

Results

1. At the end of the experiment, measure the height of each plant (i.e. each stem) in each pot. (You could line the pots up grouped according to treatment and photograph them at this time.) The amount of plant growth can be determined by cutting the stems off at the soil surface.
2. Dry the plant material in paper bags (one bag per pot, with stems cut to fit) in a warm spot for a week. Weigh the total amount of dried plant material produced in each pot.
3. Prepare a table of results, grouping the results for each variable.
4. Work out an average for each treatment by adding the results for the four pots together and dividing by four. Do this for each variable.
5. Ask students if they can see any obvious differences between the treatments.
6. Consider the field situations that the different variables represent:
 - **Variable 1:** Represents a patch of soil on which cattle dung was dropped but removed after 14 days by harrowing so that only the dung fluids were absorbed by the soil.
 - **Variable 2:** Represents a dung pat on soil with no dung beetles about. It receives some added nutrients from dung during pot watering.
 - **Variable 3:** Represents a dung pat that is dispersed by dung beetles on soil.
 - **Variable 4:** Represents the actual soil without any dung or beetles.
7. Did the dung beetles have a noticeable effect on the amount of plant growth?
8. Ask students to break into groups and discuss the questions in points 5 and 7. When they have reached conclusions about the experiment, the results and photographs can be compiled into a class report.

Life and Living

- 2.3 Students illustrate changes which take place in the course of the life span of living things (including the growth of a plant and animal).
- 3.1 Students draw conclusions about the relationship between features of living things and the environments in which they live.
- 3.3 Students describe some interactions (including feeding relationships) between living things and between living and non-living parts of the environment.

Students in a city area could use this activity to photosequence pots from activity 8. Photosequencing is better for recording sequential shots of dung dispersal (e.g. day of set up, one day after, two days after, three days after, etc).

9 Photosequence of dung dispersal

Focus

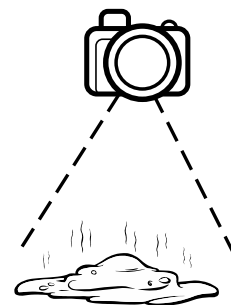
Investigating

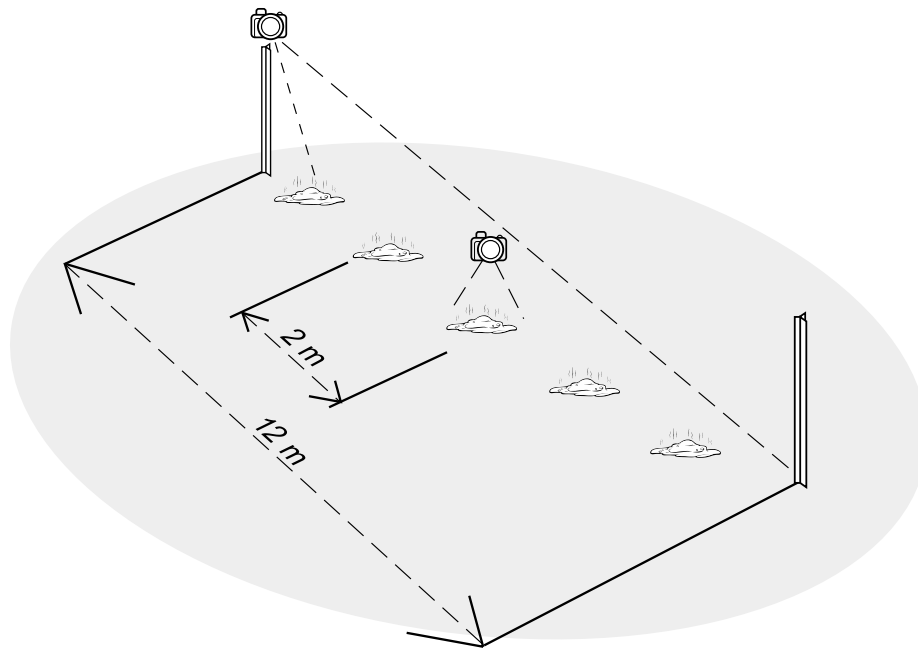
Aim

To help students to investigate dung dispersal in the field.

Materials

- Camera and film or a digital camera
- 2 star pickets or steel posts
- Sledge hammer or post driver
- Compass or north-south reference points
- Spade
- 10 litre bucket (for dung)
- Trowel
- Disposable gloves
- Dung measure (1-2 litre ice-cream container)
- 5 pats (placed on soil by hand)
- Card labels (for pats)





Sequence | Over a series of lessons in the summer months. (Time the activity to coincide with noticeable dung beetle activity in the field.)

To help monitor the activities of dung beetles—including how they help with plant growth in pastures—it is important to keep a record. One way you can do this is by taking a sequence of photographs over time. If your camera has a date feature on it this will help to keep the photographs in order; otherwise, record the date on a card and keep it with the photograph.



Photosequence procedure

(Source: Adapted from *PastureWatch Field Activities*, p.33)

1. Drive in two star pickets or posts 12 metres apart in a north–south direction on your chosen site in, or near, a cattle paddock. These posts should be permanent as they mark a standard site where pats are lined up and photographs are taken. Avoid areas with tall grass.
2. Use the spade to shave the grass off the soil surface (to 250 mm diameter) so each pat is 2 metres apart. This is to facilitate beetle activity. Use the trowel to fill the dung measure and then place five pats on the prepared sites.
3. Label pats for continuity (e.g. card with pat number and date for photographs).
4. Photograph each fresh dung pat close up, for detail, and the group of pats from a distance, with one of the pegs as a rest for the camera.
5. Conduct this activity over a number of days, weeks, or months, depending on the time available. In time, only close-up photographs may be possible due to pasture growth.
6. Compile photos in an album and record observations of the site over the course of the experiment. Observations could include:
 - the size of the pat or the extent of dung dispersal
 - any change in adjoining plant growth
 - other changes to the pats and surrounding area.