Sink & Float

Montessori & EYLF	21 Aug 2018

Observation:

Jessica Matheson:
STEAM Streams: Science (physics)

Rationale: There are many physical forces that surround children on a day to day basis that they may not consciously notice but which impact their lives. Exploring the concept of buoyancy is an ideal way to help draw a child's attention towards these interesting phenomena as it is fun, accessible and easy to observe through hands-on experimentation.

Learning goal: To help children consider the different attributes of objects to identify whether they will sink or float.

Key words: Sink, float, buoyancy

Materials: A bowl, bucket or jug half-filled with water. A series of common objects - including some that will sink and others that will float (eg. shell, stone, ping-pong ball, small jar with lid, rubber duck). A towel. Two containers and two labels (one reading 'sink' the other reading 'float').

Hypothesis: Each child, upon choosing an object to test, is encouraged to guess (or 'hypothesise') whether it will sink or float.

Procedure: The child (or partnership or group) places one object at a time into the water after guessing whether it will sink or float. They watch for a few moments to observe its outcome and then remove it from the water, dry it with a towel, and place it in one of the two containers depending on whether they saw it 'sink' or 'float'. This process is repeated one object at a time until they have all been tested.

Outcome: At the end of the experiment children reflect on their two collections - the objects that sink and those that float - and analyse what similarities and differences they notice. Each child, partnership or group notice unique characteristics - such as some identifying that the "heavy" objects tend to sink while the "light" ones float, or others focusing on materials such as the way that more glass objects sink than plastic ones. It is not important for children to be 'correct' in their analysis of why the objects sink or float - the experience is not so much intended to result in a complete comprehension of buoyancy but is simply designed to encourage children to engage in the process of experimentation and analysis to start drawing their own conclusions from observation.

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Outcome 4: Children are confident and involved learners

- Children develop a range of skills and processes such as problem solving, enquiry, experimentation, hypothesising, researching and investigating.
- Children resource their own learning through connecting with people, place, technologies and natural and processed materials.

Analysis & Reflection:

Jessica Matheson:
Initially this experiment tends to be set up by the adult with a series of pre-selected objects so that there can be a fairly even comparison of some that sink and others that float. However this can be extended into a completely open-ended experience where children 'hunt and gather' for objects to test. In fact, once they've used this initial activity children tend to transfer and adapt this exploration whenever water is present - such as noticing that soap shavings float for a moment on the surface of a bowl of water before they mix them in to make bubbles, or observing that a fallen autumn leaf is floating on the surface of a puddle outside.

#steam

Montessori & EYLF	29 Aug 2018

Observation:

STEAM Child:

STEAM streams: Engineering, Science (Physics)

Rationale: It is an exciting experience for the children to build a machine all by themselves to learn about the effect of air power and gravitational force. Some children are already familiar about the obvious fact that earth pulls everything towards it as it is a huge magnet. This force is called gravitational force (gravity).

Learning goals:

Introduce the following concepts:

- Gravity (earth's pulling force) - This is done by giving some examples, such as jumping up and landing back on the ground.
- Air power – air is a power as it can carry or push things. This is done by reminding them of how wind carries the dead leaves and blows them from one place to another.
- Stored energy – batteries have stored energy in them due to which it makes the battery-operated toys move and make sounds.

Demonstrate how air power opposed by air pressure can make a ball float in the air.

Key words: gravity, air pressure, float, air, energy

Material:

A 'Turbo air' build and play kit based on a simple physical principle. All the material required for this activity is enclosed in the box, except for the batteries. (available at Target)

Hypothesis:

The ball will be floating in the air. It would neither fall down nor will it go up in the air when the switch is turned on.

Procedure:

- The card board base is assembled first so that the motor and wiring can sit on it.
- Wiring is connected by following the step by step instructions given in the box.
- After inserting the batteries, the motor will lift the ball up in the air and it will stay there due to gravity.

Outcome:

The hypothesis turned out to be correct.

