

Activity 1: [Indigenous Seed Germination experiment]

[Simone Butten horticulturalist and manager, Creswick Nursery
<http://www.dpi.vic.gov.au/DPI/nreninf.nsf/childdocs/>]

Curriculum connections

Use of this learning and teaching activity may contribute to achievement of elements of the Standards. Indications of relevant Domains and Levels in the Victorian Essential Learning Standards are provided to assist teachers to make decisions about the appropriateness of the activity for their students.

Victorian Essential Learning Standards Domains and (Levels):

Science (4, 5)

“ They analyse what is needed for living things to survive, thrive or adapt ” L5

Duration: 45 minutes

Setting: An outside area.

Summary

This activity enables students to understand that different indigenous seeds require special conditions for them to germinate through a hands on comparison of different seed pre - treatment techniques.

Student outcomes

This activity will enable students to:

- Better understand the nature of the similarities between, and diversity of, living things and their sustainable relationships with each other and their environment.
- Improve their knowledge of indigenous seed biology and the germination process.
- Draw conclusions about which pre treatment technique is best for successful wattle seed germination.
- Begin to investigate the atmospheric nitrogen fixing properties of wattles and their role in healthy forest ecosystems

Background notes for teachers

The seeds of wattles possess a thick seed coat. This prevents entry of water and protects the seed from predators until conditions are right for germination. In nature, this may occur following a bushfire. Fire can be used in bushland remnants to promote germination of most wattles, however, care must be taken to avoid damage to other fire-sensitive and juvenile plants. Cultivation can also be used to damage the seed coat and so encourage germination of wattles. Wattles may also be established by direct seeding of pre-treated seed (described below).

The seed of most wattles will require pre-treatment to damage the seed coat (dark black outer layer) for successful propagation. There are various options. The most widely used treatment for medium quantities of seed is placement in boiling or hot water (let stand till cool). This imitates the natural heating of a fire. Note that some species (and batches within a species) do not require heat treatment or are sensitive to prolonged heating. For example, Cavanagh⁸ recommends 30secs at 100°C for *Acacia terminalis*. A sample of each seed lot should be tested before treating the entire batch. Nicking the seed coat with a single-sided razor-blade is suitable for small quantities. Other treatments include acid scarification (H₂SO₄, 20 mins), microwaving (120 secs) and machine scarification⁸.

Asexual reproduction means that an organism reproduces somehow by mitosis: splitting in two, budding, fragmentation and regeneration, etc. Asexual reproduction produces identical offspring or clones.

Sexual reproduction means that two reproductive cells or gametes must have joined together.

Sexual reproduction allows for variation among the offspring.

Note that it is NOT the number of parents that makes the difference. Just check to see if two cells or even two nuclei are joining together ... that's sexual reproduction.

Materials

Equipment:

Potting mix/seed raising mix
trowels
Hyco trays
Sandpaper
Labels

Prepared seed samples* (blackwood - *Acacia melanoxolyn*)

*microwaved 30 secs,

*primed in hot water (Soaking, imbibes water),

* pre treated - hot and cold for a minute – doesn't imbibe water but softens testa

*scarified/stratified

*untreated

The activity

Aim: To explore how different indigenous seeds require different conditions to germinate, thrive and survive.

To compare seed pre - treatment techniques to establish the most successful method.

1) Discuss some seed biology, (Testa, funicle, aril). The seed is treated to damage/soften the seed coat and mimic natural germination triggers/promoters like fire. Treatment is for imbibation to occur (ie so the seed imbibes water) Stress that different seeds require different conditions to promote germination.

2) Fill hyco trays with soil/potting mix

3) Plant rows of seeds, one row per treatment type. Plant the seed to a depth in the soil equal to the length of the seed.

4) Label each row as to the type of treatment the seed has received, eg untreated, scarified

5) Place trays in the sun to promote growth, keep water up to the seeds - if the school does not have a hot house, form a partnership with a local nursery and have them look after the seeds. Digital photographs can be used to monitor the effectiveness of each treatment by recording the progress of seedling growth, about three to four weeks after the seed has been sown.

6) Conclusion: Use the activity to promote discussion and review the importance of indigenous vegetation to prevent degradation in the landscape and promote water quality and biodiversity. The activity is a starting point to investigate the germination conditions required by other indigenous seeds.

Extension activities

Research seed biology.

Investigate the conditions required for germination of other indigenous species in your area.

Investigate the scientific processes associated with erosion and salinity.

Related LandLearn/Landcare activities

Biodiversity in Balance Booklet, Seed sowing activity, Cutting propagation activity



 **Worksheet**

Name: _____

1) What are some of the natural promoters of germination for indigenous seed?

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2) Observe a seed that has already begun to germinate. Draw a diagram of what you see and clearly label the parts.

3) What are some of the advantages and disadvantages of raising indigenous plants from seed?

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