

“How to build up worn-out soils”
Creative Approaches to looking at
soil health and fertility
using George-Washington-Carver’s
influence as a stimulus

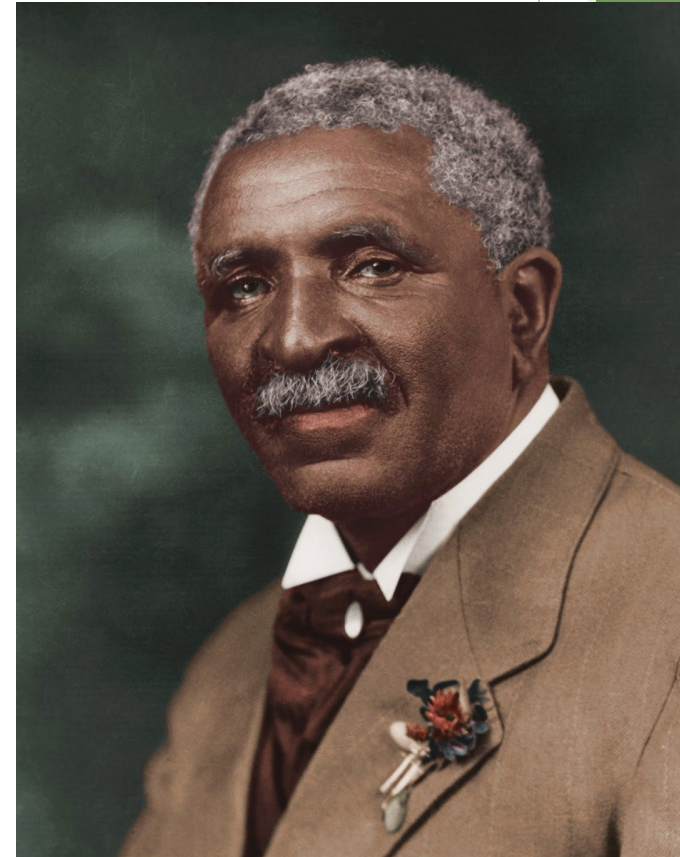
Clarysly Deller
PSTT Conference 2023



George Washington-Carver

Monologue

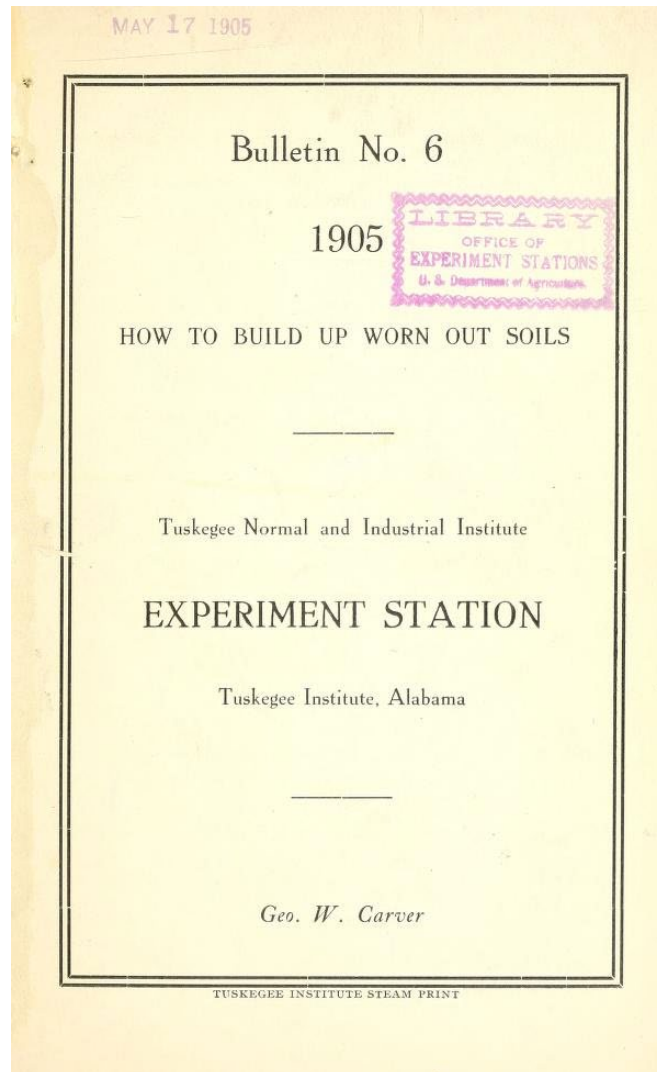
- ▶ Listen to this.....
- ▶ Reflective Qs for discussion :
- ▶ What do you know about this person?
(at least 2 facts you are sure of)
- ▶ What do you think we know about
the person? (at least 2 things)
- ▶ What do you imagine about them?
(at least 2 things)
- ▶ Who could the person be?