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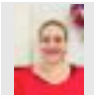
Outcome 4: Children are confident and involved learners

- Children develop a range of skills and processes such as problem solving, enquiry, experimentation, hypothesising, researching and investigating.
  - applies a wide variety of thinking strategies to engage with situations and solve problems, and adapt these strategies to new situations.
  - uses reflective thinking to consider why things happen and what can be learnt from these experiences.
- Children resource their own learning through connecting with people, place, technologies and natural and processed materials.

Leak proof bag.

Montessori & EYLF	21 Aug 2018

Observation:



Olivia Furner:
STEAM streams: science & maths

Rationale: Children explore the magic of a bag with holes that doesn't leak (straight away)

Materials:
Zip lock bag
Jug of water
Sharp pencils

Procedure:
Fill bag with water, as close to the top as possible & seal.
Ensure you find a large outdoor space to experiment in.
Insert one pencil at a time through both sides of the bag.
Once you have added as many pencils as you like, you can remove them and watch the

Extensions:
Count how many pencils you can fit in the bag.
Use different thickness bags or different sized pencils.

Science behind the experiment:

The polymers that make the plastic bag are similar to long strands of spaghetti, when each pencil is inserted it spreads the polymers for the pencils to push through and they enclose around the pencil and form a loose seal. Once the pencils are removed the water leaks as the pencils created permanent holes in the polymers.

Bubbles

Montessori & EYLF	16 Aug 2018

Observation:

Josie DiGirolami:
STEAM stream: Physics

Rationale: Most children love bubbles and this activity will give the children the opportunity to explore the wonder of bubbles.

Learning Goals: To teach the children to be able to control their bodies and their breath to be able to blow the bubbles. To learn about how bubbles are formed.

Key Words: Bubbles, soap/bubble mixture, floating

Materials: Bubble mixture, bubble blowers, containers for the bubble solution, and towels for wiping up any spills.

Hypothesis: When blowing at just the right strength, a bubble will form and then float up into the sky.

Presentation: Start by blowing bubbles and asking the children- what are bubbles, how are they made? Explain to the children that bubbles are pockets of soap and water that are filled with air. When soap and water are mixed together and air is blown into the mixture, the soap forms a thin skin or wall and traps the air, creating a bubble. These walls are so thin and light that the bubbles are able to float up into the air and then eventually burst.
Give the children a demonstration of how to blow a bubble and how careful you need to be - can't blow too hard, or too softly. Then give the children a chance to explore and experiment on their own.

Outcome: The children always have fun and show lots of excitement and interest in blowing bubbles. Some children were able to blow bubbles easily and refined the skills they already had. Others found it more challenging to create bubbles. We discovered it didn't matter how big or small the bubbles were, they would still float. If we blew too hard or too softly then bubbles wouldn't form. We also observed that the bubbles are multi coloured and the thin skin of the soap mixture reflects the light and creates a rainbow.

Rain Cloud in a Jar

Observations (EYLF)	28 Aug 2018

Observation:

Helen Morris:
Steam Streams: Gravity/ Environment .

Rationale: Children often speak of the 'weather' we are experiencing, during group times we discuss the weather children help gauge for themselves if they need to wear a jacket to protect them from the cold, a sun hat during the warmer months and if we should play under cover when it's raining.

Learning goals: To introduce the concept of how clouds are formed (water vapour rises into the air and condenses making the visible cloud represented by the shaving foam for this experience), when the water droplets within the cloud become heavy enough gravity pulls them down as raindrops (represented by the coloured water), this simplistic model gives children a hands on visual tool to their learning.

Key words: Clouds, rain, Gravity

Materials:
A clear jar
Shaving Foam
Water colour/food colouring
Pipettes

Hypothesis:
"It will roll off"
"It will make the cloud blue"

Procedure:
- Mix a few drops of colouring into some water and set aside this will be your rain (any colour will work)
- Fill the clear jar 3/4 full with water
- Squirt the shaving foam cloud directly onto the water, ensuring you have a 'fluffy cloud' on top
- ask your child to use their fine motor skills to draw some of the coloured water up into the pipette and gently squirt it on top of the shaving foam cloud
- observe
- you may wish to use different colours together or continue to saturate the 'cloud' until it deflates!

