9 SCIENCE BIOLOGY ASSIGNMENT

DUNG BEETLES

Name:_____

Form:_____

Teacher:_____

Due date:_____

Aim: This assignment will allow you to find out about dung beetles and their importance to Australia's environment.

ANSWER KEY

IMPORTANT INFORMATION

Plagiarism

- This assignment is to be done individually, not with a partner.
- You must write in your own words not copy sentences word for word from another student or another source.
- Plagiarising = instant zero on assignment and you will have to re-do it.

How to reference a book:

Tsutaya, K. (2011). Crafting with Cat Hair: Cute Handicrafts to Make with Your Cat. Philadelphia: Quirk Books.

Author's last name, first letter of first name. (Year of publication). Title of book. Place of publication: name of publisher.

How to reference a web site:

Rice, C. (2013). Retrieved February 8, 2014 from www.bbc.co.uk/news/technology-25103362

Author's last name, first letter of first name. (Year of publication). Date you retrieved the information, website

Assessment policy

Have sick note/legitimate reason from parent = new negotiated due date.
Assignment not submitted on due date and no sick note from parents = -20% mark
Assignment not submitted on new negotiated due date = -40% mark
+ Letter home to parents
+ Must attend academic completion to complete assignment

OR

Submit assignment to student services before academic completion date and academic completion not necessary.

Academic completion not attended= zero on assignment + Saturday detention

If you know that you cannot submit your assignment on the due date, let your teacher know BEFORE the due date (email them if you are not in school) or just email them your assignment the night before.

ANSWER KEY

Dung beetles comprehension

Dung beetles are insects whose young eat animal dung (faeces). There are many different species. The adult beetles buy the dung under the soil and lay their eggs in it. This removes dung from the soil surface and takes away a food source for bushflies.

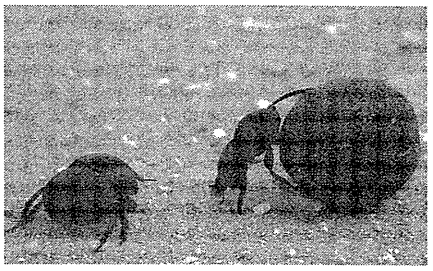

Figure 1

Bushflies also lay their eggs in animal dung. Bushflies cause disease in animals such as sheep. Dung beetles are widely used throughout Australia as biological control agents for bushflies. You can see some dung beetles in figure 1 rolling some dung.

Some agricultural scientists thought that there may be another benefit of dung beetles. The scientists proposed that the beetles could be making the soil more fertile when they buried the dung. They predicted that these nutrients could make the soil better for growing the plants that are used to feed farm animals. The scientists conducted an experiment on a cattle farm in Merton, Victoria, to test their proposition (hypothesis).

The experiment used a grid of rectangular 'plots' measuring 50cm by 50cm covered by a metal mesh cage. Each site had three sets of plots.

You can see the plots in figure 2.

Each plot was given one of three treatments: 'dung and beetles', 'dung only' or 'control' (no dung or beetles). There were 54 plots in total, 18 for each treatment.

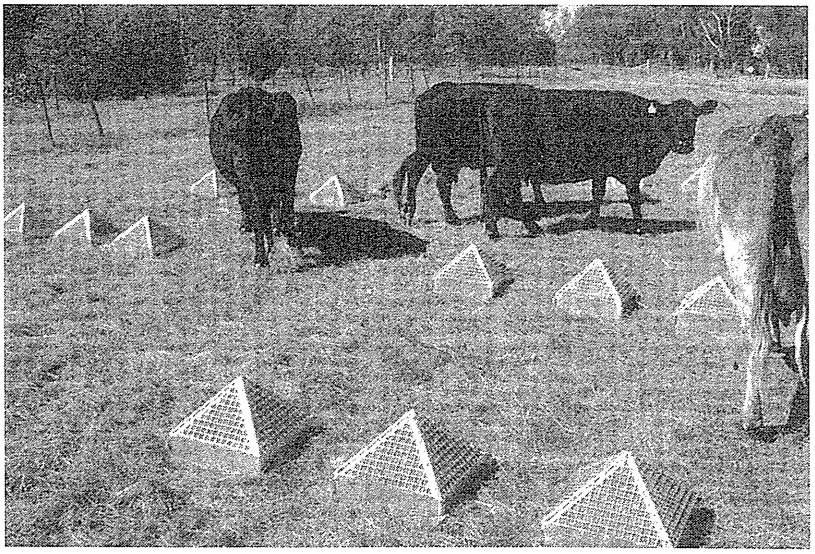

Figure 2

Early results

The experiment is still continuing, but some results have been found. The plants in each of the 54 plots were cut off at ground level and placed in bags. The plants were then dried and weighed. The data collected in shown in the table.

