profit and environmental management | Agriculture and Food: https://www.agric.wa.gov.au/water-management/irrigating-carrots-profit-and-environmental-management

WORKSHEET 1A: SUSTAINABILITY - WATER CONSERVATION

1. What are three water conservation techniques used in carrot farming?

2. What is drip irrigation? Explain how it helps conserve water.

3. What role does soil moisture monitoring play in water conservation?

WORKSHEET 1B: SUSTAINABILITY - SOIL HEALTH

Group members:

Your mission is to become the ultimate experts on how soil health is managed by carrot farmers. As a group you will be required to complete this worksheet in preparation for the class discussion.
Objective: Explore how soil health supports carrot production.
Instructions: Each person in your group should look at one of the suggested research sites and take some notes. Then answer the questions as a group.

Soil Health in Carrot Farming

Healthy soil is essential for growing high-quality carrots. It provides nutrients, retains moisture, and supports root development. Practices such as crop rotation and adding organic matter can improve soil health.

Resources

- Sustainability - Kalfresh: https://www.kalfresh.com.au/sustainability/
- Carrot Soil Profile: How to Fix Your Soil to Grow Healthier Carrots | Gardening Know How: https://www.gardeningknowhow.com/edible/vegetables/carrot/healthy-carrot-soil.htm
- Organic Carrots Farming: Cultivating Health and Sustainability - Global Sustainable Food Security Initiative: https://globalfoodsinitiative.org/organic-carrots-farming-cultivating-health-and-sustainability/
- Healthy soil: what is it and why is it important? | Charles Sturt Uni: https://insight.study.csu.edu.au/healthy-soil/
- Save our soils: Why dirt matters | Pursuit by the University of Melbourne: https://pursuit.unimelb.edu.au/articles/save-our-soils-why-dirt-matters

WORKSHEET 1B: SUSTAINABILITY - SOIL HEALTH

1. List three practices that can improve soil health.
2. Explain why healthy soil is vital for carrot (and all vegetables) growth.
3. What are some of the issues with soil on agricultural land?

WORKSHEET 1C: SUSTAINABILITY - INTERGRATED PEST MANAGEMENT (IPM)

Group members:

Your mission is to become the ultimate experts on how integrated pest management is implemented by carrot farmers. As a group, you will be required to complete this worksheet in preparation for the class discussion.

Objective: Explore how integrated pest management supports sustainable carrot production.

Instructions: Each person in your group should look at one of the suggested research sites and take some notes. Then answer the questions as a group.

Integrated Pest Management in Carrot Farming

Integrated Pest Management (IPM) is an eco-friendly approach to pest control. It combines biological, cultural, physical, and chemical tools to minimise economic, health, and environmental risks.

Resources

- Root and tuber vegetables. AUSVEG: https://ausveg.com.au/knowledge-hub/crop-protection/root-and-tuber-vegetables/
- Carrot / Agriculture: Pest Management Guidelines / UC Statewide IPM Program: https://ipm.ucanr.edu/agriculture/carrot/#gsc.tab=0
- The Spruce. (2024). *18 Carrot Companion Plants to Add to Your Crop*. thespruce.com: https://www.thespruce.com/carrot-companion-plants-8613089
- *Optimize Your Carrot Growth: Implementing Integrated Pest Management*. Veggie Knowledge: https://veggieknowledge.com/how-to-implement-integrated-pest-management-for-carrots/

WORKSHEET 1C: SUSTAINABILITY - INTERGRATED PEST MANAGEMENT (IPM)

1. What is Integrated Pest Management (IPM)?

2. What are three key principles of Integrated Pest Management?

3. List some of the main pests and diseases that threaten carrot crops.

WORKSHEET 1D: SUSTAINABILITY - CROP ROTATION

Group memembers:

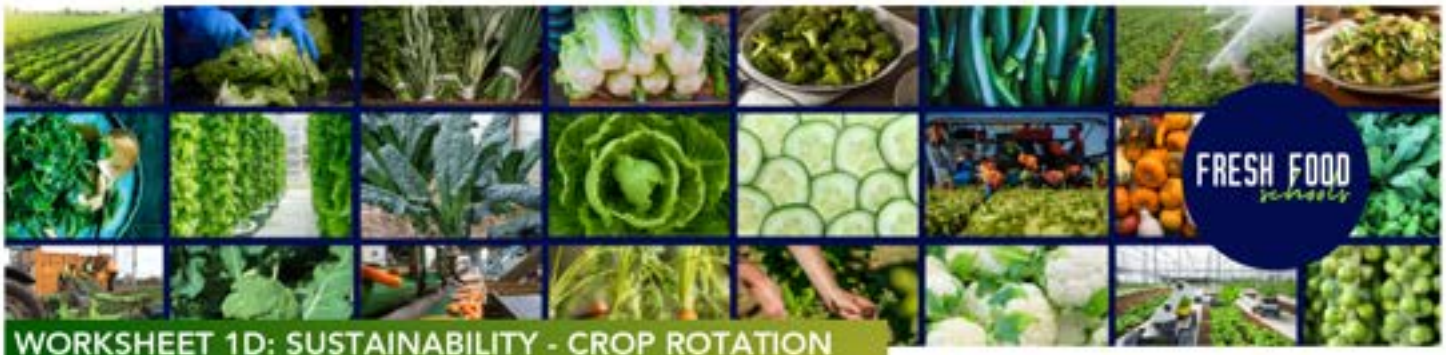
Your mission is to become the ultimate experts on how crop rotation is utilised by carrot farmers. As a group, you will be required to complete this worksheet in preparation for the class discussion.
Objective: Explore how crop rotation supports sustainable carrot production.
Instructions: Each person in your group should look at one of the suggested research sites and take some notes. Then answer the questions as a group.