Outcome: The cloud becomes heavier and within minutes the first drops of coloured 'rain' should make it's way through the cloud and drop into the water underneath, causing cheers of excitement from the children.

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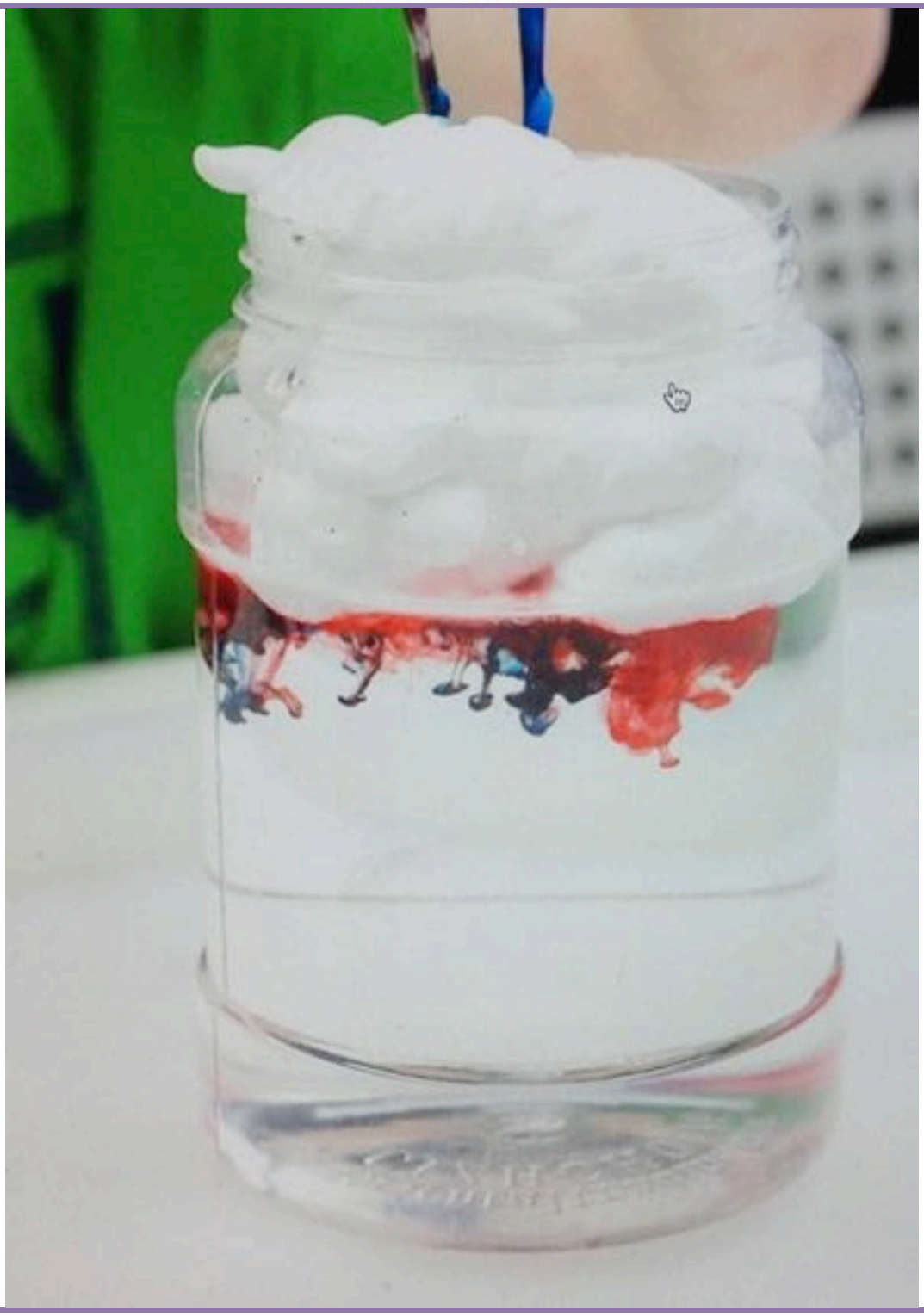


Outcome 4: Children are confident and involved learners

- Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity,commitment, enthusiasm, persistence, imagination and reflexivity.
- Children develop a range of skills and processes such as problem solving, enquiry, experimentation, hypothesising, researching and investigating.
- Children transfer and adapt what they have learned from one context to another.