Treatment	Average dry weight per plot (g)
Control	90.95
Dung	122.95
Dung and beetles	148.23

① **Research questions: answer the following questions based on the information above.**

1. **State** the hypothesis that the scientists were testing in their experiment. (1 mark)

The dung beetles add more plant nutrients into the soil by burying the dung, & this makes the plants grow better. (something similar, no 'I think' etc)

2. **State** the dependent variable in this experiment (1 marks)

Average dry weight of plant

3. **State** the independent variable in this experiment. (1 mark)

Dung beetle or no dung beetle

4. **Explain** the use of the control plots in this experiment. (2 marks)
(Minimum of two sentences).

- Allowed scientists to show that either the dung alone, or the (1) dung & beetles, improved the pasture growth compared with no treatment. (1)

5. **Evaluate** whether the results support the scientists' hypothesis. (2 mark)

(Minimum of two sentences).

The results do support the hypothesis (1) because the best pasture growth was in plots that had beetles & dung.

6. **Explain** two uses of dung beetles. (1 mark)
(Minimum of two sentences).

- useful for controlling bushflies (0.5)
- Allowed plants to grow better by making soil more fertile (0.5)

*The following questions are **not taken** from the comprehension.*

7. **Explain** why you think the introduction of the dung beetle has been a scientific success in the control of bush flies. (2 marks)
(Minimum of two sentences).

- Has reduced population of bushflies. (1)
- Has removed food source for bushflies. (1)

8. **List** some of the advantages of using dung beetles on Australian farms. (1 marks)
(Minimum of two advantages).

- Makes soil more fertile - regrouth of grass (food for livestock)
- Reduces number of bushflies that cause trouble for livestock (diseases/infections)
- Helped water infiltrate soil
- Aerate soil

Any 2, 0.5 marks each

9. **Describe** what first led scientists to look at dung beetles as a control for bush flies in Australia. (1 marks)

Scientists saw that in Africa, (& Hawaii) areas where there were dung beetles had less bush flies than areas where there were no dung beetles.

	Cane toad	myxomatosis	Calicivirus
origin	South America - Brazil, Venezuela, Peru, Columbia (2) Central America - Mexico	Uruguay	
What were scientists trying to combat	- To destroy French Cane Beetle & Greyback cane Beetle which eats the roots of sugar cane & the larvae can kill or stunt the growth of the plants. (2) - Chemicals were tried to kill the beetles but wasn't good as quite destructive.	- Too many wild rabbits in Australia - introduced myxomatosis to control numbers	Introduced in an attempt to control rabbit population.
Research done & led scientists to use control	Scientists saw that cane toads in Hawaii were getting rid of cane beetles. - Australian Bureau of (3) - Sugar experimental stations imported about 100 toads from Hawaii to Cairns - they saw that they bred quickly & were hardy & decided to release more. - Scientists saw they had no predators in Australia	- Field-tested in Australia in 1938. on Wardang Island.	
Issues with scientific method	- Cane toads eat more than just beetles - was not considered - what would eat the cane toads? - Cane toads could not reach the beetles. (2)	- Rabbits remaining alive least affected by disease & genetic resistance was observed.	

Positives	Negatives	Positives	Negatives	Positives	Negatives
- Sometimes used as pets - Smaller native animals increase in number as their larger predators are killed by cane toads. (4) - Encouraged native Aborigines to work with others to fix problem	- Poisonous & kills pets - Killing native species - Can irritate human skin & damage eyes - cane toad makes water toxic to both humans & animals (4) - They have no predators	- Reduced massive population of rabbit - Australia's wool & meat production increased	- Can kill pet rabbits - Rabbits have become more immune to myxomatosis over the years (resistant) - Inhumane way of killing them - cruel - In some cases domesticated cats have been affected		

MARKING KEY

Content	Description		Your mark
Comprehension	Questions	12	
Research	Origin of biological control What led scientists to investigate the biological control, what were they trying to combat? Research that has been done, what led scientists to believe it was a good idea to use the biological control. Explain issues with scientists' scientific method Positives of introducing the biological control Negatives of introducing the biological control	2 2 3 2 4 4	
Notes	Hand written notes stapled to back of assignment	1	
Referencing	Minimum of 3 references Variety of sources Referenced in correct format	1 1 1	
Presentation	Appropriate title, name, form, teacher included on report Clear headings Appropriate images or diagrams (must be referred to in text) Well formatted (appropriate font, font size, layout etc.) Correct spelling Correct grammar	1 1 1 1 1 1	
Total mark		39	

Mark as percentage: %

Teacher's comments: