

# Primary Science & Technology *Bulletin*



Ideas and inspiration for teachers in Primary Schools and S1/S2

## Tatties in a tub





Figure 1 - "Seed potatoes".

# Tatties in a tub

Growing potatoes in a container is a great way to give learners the opportunity to care for plants, experience food production first hand and make connections between the food on their plate and crop production.

The concept of "field to fork" [1] and associated food security issues [2] are often in the news and with an ever-growing world population, the sustainable production of nutritious food is of particular relevance.

Growing potatoes in containers is one way of obtaining an abundant edible crop in a small area within a manageable time-scale. Spring is the perfect time to start planting and you don't even need a school garden!

Begin by obtaining seed potatoes (Figure 1). These can be purchased from garden centres and some supermarkets, however don't be tempted to use potatoes bought for cooking - these won't have been specially selected to give a good crop under normal gardening conditions and aren't as disease resistant as seed potatoes. The name "seed potato" is a misnomer as the seed potato is actually a tuber **not** a seed. Tubers form from the swollen tips of the underground

stems of some plants and are a way of reproducing vegetatively (or asexually). This alternative to sexual reproduction ensures that plants may survive in unfavourable conditions when seeds would not germinate or thrive. SAPS (Science and Plants for Schools) produce resources and information to support plant-based investigations in the classroom [3].

As the tubers are produced asexually each new plant will be genetically similar to the parent plant and will lack the variation present in those plants grown from seed. This can be a disadvantage as the entire crop may be vulnerable to disease - as starkly illustrated by the Irish Potato Famine. This event occurred during 1845-49 when the potato crop failed in successive years. The crop failures were caused by the fungus-like organism *Phytophthora infestans* resulting in a disease that destroys both the leaves and the edible tubers of the potato plant. At that time just one or two high-yielding varieties of potato were being cultivated - greatly reducing the genetic variety of the plants. In 1845 *Phytophthora* arrived from the Americas, coinciding with a spate of cool, moist weather, in which the blight thrived. Much of that year's potato crop rotted in the fields [4].

Learners might be surprised to learn that potato plants produce fruit if the flowers are left to be pollinated and fertilisation takes place (Figure 2). The fruits are **toxic**



Figure 3 - Inexpensive containers.

and should never be eaten. These fruits contain seeds - produced via sexual reproduction. Their similarity in appearance to the tomato fruit illustrates that the plants are indeed part of the same family (*Solanacea*).

There are a number of different types of seed potato, First Earlies, Second Earlies, and Maincrop. Choose the potato variety that best suits your setting [5]. First Earlies are planted from March onwards and can crop within 7- 8 weeks of planting. As potatoes are only half-hardy they will not survive a hard frost, so tubers and plants must be protected until the threat of frost is over.

Second Early potato varieties crop within around 100-120 days and should be planted mid-late April to be harvested in mid-August. First and Second Early varieties tend to be lower yielding than Maincrop varieties and usually have smaller tubers, so need less space. They are eaten when harvested as "new potatoes."



Figure 2 - The fruit of the potato plant - these fruits are toxic and should not be eaten!



**Figure 4** - Broken pots or "crocks" to assist drainage.



**Figure 5** - Tubers placed in the container shoots facing upwards.



**Figure 6** - More tubers can be placed in a large container.

Maincrop varieties can be planted from March-May and are harvested in the autumn. Maincrop potatoes store well and produce larger tubers.

Whichever variety of seed potato you choose many growers recommend "chitting" the tubers before planting. Simply place the seed potatoes on an open container, for instance an egg box, and place in a light and airy position, away from frosts. The potatoes will soon start to sprout, once the shoots are 2 cm long the tuber can be planted. Potatoes can be grown outside once the danger of frost has passed.

Select a suitable container, pot, bucket or bag (it must be at least 25 cm in diameter), ensure there are adequate drainage holes otherwise the tubers may rot. A wide variety

of containers is available and they don't have to be expensive (Figure 3). Carefully place some broken pots (crocks) or gravel in the bottom of the container to encourage good drainage (Figure 4). Using multipurpose compost (consider using peat-free compost) fill the container to a depth of one third. Place the chitted potatoes on top of the compost with the shoots facing upwards (Figure 5 & 6) and gently cover with a layer of soil until only the tops of the shoots are visible (Figure 7). Take care not to damage the shoots (or chits). Water regularly (Figure 8) and leave until the shoots have grown up to 15 cm - adding another 10 cm of compost until the tips are again just visible. This "earthing up" of the potatoes encourages a better yield and also protects the developing

tubers from light - any tubers exposed to sunlight will turn green and should not be eaten. Repeat the process until the top of the container is reached - allowing room for watering. Keep the potatoes well watered - fertiliser could be added after 4 weeks. Although often labelled "plant food" fertilisers actually provide essential mineral salts not food - as any budding botanist knows, plants produce their own food via photosynthesis! This would be a good opportunity to discuss this confusing labelling and explore any misconceptions with learners. SAPS have ideas for investigating the role of fertilisers [6].

Once the potatoes have flowered it will be nearing harvesting time - check the size of the potatoes by digging carefully into the compost and checking on one or two of the tubers, if they are of a useable size then they can be harvested (Figure 9). If they are still too small at this stage they can be left to grow on for a couple more weeks. Different varieties could be compared and the starting weight and yield weight compared - providing scope for various numeracy linked activities [7]. The importance of healthy eating and food production could be explored to support *CfE* Health and Wellbeing Experiences and Outcomes [8]. A variety of cooking methods could be discussed and tried out, if practical. Potatoes formed an important part of the Dig for Victory campaign during WWII [9], the character Potato Pete [10] was created to encourage potato production and promote the health benefits of eating more home grown potatoes.