Outcome 5: Children are effective communicators

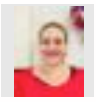
- Children interact verbally and non-verbally with others for a range of purposes.

Developmental Area: Cognitive; Fine Motor

Magic Water Rose

Montessori & EYLF	9 Aug 2018

Observation:



Olivia Furner:
STEAM streams: Engineering, art, science.

Rationale: Children have the opportunity to watch their flower bloom before their eyes.

Materials:
Flower template on plain white paper
Coloured pencils
Scissors
Tepid water

Procedure:
Colour in the flower and cut out along lines.
Fold each petal into the centre of the flower.
Pour water into an appropriate container.
Place the flower with the folded petals facing up.
Watch as flower blooms.

Questions to encourage discussion:
Why do you think the flower bloomed when placed in water?

Extensions/ Variations:
Make a smaller or larger flower and see if this effects the outcome.
Use warmer or cooler water and see what happens.

Science behind the experiment:
As the paper is made of wood fibres woven together there are small gaps within it. When the flower is placed in the water it absorbs the water into the gaps in the paper which causes it to expand and thus the petals gently move to reveal the flower.

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Outcome 2: Children are connected with and contribute to their world

- Children become socially responsible and show respect for the environment.
  - demonstrates an increasing knowledge of, and respect for natural and constructed environments.

Outcome 4: Children are confident and involved learners

- Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity,commitment, enthusiasm, persistence, imagination and reflexivity.
  - expresses wonder and interest in his/her environments.
  - uses play to investigate, imagine and explore ideas.
- Children develop a range of skills and processes such as problem solving, enquiry, experimentation, hypothesising, researching and investigating.
- Children resource their own learning through connecting with people, place, technologies and natural and processed materials.
  - experiences the benefits and pleasures of shared learning exploration.

#steam

Montessori & EYLF	15 Aug 2018

Observation:

Faryal Azhar:
STEAM Steam:Art

Rationale:Children at Jesscot are in love with the blossom tree. This love lead them to creating their own little versions of blossom trees which could be presented to their loved ones at home.

Learning Goals:

- Connecting with nature while collecting blossoms, twigs, and leaves
- The concept of working as a team and sharing all that is collected.
- Use their creativity to create their own master pieces by taking inspiration from their surroundings.
- Using their motor skills to apply glue
- Practising patience as they wait for the glue to dry

Key words:

Create, paste, collect, tree, blossom, artwork

Material:

- Glue
- Paper
- Twigs
- Flowers
- Leaves

Hypothesis:

- Creating a blossom tree on a paper that could be taken home
- all the material to make this tree will be available in the garden

Procedure:
- Children collect the leaves, twigs and blossoms from their garden in a basket
- They assemble the material on their papers using their imagination.
- After that they start applying glue on the under side of the material that they have assembled on the paper.
- This creation is kept somewhere safe so that they glue can dry.

Outcome: We worked as a team to collect material for making our blossom tree. This encouraged the children to work as a team and practice patience and the ability to share. They were able to appreciate the beauty of nature around them and then praise each other’s art pieces.

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Outcome 1: Children have a strong sense of identity

- Children feel safe, secure, and supported.
- Children learn to interact in relation to others with care, empathy and respect.

Outcome 2: Children are connected with and contribute to their world

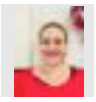
- Children become socially responsible and show respect for the environment.

#steam

Paper Rockets

Montessori & EYLF	3 Aug 2018

Observation:



Olivia Furner:
STEAM streams: Engineering; construction of the rocket. Science; air pressure

Rationale: Children enjoy exploring items which explore the concept of cause & effect.