<https://www.pbs.org/video/opt-documentaries-seeds-success-legacy-george-washington-carver/>
<https://kids.nationalgeographic.com/history/article/george-washington-carver>

Crop rotation

- ▶ As a botany and agriculture teacher to the children of previously enslaved people, Dr. George Washington Carver wanted to improve the lot of “the man farthest down, the poor, one-horse farmer at the mercy of the market and chained to land exhausted by cotton.”
- ▶ Unlike other agricultural researchers of his time, Dr. Carver saw the need to devise practical farming methods for this kind of farmer. He wanted to coax them away from a mono-culture of cotton growing, to such soil-enhancing, protein-rich crops as soybeans and peanuts and to teach them self-sufficiency and conservation.
- ▶ Dr. Carver achieved this through an innovative series of free, simply-written brochures (bulletins) that included information on crops, cultivation techniques, and recipes for nutritious meals. He also urged the farmers to submit samples of their soil and water for analysis and taught them livestock care and food preservation techniques.



Bulletins

- ▶ "The subject of soil improvement through natural agencies has been one of much concern to both ancient and modern agriculturists.
- ▶ The ancient Egyptian knew that if he let his land lie idle, (rested) as he termed it, he was able to produce a much better crop, and that crop would be in quantity and quality, all other things being equal, proportionate to the length of time this land had been rested."
- ▶ At a later period the fertilizing value of legumes (pod bearing) plants was recognized, but as the population of the world increased and civilization advanced, it became imperative that all farming operations should become more intensive and less extensive.
- ▶ For eight years the Tuskegee station has made the subject of soil improvement a special study, emphasizing the subject of crop rotation, deep ploughing, terracing, fertilizing, etc., keeping in mind the poor tenant farmer with a one-horse equipment; so therefore, every operation performed has been within his reach, the station having only one horse.

Crop rotation

- ▶ One of the main crops in the south was cotton. However, growing cotton year after year can remove nutrients from the soil. Eventually, the cotton crop will grow weak. Carver taught his students to use crop rotation. One year they would grow cotton, followed by other crops such as sweet potatoes and soybeans. By rotating the crops, the soil stayed enriched.

Carver's research and education into crop rotation helped the farmers of the south be more successful. It also helped to diversify the products that they produced.



Drama technique - modelling

Activity - modelling plant growth and crop rotation

Ways to approach sustainable education and global citizenship like GWC did...



<https://www.countrysideclassroom.org.uk/resources/1639>

Inventor

- ▶ George Washington-Carver is often called the father of the peanut industry because he realized how much potential peanuts held for the Southern economy in the early 1900s.
- ▶ While GWC didn't invent peanut butter, he did create a list of over 300 items that could be made from peanuts; everything from foods and medicines to ink and paper. The renowned scientist overcame incredible odds, and his discoveries spurred many uses of the peanut, increasing the legume's popularity and making peanuts a staple in the American diet.

