

Drones and UAV's in Primary Industries production-

Support document

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Department of
Primary Industries





Resource background

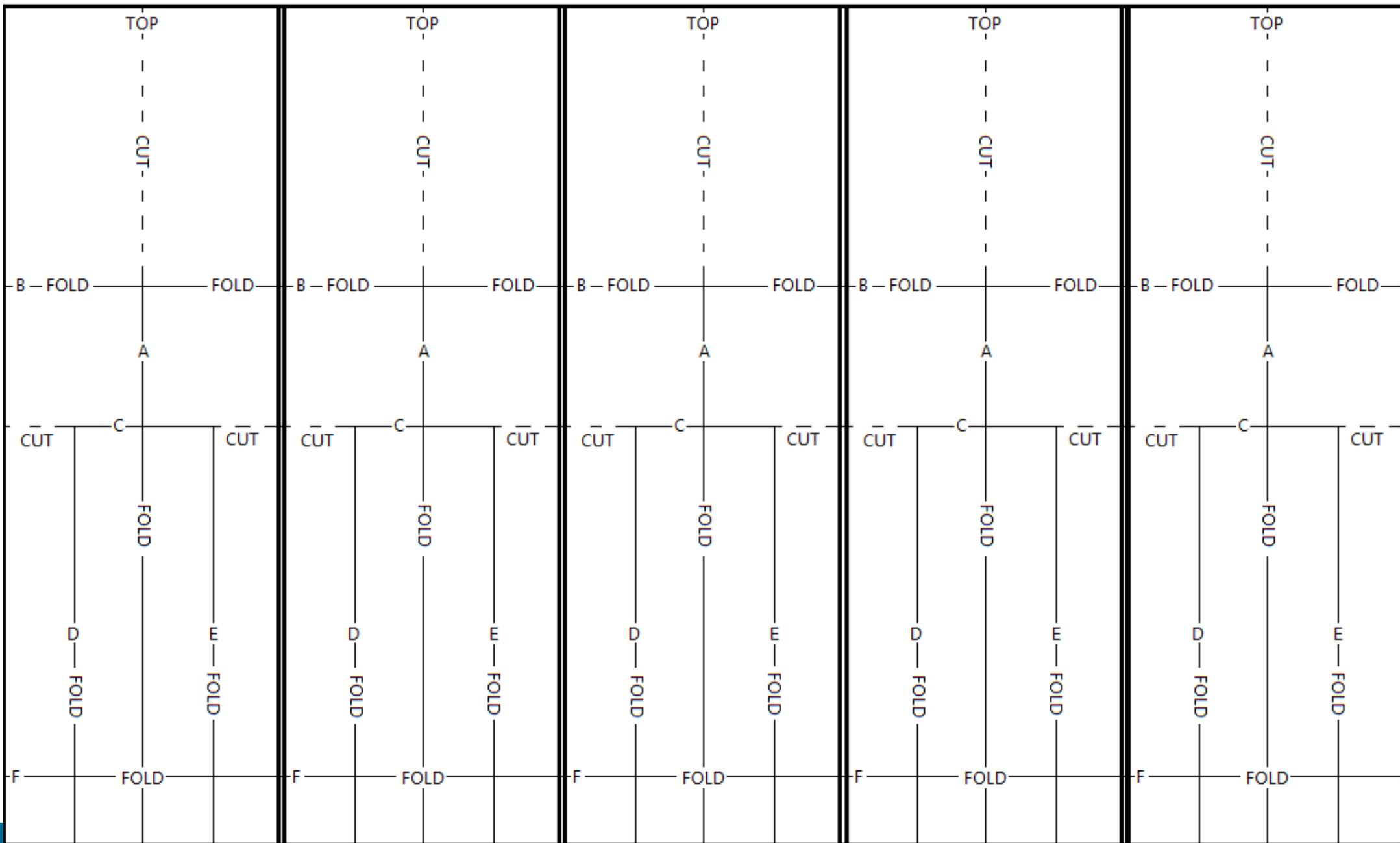
The following worksheets and templates support learning for the NSW DPI [Drones and UAV's in Primary Industries production](#) resource. The resource is designed for Stage 4-5 learners and mapped to the NSW Agricultural Technology Years 7-10 Syllabus (see end of document for syllabus map). These resources however could be adapted for STEM learning or Stage 4 Technology Mandatory syllabus.

Activity 2- How does a rotor work?

The following templates p2-3 support Activity 2- Drone mission from the '[PPT Drones and UAV's in Primary Industries production](#)'.