Materials:
Rocket template (see templates)
Coloured pencils
Scissors
Sticky tape
Wide mouthed straw / pipette with narrow length cut off.
Standard sized drinking straw

Procedure:
Colour in the rocket image and cut out along lines.
Trim the large straw to no longer than the length of the rocket.
Tape closed one end of the trimmed wide straw, ensuring there are no openings present.
With the taped end of the straw facing up, tape the large straw to the back of the rocket.
Place the narrow straw into the wider straw and blow into the narrower straw, launching your rocket!

Questions to encourage discussion:
Why do you think the rocket launched when we blew into the straw?
If you bend the straw and then blow into it does the rocket still launch?
Is there a way to make the rocket fly in a certain direction?

Extensions:
Make a larger/heavier rocket, will it move the same way as the original?

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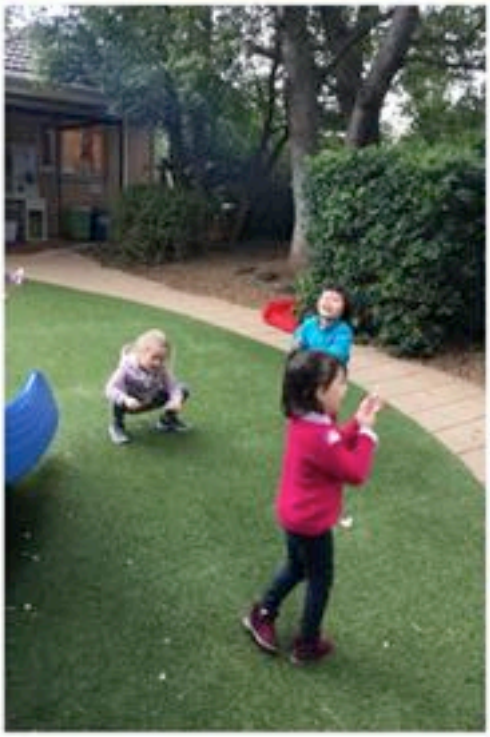
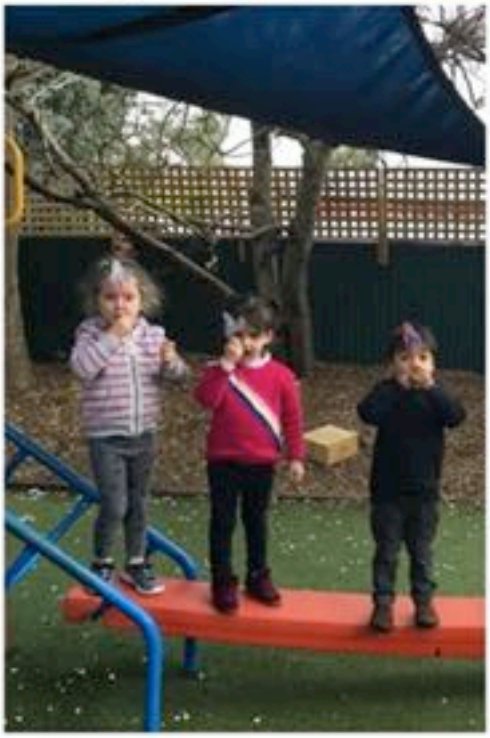


#steam

Paper Planes: Design, test, measure, record!

Montessori & EYLF	2 Aug 2018

Observation:

Jessica Matheson:
STEAM streams: Engineering, maths

Rationale: The children are intrinsically interested in folding paper planes and launching them in the garden to watch them fly, turn and somersault. The children often make spontaneous observations about the distances they fly and have started drawing casual comparisons from these.

Learning goals:
Introduce the concept of using charts to record data.
Demonstrate how maths can be embedded in play-based explorations and how it is relevant to day-to-day life.

Key words: Graph, chart, record, compare, measure, distance.

Materials:
Paper to fold into planes
Montessori Number Rods
Paper with chart template and writing instruments

Hypothesis:
Taiten: "I think mine will fly the longest."
Jethro: "The pointy end makes mine fly faster."