Pedagogy

► Active participatory learning

These participatory and active approaches are central to global education because they can help to encourage pupil voice, exploration and critical engagement, and peer learning. They move away from the teacher being the sole transmitter of knowledge by allowing students to contribute to the construction of knowledge. (McGregor, 2012)

<https://doi.org/10.1080/09500693.2012.660751>

► Teacher in Role

Working like this can really help engage learners, adding intrigue and real-life application to the learning. (McGregor et al., 2019)

<https://doi.org/10.1080/21548455.2019.1585994>

► Science Capital Teaching approach

The Science Capital Teaching Approach is designed to support teachers in helping students find more meaning and relevance in science and, as a result, engage more with the subject (Godec, King & Archer, 2017). Adopting approaches which resonate with children, helping them to see the relevance of the activities to their every-day lives will engage learners and help them to understand the impact of science in their normal lives (Deller, 2018).



Working Scientifically

Activity Challenge: choose an item and see how inventive you can be! Come up with as many products as you can to present to your peers.

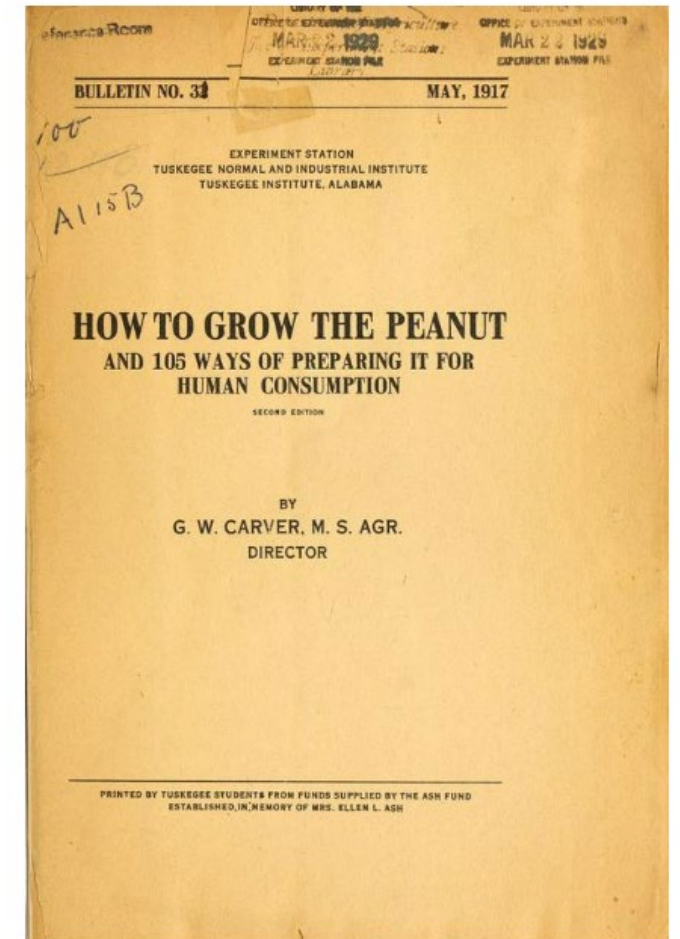


Photos C. Deller 2015 - used with permission

Create your own Bulletin to sell your products!

- ▶ 8. The peanut exerts a dietetic or a medicinal effect upon the human system that is very desirable.
- ▶ 9. I doubt if there is another foodstuff that can be so universally eaten, in some form by every individual.
- ▶ 10. Pork fattened from peanuts and hardened off with a little corn just before killing, is almost if not quite equal to the famous Redgravy hams or the world renowned Beech-nut breakfast bacon.
- ▶ 11. The nuts yield a high percentage of oil of superior quality.
- ▶ 12. The clean cake, after the oil has been removed, is very high in muscle-building properties (protein), and the ease with which the meal blends in with flour, meal, etc., makes it of especial value to bakers, confectioners, candy-makers, and ice cream factories.
- ▶ 13. Peanut oil is one of the best known vegetable oils.
- ▶ 14. A pound of peanuts contains a little more of the body-building nutrients than a pound of sirloin steak, while the heat and energy-producing nutrients it has more than twice as much."