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Activity 3- Drone Mission

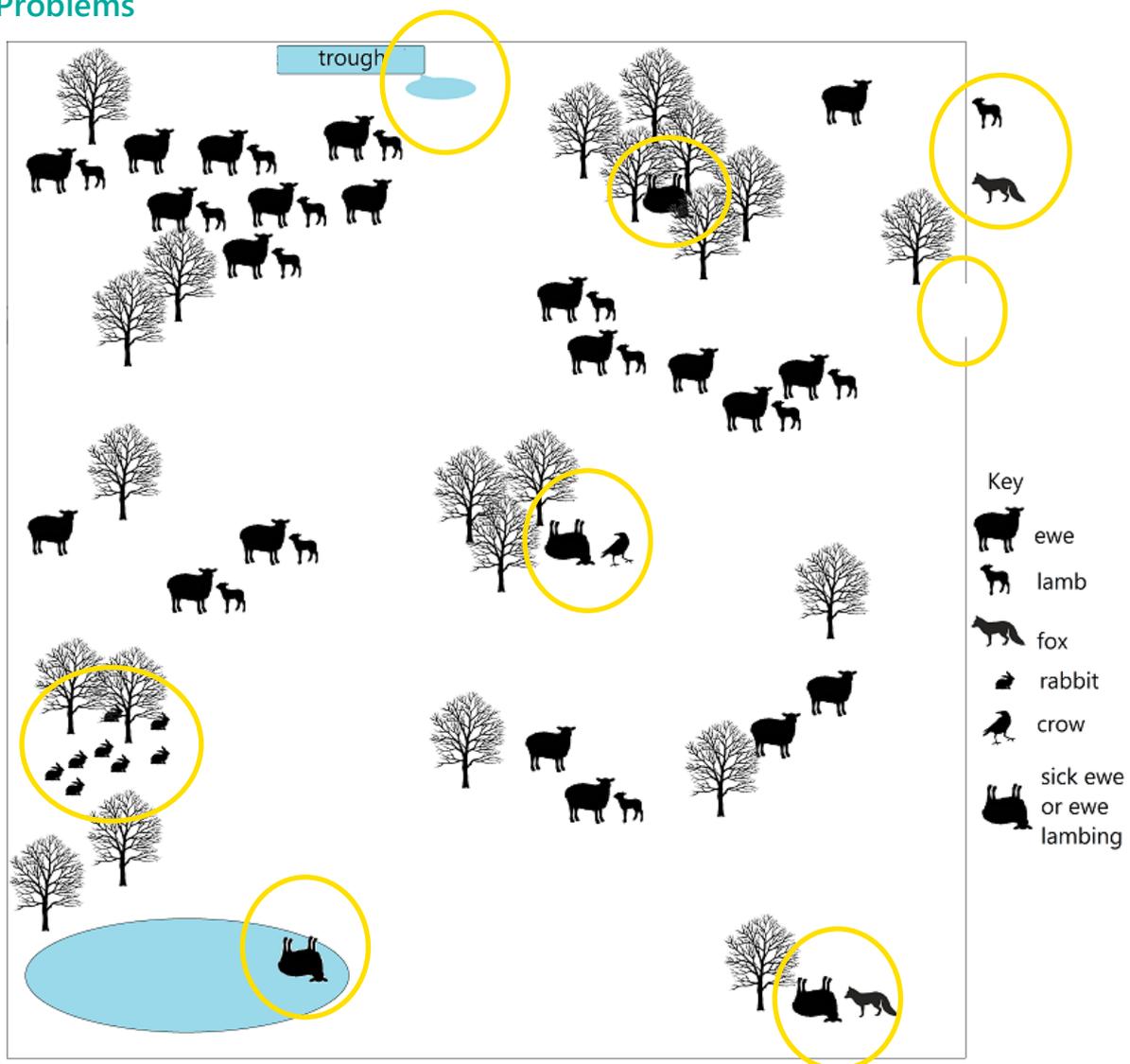
The following worksheet supports Activity 3- Drone mission from the '[PPT Drones and UAV's in Primary Industries production](#)'.

Background

Imagine that you are a farmer, and you raise sheep. Your sheep that have started lambing, are grazing on a large, hilly paddock surrounded by fences.

The area is so large that it takes hours to monitor the entire area, even with horses or all-terrain vehicles. You have just purchased a drone to help monitor the lambing ewes. You have programmed a flight plan and have looked at the footage from the morning's flight. There are some problems.

Problems



Mission

Create the shortest flight path to further photograph each problem, so you can properly plan the gear to bring.

Group roles

You must work as a group to make accurate directions (code) for the 'blindfolded drone' to accurately 'fly' around the course and take photos of the 8 problems.

Within your group select roles:

- One group member to give instructions
- Drone (blindfolded)
- Whole group working together to 'code' flight plan

You must use correct programming and flight terminology e.g. hover, yaw, pitch, roll, clockwise.

Flight path requirements

- Drone mission may start at any location along the perimeter of the paddock
- The drone must take-off and land at the same location.
- The drone must stay within the fence line (perimeter)
- The 'drone' must pass over each of the 8 problem areas, 'hover' and take a photo (drop a 'photo' card)
- Accuracy of photos (photo card drops), flight plan and quickest time will be used to determine the most successful team in the drone mission.

Terminology and hints

- **Yaw** is the rotating of the drone either clockwise or counter clockwise on a vertical axis.



