

S.A.P.F Experiment Observations

Homemade Polymer 1

Day Qualitative/Physical Observations

Weight (g)

- 5
- very dry surface which penetrates 1 cm deep
 - about the same height as the NP's
 - everything is clumped together either due to dryness or mold
 - ps. last day

75

S.A.P Experiment Observations

Homemade Polymer I

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - soil is dark like black - soil is much denser compared to others - small clumps have formed 	94
2	<ul style="list-style-type: none"> - soil is ^{sticky} dark/black - clumps of soil on the top (resemble a oreo cookie pie crust) - a faint smell of the polymer is present <ul style="list-style-type: none"> ↳ scent is similar to that of cheese - soil still feels and looks dense - slight loss of expansion of cup rim - soil is hydrated/moist but not as sticky 	91
3	<ul style="list-style-type: none"> - surprisingly enough smell is gone but there is a thin layer of mold - no noticeable/visible dry patches on the top - dark-chocolate brown - clumps of soil encased in mold cohorts - slight dryness on the cup wall - soil is coming off of the cup wall slightly 5mm away from wall - 1.5cm loss in height 	84
4	<ul style="list-style-type: none"> - mold has increased on surface - soil clumps encased in mold - dark-chocolate brown - top half of soil is pulling away from the cup wall - noticeable dry clumps - soil still feels moist (reason mold is growing) <ul style="list-style-type: none"> ↳ look into this 	79

Homemade Polymer 2

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - dark in colour (black) - minimal clumping and not as sticky/binded - no visible expansion 	91
2	<ul style="list-style-type: none"> - dark/black - smells like the polymer - feels moist but at this point I would usually water it - no loss of expansion visible - no large clumps - soil particles look more evenly distributed 	91
3	<ul style="list-style-type: none"> - noticeable dry clumps on the soil surface and sides - thin layer of mold on the surface - smell of polymer gone - soil isn't sticky - dry - soil is dark-chocolate brown - dry clumps a brown - soil separating from cup wall ~5mm 	73
4	<ul style="list-style-type: none"> - increase of mold - half the soil is pulling away from the soil - surface (~1/7) of soil is dry - below surface soil is damp (it about the wetness it was when it came out of the bag) 	70
5	<ul style="list-style-type: none"> - surface is dry again penetrates 1 cm deep - lots of mold on the sides holding/binding everything together - surface is a lighter brown than bottom - ps last day 	66

S.A.P Experiment Observations

Homemade Polymer 3

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - dark colour (black) - looks expanded but feels dense - minimal clumping with a weaker bind 	81
2	<ul style="list-style-type: none"> - dark/black - faint cheese-like smell - 0.5cm visible loss in expansion - similarly to 2 soil feels moist but I would usually water it by - no large clumps 	82
3	<ul style="list-style-type: none"> - dry brown clumps on surface - thin layer of mold - faint smell of polymer - soil separating from cup wall in places ~ 5mm - under surface soil is still slightly moist (still consider it dry) 	74
4	<ul style="list-style-type: none"> - dry clumps on surface - increase of mold - soil has filled out space from cup - in certain areas/spots soil is pulling away - below surface still feels damp/moist 	73
5	<ul style="list-style-type: none"> - dry surface but moist soil peeks through - its mostly dry around the sides - lots of clumps again encased by mold or dryness - surface is a lighter brown than rest of the soil 	68

-accidentally
knocked over
so may have
impact on weight

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none">-feels less dense-visibly expansion (not as much compared to 2)-no clumping-dark/black in colour-expanded crystals visible on the top layer of soil	81
2	<ul style="list-style-type: none">-dark brown in colour-crystals looks smaller-no unusual smell-1cm of visible loss of expansion-feel lighter and less dense than 2 and 3-top layer of soil feels dry and there are some visibly dry clumps	78
3	<ul style="list-style-type: none">-surface is brown the rest of soil is dark chocolate brown-surface is visibly and feels dry-no clumps-below the surface still feels moist-1.6cm loss in height (could be from spill yesterday)-feels lighter and less dense than 2 and 3	73
4	<ul style="list-style-type: none">-soil surface is very dry and below surface appears to be drying out-soil below surface is still slightly moist-soil is no longer sticky to cup walls-polymer crystals appear to have reduced in size-surface is brown-below surface is dark-chocolate brown-~.5cm loss in expansion	71