Crop Rotation in Carrot Farming

Crop rotation is the practice of growing different crops in the same area across seasons. It helps manage soil fertility, reduce pest and disease problems, and improve overall farm productivity.

Resources

- Comprehensive Guide to Crop Rotation Principles, Benefits & Best Practices: https://kg2.com.au/crop-rotation-guide-principles-and-benefits/
- Four Bed Crop Rotation | Sustainable Gardening Australia: https://www.sgaonline.org.au/
- Crop Rotation - Gardening Australia: https://www.abc.net.au/gardening/how-to/the-vegie-guide-crop-rotation/9375784



WORKSHEET 1D: SUSTAINABILITY - CROP ROTATION

1. What are three benefits of crop rotation in carrot farming?
2. How does crop rotation help manage soil fertility?
3. What crops are typically rotated with carrots and why?
4. List an example of the different crops a carrot farmer might grow over a four year crop cycle.

WORKSHEET 2: CREATING AN INFOGRAPHIC

Group members:

By following these steps, you'll create an engaging and informative infographic on sustainable agriculture practices. Remember to cite your sources and have fun with the design process.

STEP ONE - PLANNING YOUR INFOGRAPHIC

Research your topic thoroughly

- Water Conservation
- Soil Health
- Integrated Pest Management (IPM)
- Crop Rotation

Organise your information

- Create a brief outline for each topic.
- Identify key facts, statistics, and interesting points.
- Think about how to present complex ideas simply.

STEP TWO - DESIGNING YOUR INFOGRAPHIC

Layout and structure

- Choose vertical or horizontal layout.
- Divide your infographic into clear sections for each topic.
- Use a logical flow of information from top to bottom or left to right.

Visual elements

- Select a colour scheme (3-4 colours) to represent each of the sustainability practices.
- Use icons or simple illustrations to represent each topic.
- Include charts or graphs to display statistics or comparisons.

WORKSHEET 2: CREATING AN INFOGRAPHIC

STEP THREE - CONTENT CREATION

Crop rotation

- Define crop rotation.
- List benefits (e.g., improved soil health, pest control).
- Show a simple diagram of a 3-4 year rotation cycle.

Water Conservation

- Highlight techniques like drip irrigation and mulching.
- Include a statistic on water savings.
- Use a simple illustration of water-saving methods.

Integrated Pest Management (IPM)

- List natural pest control methods (e.g., companion planting, biological control).
- Include an illustration of beneficial insects.
- Mention the importance of biodiversity.

Soil Health

- Explain why soil health is important.
- List issues that might exist.
- Include some solutions to improve soil quality.

TEXT AND TYPOGRAPHY

Visual elements

- Use clear, readable fonts.
- Keep text concise – use bullet points where possible.
- Include a title and brief introduction.

WORKSHEET 2: CREATING AN INFOGRAPHIC

CREATING A DIGITAL INFOGRAPHIC - FREE ONLINE TOOLS

Canva (www.canva.com)

- User-friendly interface.
- Wide range of templates and design elements.
- Free account available for students.

Piktochart (www.piktochart.com)

- Offers infographic templates.
- Easy drag-and-drop functionality.
- Free plan available.

Venngage (www.venngage.com)

- Provides infographic templates.
- Simple editing tools.
- Free account option.

STEPS TO CREATE YOUR INFOGRAPHIC

Venngage (www.venngage.com)

1. Choose your preferred tool and create an account.
2. Select a template or start from scratch.
3. Add your researched content to each section.
4. Insert relevant images, icons, and charts.
5. Adjust colours and fonts to match your theme.
6. Review and refine your design.
7. Download or share your completed infographic.

FINAL TIPS

- Keep your design clean and uncluttered.
- Use consistent styling throughout.
- Proofread your content carefully.
- Ask a classmate or teacher for feedback before finalising.

APPENDIX 1:
VIDEO RESOURCE SUMMARY

WESTERN AUSTRALIAN CARROTS: *FROM PADDOCK TO YOU*

https://www.youtube.com/watch?v=Fv_dbu_6k20

CARROT PRODUCTION STAGES FROM VIDEO

- HARVEST – Early morning
- PREWASH – Sand/dirt removal
- POLISHING – Dual polishers
- CARROT SIZING – 1st stage mechanical
- HYDRO COOLING – Fast and effective
- 2ND COLD BATH – Preparing for boxing
- MANUAL SORTING – Quality control and size
- PACKING – Ready for shipping

Sustainable Processes

Carrot tops left in the field to be plowed into the soil to provide nutrients to the soil.

Pre-washing to save water.

Use of hydro cooler.

Packed in cardboard boxes.

APPENDIX 2:
SAMPLE INFOGRAPHIC LAYOUT