CARRYING CAPACITY – MINI WATER GARDEN

meriSTEM | https://meristem.anu.edu.au/ | 38A Science Road, Acton ACT 2600 | contact.meristem@anu.edu.au

Key Learning Objectives:

1. Understand that the availability of energy and matter is one of the main determinants of ecosystem carrying capacity; that is, the number of organisms that can be supported in an ecosystem (ACSES054)
2. Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes (ACSES030)
3. Design investigations including the procedure/s to be followed, the information required and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics (ACSES031)
4. Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error, and uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions (ACSES033)

*SEQ Figure * ARABIC 1: Ecosystem Carrying Capacity*

https://bit.ly/meriSTEMcarryingcapacity

The carrying capacity of an ecosystem is **the largest number of individuals an ecosystem can support**. A number of factors can affect the carrying capacity of an ecosystem, but these factors generally fall into one of two categories: energy and matter.

Abiotic (non-living) factors include:

- Weather
- Sunlight
- Soil conditions
- Water availability

Biotics factors are instead those that reference the interplay between living organisms.

In this experiment, you will be testing how carrying capacity is affected when different environmental conditions are altered.

INSTRUCTIONS

Duckweed is a native Australian plant that reproduces both sexually and asexually. In this experiment, you will be monitoring the reproduction of an initial 20 duckweed plants to determine their ecosystem carrying capacity.

You must design an experiment that will test how one factor affects the carrying capacity of the environment.

Recommended factors to test include:

- Light
- Nutrients
- Space
- Water

You should consider how you will set up a control for this experiment and how you will represent your findings. Below is a base experiment monitoring the growth of duckweed plants over a two-week period. You may use this to help you design and develop your own experiment.

Base Experiment

Materials:

- 250ml beaker
- 5 duckweed plants
- Light source
- Magnifying glass

Method

1. Fill a 250ml beaker with 200ml of water.
2. Add to the beaker 5 duckweed plants. Each leaf counts as one plant.
3. Place the beaker near a light source. E.g. window sill, on a table near a heat lamp.
4. Record the initial number of plants and the date.
5. For two weeks, at the start of each class, count (with the help of a magnifying glass where needed) and record the number of plants present in your beaker and the date.

Your Experiment

Materials:

Method:

Experimental Setup:

Aim:

Hypothesis:

Risks and Precautions:

Results:

Record your results in an appropriate format in a separate document. ***Include a discussion of your results and a conclusion****. Use your data to answer the questions below.*

What environmental factor did you choose to test?

_____

Did you find that alterations to your environmental factor changed the carrying capacity of your environment?

_____

_____

Based on your results, how would you set up your environment to optimise the carrying capacity of your environment?

_____

_____

_____

_____

_____

_____

_____

Did your results support your hypothesis? Did you record any