S.A.P Experiment Observations

Miracle-gro water storing crystals 2

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - visible expansion - not too dense compared to 3 - expanded water crystals on top layer of soil - fine soil particles bind to a clump of crystals - particles that aren't in proximity to crystals show no clumping 	90
2	<ul style="list-style-type: none"> - 1cm visible loss of expansion - dark brown with some dispersed light brown clumps - no unusual smell - small clumps - feels a little dry and there are some visible dry patches 	85
3	<ul style="list-style-type: none"> - dry surface - brown surface - below-surface is dark-chocolate brown - below surface is slightly moist - 0.7cm loss in height - crystals decreased in size 	79
4	<ul style="list-style-type: none"> - soil surface feels and looks dry - below surface soil feels damp - difference in hydration is very noticeable - slight loss of height - below surface is dark chocolate brown - surface is brown-medium light brown 	77

Miracle-gro water storing crystals 3

Day	Qualitative/Physical Observations	Weight(g)
1	<ul style="list-style-type: none"> - top soil layer more even compared to 1 and 2 - no soil particles binding to crystal clumps - dark/black in colour - feels and looks denser compared to 1 and 2 - expanded crystals visible on top soil - visible expansion 	95
2	<ul style="list-style-type: none"> - feels and looks less dense - looks the most expanded - light brown - no visible loss of expansion - top layer looks and feels dry - no unusual smell - personally shocked by the difference in weight 	83
3	<ul style="list-style-type: none"> - surface is dryer than yesterday - below surface is dark-chocolate brown - 0.5cm loss in height - below surface is pretty moist - surface is brown 	78
4	<ul style="list-style-type: none"> - surface looks and feels very dry - the rest of the soil - hard to determine soil moisture levels since the soil was sticking to the crystals - crystals felt more expanded and dispersed - soil didn't feel dry enough to be considered dry 	74

S.A.P Experiment Observations

(1) acrylamide and potassium acrylate 1

Day	Qualitative/Physical Observations	Weight(g)
1	<ul style="list-style-type: none"> - 3/4 of soil looks packed and dense - 1/4 is visibly expanded - dark/black in colour - "crystals" visibly expanded and much larger compared to other polymers - small clumps 	93
2	<ul style="list-style-type: none"> - dark chocolate brown - some small visibly dry light brown clumps - polymer crystals appear to have decreased slightly in size - soil is not sticky feels slightly dry - 0.5cm of visible decrease in expansion - no unusual smell - shocked by the difference in weight 	81
3	<ul style="list-style-type: none"> - surface very dry and crumbling - surface is brown - below surface is dark-chocolate brown - polymer crystals reduced in size and have separated - 0.62cm in height - some small clumps - below surface still slightly moist 	74
4	<ul style="list-style-type: none"> - 1.2cm of the soil is extremely dry (measurement is from the surface down) - polymer crystals appear to be deteriorating - difference in moisture is very apparent from the side - surface is a medium brown - below surface is a dark chocolate brown - below dry surface soil feels dry and wet in certain spots 	73

CLPA 2

Day	Qualitative / Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - large clumps - 2 crystals expanded and fused together - dark/black in colour - visible expansion - large clumps on top soil 	67
2	<ul style="list-style-type: none"> - polymer crystals appear the same size - no unusual smell - dark chocolate brown - no visible dry clumps/patches - 0.5cm of visible decrease in expansion - feels lighter than 1 and heavier/more dense than 3 	85 -brings up questions about the scales accuracy? ← look into this
3	<ul style="list-style-type: none"> - small dry clumps (brown) - polymer crystals seem to have expanded - most of soil is incredibly hydrated/moist - most of soil is dark-chocolate brown - expanded slightly ~ .5 cm 	80
4	<ul style="list-style-type: none"> - polymer crystals have shrunk and appear to be deteriorating - surface is dry but the dryness doesn't penetrate as deep into the soil compared to one and two - below the dry surface soil feels damp - contrast in soil colour is very distinct and visible 	78