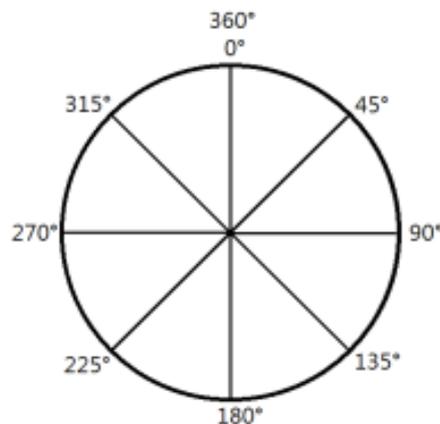
- **Pitch** is the movement of the drone either up or down on a lateral axis.



- **Roll** is the rolling movement of the drone sideways, either to the left or the right, on a longitudinal axis



| Flight Commands | | |
|------------------------|--------------------------|------------------------|
| Take-off | Fly Forward (__ steps) | Roll right (__ steps) |
| Land | Fly backward (__ steps) | Roll left (__ steps) |
| Yaw right ____ degrees | Pitch down | Hover ____ seconds |
| Yaw left ____ degrees | Pitch up | Take photo |



Your flight plan code

| Step | Instruction |
|------|-------------|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |
| 7. | |
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| 31. |

Stage 5 Agriculture syllabus

Learning across the curriculum- general capabilities

- Critical and creative thinking
- Information and communication technology capability
- Literacy
- Numeracy
- Personal and social capability

Outcomes

Content

AG5-8 evaluates the impact of past and current agricultural practices on agricultural sustainability

AG5-9 evaluates management practices in terms of profitability, technology, sustainability, social issues and ethics

AG5-11 designs, undertakes, analyses and evaluates experiments and investigates problems in agricultural contexts

AG5-12 collects and analyses agricultural data and communicates results using a range of technologies

AG5-13 applies Work Health and Safety requirements when using, maintaining and storing chemicals, tools and agricultural machinery

AG5-14 demonstrates plant and/or animal management practices safely and in collaboration with others

Core A: Introduction to Agriculture

- Identify and apply ethical and WHS practices, for example: (ACTDEP050)
 - demonstrate correct methods of operating and maintaining agricultural tools, equipment and machinery
 - demonstrate safe and ethical handling of animals
- investigate procedures in the management of plants and animals within animal welfare guidelines (ACTDEP048, ACTDEP050)

Core A: Plant Production 1

- research an agricultural issue relevant to the plant enterprise chosen and propose possible solutions, for example: (ACTDEK044)
 - rust in wheat
 - soil-borne diseases
 - changing consumer markets
 - food quality
 - rising cost of inputs
- investigate technologies that assist in record-keeping and monitoring of the plant enterprise and its performance (ACTDEK047)
- collect accurate evidence and record relevant data relating to the plant enterprise, for example:
 - growth rates
 - yield
 - climatic data through growing period
 - management operations, eg fertilising, watering, weeding
- select and use appropriate software to analyse and present agricultural data related to the plant enterprise (ACTDEP052)
- identify and apply ethical and WHS practices, for example: (ACTDEP050)
 - demonstrate correct methods of operating and maintaining agricultural tools, equipment and machinery
- manage and monitor crops to raise/grow products on the school farm, for example: – grow a crop from seed to harvest

Core A: Animal Production 1

- identify opportunities provided by the agricultural sector, both as an employer and as a user of products
- plan and undertake procedures in the management of an animal enterprise within animal welfare guidelines (ACTDEP048, ACTDEP050)

Core B: Agricultural systems and management

- identify opportunities provided by the agricultural sector, both as an employer and as a user of products

Core B: Plant Production 2

- evaluate the impact of current technologies on sustainability (ACTDEK041, ACTDEK044, ACTDEP051)
- draw conclusions from evidence and the analysis of data (ACTDEP051)
- formulate a solution to an agricultural issue (ACTDEP048)
- examine and analyse data from a range of sources, for example:

- – use primary and secondary data, eg government websites
- conduct a hazard identification and risk assessment task when undertaking a plant production activity (ACTDEP050)

Core B: Animal Production 2

- select and use technologies to assist effective animal management practices, for example: (ACTDEK047)– electronic ear tags to identify animals
- – automated bail feeding systems – sheep auto drafters – rumination collars – virtual fences – water point weigh systems
- identify emerging technologies that affect sustainability, for example: (ACTDEK041) – genetic engineering, eg sex selection of embryos – electronic pasture meters – electronic monitoring of sheep
- draw conclusions from evidence and analysis of data, for example: – determine the best feed for optimal growth rates – determine the suitable stocking rate
- formulate a solution to an agricultural problem (ACTDEP048)
- examine and analyse data from a range of sources, for example: – primary and secondary data, eg experiments, websites
- conduct a hazard identification and risk assessment task when undertaking animal husbandry tasks (ACTDEP050)