Procedure:
-The children fold paper planes based on a step-by-step demonstration given by a teacher beside them.
-The children place the Number Rods end-to-end to create a flight path that we can measure in consistent units.
-Each child takes a turn to stand on the 'runway' and launch their plane.
-The child then places their name tag beside where their plane landed and counts the number of units on the flight path to identify the distance travelled.
-The child records this number into the chart below their name.

Outcome:
After many repetitions - and lots of new children joining in - we were able to identify that all sorts of different planes can still fly long distances (and some can even perform special tricks like 'loop-de-loop'!) We identified that the planes that flew the farthest had some things in common - they were usually smaller and the folds were tighter. Jethro's hypothesis that the pointy end contributes to flight seems to be accurate as the pointier planes travelled in long, straight paths! Taiten's hypothesis appeared accurate for a long time during the experiment, as his plane travelled a very far distance and it took a long time for another child's plane to pass his record. When that did happen Taiten happily accepted that the results didn't quite match his expectations, and we discussed the fact that this often happens to scientists during experiments. Taiten examined the other paper plane to try to identify some tips he could use for his next plane, which embodies the scientific spirit of peer collaboration!

Maths / Linear Counting (0-10): Number Rods / Counts 10: Presented

Outcome 4: Children are confident and involved learners

- Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity,commitment, enthusiasm, persistence, imagination and reflexivity.

Outcome 5: Children are effective communicators

- Children interact verbally and non-verbally with others for a range of purposes.
- Children engage with a range of texts and gain meaning from these texts.
- Children begin to understand how symbols and pattern systems work.

Analysis & Reflection:

Jessica Matheson:
This experience generated a lot of interest and excitement as it capitalised on the natural interest of the children in building their own paper planes. The children were deeply engaged by the overall process, but the placement of the experience in the garden also allowed the flexibility for them to take breaks while waiting for their next turn (as it took quite a while for each child to launch, count and record). We started with a small group initially but more children asked to join in as they saw the fun we were having, and all our participants are eager to repeat it again!

What's Next?:

Jessica Matheson:
This experience can be repeated - not just because it's fun to revisit such an enjoyable game but also because it allows us to build up more 'data'! As we record more results the children can start to make deeper comparisons based on their analysis of the statistics and use this information to guide their continued activities.

For instance, does one person's plane always fly the farthest? If so, what is it about that design that makes it fly?

Or, did they all fly a shorter distance on a particular day? If so, why? Was the weather windy? Did we use different paper that day? What does this tell us about how weather conditions and materials affect the outcome?

#steam

Slime - Solids and Liquids

Observations (EYLF)	28 Aug 2018

Observation:

Helen Morris:
Steam Streams - Maths, Science, Art

Rationale: To provide sensory play

Learning goals: Children follow a recipe looking into ratios embedding maths into play based experiences

Key words: Slime, sticky, gooey, oozing

Materials:
Elmer's washable clear glue
Elmer's magical liquid
Glitter
Bowl
Spoon

(There are many slime recipes available on the Internet, these are an example of the ingredients we used)

Hypothesis:

"it will be sticky like glue"
"It won't work because it's too runny"

Procedure:
- Pour glue into a bowl
- Add the magical liquid a little at a time, mix with the glue until fully blended
- Take slime out of the bowl and begin kneeing with both hands until the slime reaches your desired consistency
- Add glitter if desired

Outcome:
Slime has the strangest characteristics that flows almost like a liquid, but it's obviously a solid it clings to you hands but shouldn't be too sticky!
Children seem to need time to play with it, to explore, discover and experiment to enable them to make to process such a strange sensory material, they may then wish to add props into the play.

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Montessori Pre-School

Outcome 1: Children have a strong sense of identity

- Children feel safe, secure, and supported.

Outcome 4: Children are confident and involved learners

- Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity,commitment, enthusiasm, persistence, imagination and reflexivity.
  - is curious and enthusiastic participants in his/her learning.
- Children develop a range of skills and processes such as problem solving, enquiry, experimentation, hypothesising, researching and investigating.
- Children transfer and adapt what they have learned from one context to another.

Developmental Area: Social; Emotional; Cognitive; Fine Motor