<https://www.nal.usda.gov/exhibits/ipd/carver/exhibits/show/bulletins/carver>



**How to Grow the Peanut:
And 105 Ways of Preparing
It for Human Consumption
(1917)**

Other linked investigations

- Investigate how seeds disperse. Look at a cotton boll. Produce ideas for ways that plants distribute seed using the air. Get children to invent their method and test the ability of the seeds to move from the parent plant.



Reflections on and analysis of the use of drama techniques and dialogic practices in teaching science in primary school

● Clarysly Deller



Abstract

This reflective article examines science learning, experienced in a primary school, in light of theories of social constructivism and how they can illuminate and explain learning experienced within an innovative project. This project sought to combine the use of drama techniques to teach tricky concepts in science with discussion, collaboration and peer support. Having established the background to the project, this article examines some of the theories of social constructivism evidenced in the project. Its

Talk and discussion was a major part of this process, helping the children to be more aware of the benefits of dialogic talk in their learning to aid problem-solving and to develop their science understanding (Mercer, Dawes & Staarman, 2009; Alexander, 2010). This article represents my reflections on the learning experienced in the school, using social-constructivist learning theory to shed light on the outcomes I observed. I found that many of the activities spawned deep

<https://www.ase.org.uk/resources/journal-of-emergent-science/issue-15/reflections-and-analysis-of-use-of-drama-techniques>



Article

Participatory Inquiries That Promote Consideration of Socio-Scientific Issues Related to Sustainability within Three Different Contexts: Agriculture, Botany and Palaeontology

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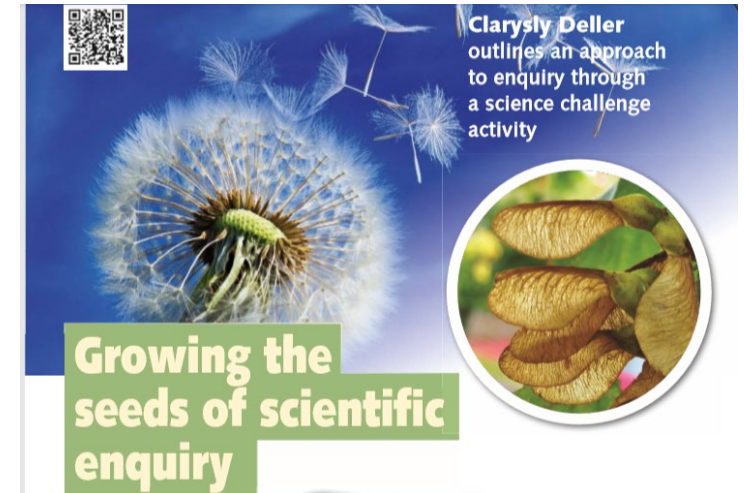
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Abstract: The involvement of students in dramatised inquiries, through participatory activity, offers opportunities to act in-role as scientists. The inquiries can 'set-the-scene', provide context and challenges for students to consider possibilities within and beyond everyday life. This approach can engage students in thinking about sustainability and developing citizenship competencies, such as thinking scientifically and critiquing ideas, interrogating evidence and assessing the validity of information, as well as decision making and problem solving. In this paper, adopting stories from the history of science is shown to provide rich, authentic contexts that engage students imaginatively and collaboratively in addressing past, present and future socio-scientific issues. To demonstrate how

<https://www.mdpi.com/2071-1050/15/8/6895>



<https://www.ase.org.uk/resources/primary-science/issue-149/growing-seeds-scientific-enquiry>

Examples

- ▶ These journal articles help to explain how these techniques can effectively promote excellence in learning in classrooms and help students to develop and deepen their scientific understanding.

Any questions?

- Follow-up survey - please click & complete

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