**Figure 7** - Cover the tubers with a layer of compost, allow the tips of the shoots to remain uncovered.



**Figure 8** - Water the tubers and keep well watered throughout the growing season.



**Figure 9** - Harvest the crop of potatoes and prepare for a feast!



**Figure 10** - Potatoes growing in the SSERC garden in a plastic lined stack of recycled tyres.

The potato is an important crop for Scotland which is recognised within the European Union as a Community Grade Region for seed potato production. Around 65,000 t of seed potatoes are produced each year in Scotland for export outside the European Union [11]. The Royal Highland Education Trust [12] has a variety of resources and competitions linked to growing potatoes [13] and works with schools across Scotland to encourage a wider understanding of the environmental, economic and social realities of rural Scotland.

The Potato Council [14] have resources and organise annual potato growing competitions along with advice and encouragement to help schools grow their own potatoes.

We have successfully grown potatoes in tyres here at SSERC (Figure 10), however we would strongly recommend lining the growing area with a sturdy plastic refuse sack or compost bag (with plenty of drainage holes cut and crocks placed in the bottom) which will then hold the compost whilst preventing any possible contamination from the tyres entering the soil.

#### CfE links

- I have helped to grow plants and can name their basic parts. I can talk about how they grow and what I need to do to look after them - *SCN 0-03a*.
- I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings and from what I have learned I can grow healthy plants in school - *SCN 1-03a*.
- I have collaborated in the design of an investigation into the effects of fertilisers on the growth of plants. I can express an informed view of the risks and benefits of their use - *SCN 2-03a*.
- Through carrying out practical activities and investigations, I can show how plants have benefited society - *SCN 2-02b*.
- Having explored the variety of foods produced in Scotland, I can discuss the importance of different types of agriculture in the production of these foods - *SOC 1-09a*.

#### Further CfE links

*HWB 0-30a/1-30a • HWB 1-30b • HWB 0-35a • HWB 1-35a/HWB 2-35a*.

#### Health and safety advice for growing potatoes

- Always check and follow your Local Authority's guidelines when working outdoors.
- Produce an up-to-date risk assessment prior to undertaking the activity.
- Observe good hand hygiene during and after the activities.
- Potatoes exposed to light or stored incorrectly may become green - these green potatoes contain toxins and should not be eaten.
- Potato fruits are toxic - do not allow these to be eaten. They closely resemble tomatoes and so learners should not be able to gain access to them.
- If using tyres to grow potatoes do not stack tyres so high that they may topple and cause injury.
- Line the stack of tyres with a large plastic bag to prevent possible soil contamination.
- Take care if using broken pots as crocks - wear gardening gloves to prevent injury.

For more information please contact SSERC [15].

#### References

- [1] <http://www.eathappyproject.com/farm-to-fork/> (accessed 16<sup>th</sup> April 2014).
- [2] <http://www.foodsecurity.ac.uk/index.html> (accessed 16<sup>th</sup> April 2014).
- [3] [http://www.saps.org.uk/attachments/article/236/Living\\_Processes\\_PartA.pdf](http://www.saps.org.uk/attachments/article/236/Living_Processes_PartA.pdf) (accessed 16<sup>th</sup> April 2014).
- [4] <http://www.britannica.com/EBchecked/topic/294137/Irish-Potato-Famine> (accessed 16<sup>th</sup> April 2014).
- [5] <http://by-tuesday.hubpages.com/hub/Which-potatoes-to-grow-Varieties> (accessed 16<sup>th</sup> April 2014).
- [6] <http://www.saps.org.uk/primary/teaching-resources/216-adding-mineral-salt-do-radishes-grow-better> (accessed 24<sup>th</sup> April 2014).
- [7] [http://www.educationscotland.gov.uk/Images/numeracy\\_mathematics\\_experiences\\_outcomes\\_tcm4-539878.pdf](http://www.educationscotland.gov.uk/Images/numeracy_mathematics_experiences_outcomes_tcm4-539878.pdf) (accessed 16<sup>th</sup> April 2014).
- [8] <http://www.educationscotland.gov.uk/learningteachingandassessment/curriculumareas/healthandwellbeing/eandos/index.asp> (accessed 16<sup>th</sup> April 2014).
- [9] <http://www.educationscotland.gov.uk/scotlandshistory/20thand21stcenturies/worldwarII/digforvictory/> (accessed 16<sup>th</sup> April 2014).
- [10] <http://www.dundrynurseries.co.uk/pete.asp> (accessed 16<sup>th</sup> April 2014).
- [11] <http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/plant/18273> (accessed 16<sup>th</sup> April 2014).
- [12] <http://www.rhet.org.uk/Resources> (accessed 16<sup>th</sup> April 2014).
- [13] <http://www.rhet.org.uk/wso/binaryfiles/superspudp6-11.pdf1> (accessed 16<sup>th</sup> April 2014).
- [14] <http://gyop.potato.org.uk/> (accessed 16<sup>th</sup> April 2014).
- [15] [sts@sserc.org.uk](mailto:sts@sserc.org.uk).