DIY Martian Soil:
Formulating a Simulated Regolith for Tomorrow’s Research of Mars

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ABSTRACT
The Red Rocks Community College (RRCC) Martian Soil Team is a group of students dedicated to replicating Martian soil, in order to continue conducting our own experiments for finding potential complications and sustainable solutions for life on Mars. Previously, we had obtained soil from Orbitech, a company now out of business. We started utilizing soil from other companies, but this became too expensive. So, we decided to try and make a cheaper simulant of Martian soil for furthering our projects. We have gathered our own samples of basalt rocks from various locations in the Western Hemisphere. These samples are composed of many of the same minerals that make up the Martian landscape. We are getting pieces of our sample rocks tested to determine exactly what minerals these rocks are made of, to create the most accurate substitute with our soil. The tests we will be able to do with this soil will be numerous. From Martian gardens to water filtration and microbial habitats, the possibilities are endless! With our mineral samples, we hope to compose an accurate analog of Martian soil to conduct these tests and compile data for potential Martian colonization.

PURPOSE
Can we prepare for life on Mars? With the speed at which the Human population is growing, the first place we all look to as the our next home is the red planet. A large concern for this expansion is the capability to grow and provide food to Martian colonists. That is why there currently is a lot of research being done pertaining to growing food in Martian Soil. We hope to contribute to that research by mimicking the soil composition of Mars. We can create an accessible material with which future research teams can delve into more research on plant growth, nutrient analysis, and possible sustainability of life on another planet.

SAMPLING PROCESS
To find the best possible fit for our soil composition, we scoured all over Colorado and other large, accessible resources of basalt in order to efficiently (and cheaply) find the best base to manipulate into what we expect from Martian soil. Our sample locations [right] contain consistently high volumes of basalt based minerals and, depending on their base composition, had a good possibility for our ideal choice.

TESTING PROCESS (Planned for Future)
After analyzing the makeup of our samples, we will decide which of our collected samples most closely matches NASA published data for the composition of Martian Soil (depicted to the right). We then will augment the best fit sample to even more closely match the chemical makeup of Martian soil. This can be done through the addition of acids (to remove certain molecules) or adding other mineral supplements (such as more oxidized iron).

PICTURES

The pictures above show our sample collection: [Top] the site, [Right] the method, [Bottom] the sample, [Left] the organizing

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DATA COMPARISON

Conclusion
Using the data acquired from Thermo Scientific, we plan to analyze the differences between our rock samples and preexisting Martian soil data. Later on, we will use this information to make a soil substitute. Ultimately we plan to collaborate with RRCC’s biology department and other schools to begin testing the viability of Martian soil as a plant-supportive substrate.