

The Feasibility of Growing *Medicago sativa* in a Transparent Hydrophilic Medium

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Research

Title: The Feasibility of Growing *Medicago sativa* in a Transparent Hydrophilic Medium

The versatile alfalfa (*M. sativa*) was used in this study to examine the sustainability of plant life in a hydrophilic transparent medium. To create the transparent medium we used aquabeads, a hydrophilic copolymer of isobutylene and maleic anhydride. Aquabeads, capable of absorbing $\times 200$ water, has a similar refractive index as water so it can become transparent. Thus aquabeads is ideal for creating a transparent medium that makes it possible to observe the growth of plant roots. *M. sativa* was used in this study because of its versatility, low water consumption, and its high nutritive and ecological benefits. There has been relatively little research on the sustainability of transparent media for plant growth. Alfalfa sprouts were grown in containers of the transparent medium, while monitoring light intensity, pH, and temperature. Alfalfa grows best under low light intensity. A successful alfalfa growth in a transparent medium would have tremendous application in green design. Green roofs on commercial buildings may help to create high ratings on LEED (leadership in energy and environmental design) certifications, which may lead to a higher property value. Alfalfa has high aesthetic value due to his fast growth and high biodiversity- and may contribute tremendously to the LEED ratings of commercial properties.

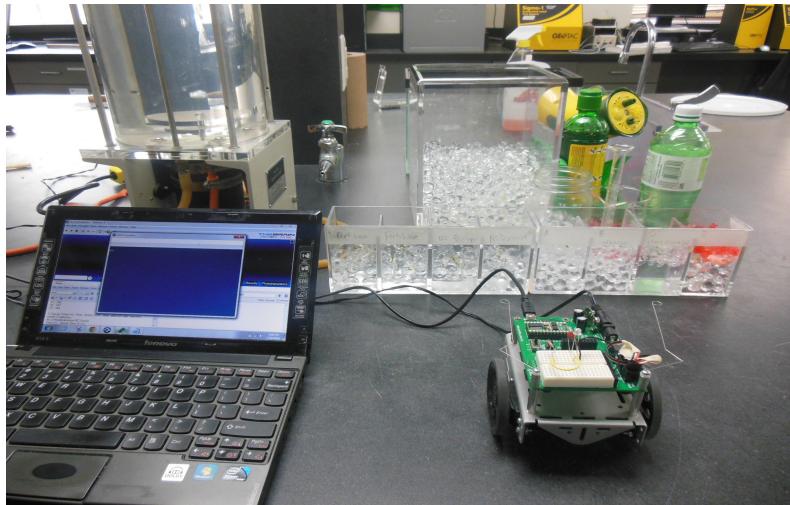


Figure: Testing light intensity during alfalfa growth in transparent medium

Lesson Plan

Title: Seed Growth in Transparent Soil

A group of students will conduct a controlled experiment in the classroom for a period of three weeks. Students will take measurements and analyze seed growth and determine the most favorable conditions for alfalfa seed growth in the transparent soil. Students will track seed growth and pH. Students will also use the BoeBot equipped with a phototransistor to measure the light intensity over the three-week period. Like engineers, students will construct building

models with vertical farming models built into them to demonstrate how alfalfa seeds will be successfully grown. Students will present their findings to the class.

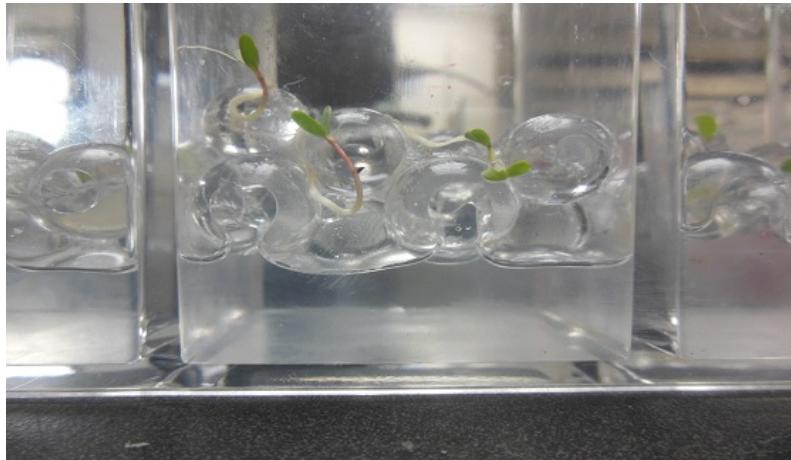


Figure: Planned classroom activity