S.A.P Experiment Observations

CLAP 3

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - looks the most expanded compared to 1 and 2 - dark/black in colour - large crystals clumps on top soil 	55
2	<ul style="list-style-type: none"> - dark chocolate brown - 1 large clump - small light brown dry clumps - polymer crystals appear to have shrunk in size - no unusual smell - 1 cm of visible decrease in expansion - feels lighter than the other 2 but not this much 	75g - accuracy problem?
3	<ul style="list-style-type: none"> - surface is very dry and lighter than below - below surface is slightly moist - below surface is a dark-chocolate brown - polymer crystals are smaller than yesterday - slight minuscule loss in height 	70
4	<ul style="list-style-type: none"> - soil is very dry on the surface - soil below surface feels dryer than 1 and 2 	67
4	<ul style="list-style-type: none"> - contrast of colour and soil moisture is very apparent - polymer crystals vary in size and strength 	

No Polymer 1

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - soil moist - no visible expansion - dark/black in colour 	80
2	<ul style="list-style-type: none"> - soil still feels moist - black in colour - no unusual smell - 1cm decrease in height - no clumps 	77
3	<ul style="list-style-type: none"> - dark-chocolate/very deep brown - soil is moist and hydrated - no clumps - small decrease in height \approx 2cm 	73
4	<ul style="list-style-type: none"> - soil is dark chocolate brown - soil is moist and hydrated - soil is sticky to sides of cup - very small loss of height 	69
5	<ul style="list-style-type: none"> - soil showing increased signs of dryness - soil is still dark-chocolate brown with some light brown clumps - soil is starting to lose its hydration and moisture 	64
6	<ul style="list-style-type: none"> - dry clumps present on the surface - soil feels slightly dry but it is still more hydrated than when it came out of the bag - soil is a lighter brown than yesterday but it is still dark 	62
7	<ul style="list-style-type: none"> - surface of soil is dry, it penetrates \approx 1cm deep - below surface soil is dark but it still feels dry - lighter brown on surface and dark-chocolate brown below surface 	55

S.A.P Experiment Observations

No Polymer 2

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - looks more packed down compared to 1 and 3 - dark/black in colour - soil is moist and sticky 	89
2	<ul style="list-style-type: none"> - soil sticking to sides of cup - 2 large clumps - soil still feels moist and sticky - dark/black in colour - no unusual smell - 1-1.5cm loss in height 	79
3	<ul style="list-style-type: none"> - 2 large clumps - very deep brown (dark-chocolate/almost black) - soil is moist but feels dryer than NP1 - loss in height ~ 7cm 	74
4	<ul style="list-style-type: none"> - 2 large clumps are still there - soil is moist and hydrated - soil is sticky to cup walls in certain spots and separating from others - slight loss in height 	70
5	<ul style="list-style-type: none"> - soil is still moist and hydrated - soil shows no signs of dryness - soil is dark-chocolate brown in colour - 1 large clump is still present - soil is slightly sticking to cup walls 	66
6	<ul style="list-style-type: none"> - no visible signs of dryness - the soil particles aren't loose and have fused together into large clumps - soil is in between dry and hydrated but leans towards hydrated - dark-chocolate brown 	63
7	<ul style="list-style-type: none"> - 3 large clumps are dry - the rest of soil feels somewhat hydrated - most of the soil is dark-chocolate brown 	56

No Polymer 3

Day	Qualitative/Physical Observations	Weight (g)
1	<ul style="list-style-type: none"> - some clumping - soil hydrated and moist - soil is sticky - dark/black in colour 	99
2	<ul style="list-style-type: none"> - no visible loss in height - black colour - no unusual smell - feels moist and slightly sticky - soil sticking to the cup 	77 diff of 22g!
3	<ul style="list-style-type: none"> - soil is moist and hydrated - dark-chocolate brown (almost black) - soil is slightly sticky - slight loss in height ~ 3cm 	72
4	<ul style="list-style-type: none"> - soil is moist and hydrated - dark-chocolate brown in colour - the soils with no polymers are the most hydrated out of the other samples 	69
5	<ul style="list-style-type: none"> - soil is slightly dry still pretty moist and hydrated - ↓ dry clump - dark-chocolate brown in colour 	64
6	<ul style="list-style-type: none"> - visible dryness in patches on surface - below surface soil hydration is similar to NP 2 - dark-chocolate brown in colour - no visible clumps 	60
7	<ul style="list-style-type: none"> - majority of surface is dry; penetrates .5cm deep - below surface soil feels slightly hydrated - majority of soil is a dark-chocolate brown - dry surface is a medium-light brown 	54