



Prize Winner

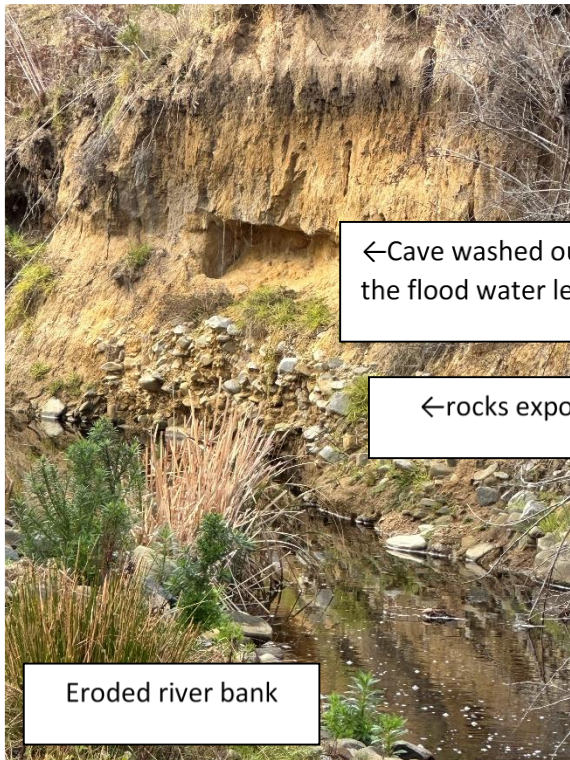
Scientific Inquiry

Year R-2

Haider Chalooob

**St Peter's Woodlands Grammar
School**





←Cave washed out by
the flood water level

←rocks exposed

Eroded river bank

EROSION

Haider Chalooob ID: 0683-008

St Peter's Woodlands Grammar School

Reception

Category: Scientific Inquiry

EROSION

Background:

During the winter the river at my farm can flood, this causes a lot of damage, knocks down trees and eats away at the river bank. This is due to erosion. Erosion is when the wind, water and other natural forces make little bits of dirt and rock slowly breakdown. The rock then washes away or is blown away to a new place in a process called deposition. When the rivers flow, the water is always moving bits of dirt and rocks downstream with the water and wash up further along the river onto the river banks. When the wave on the beach crash against the rocks, over time they break down the rocks to form new sand which can be carried back out to sea. Erosion and deposition are a natural process that reshapes the land.

Sometimes erosion can be bad and cause problems. The top of the soil is full of nutrients that allow the flowers and grass and plants to grow. When the wind and rain washes or blows the soil away the land is left with no good soil and this makes it hard to grow things. When the rivers flood and eat away and erode the river banks, it can make the river banks unstable, then the river banks might collapse and the trees fall over, which is what happened on my farm when the river flooded. Erosion can also cause landslides, where massive parts of the soil and rocks suddenly move, this can be dangerous to anything in its path and will destroy what is on top, even moving houses.

This experiment was made to learn about how erosion works and to look at what might slow down erosion. I will be able to hopefully learn ways to prevent erosion on my farm.

Aim: To test if having ground coverage helps slow down erosion.

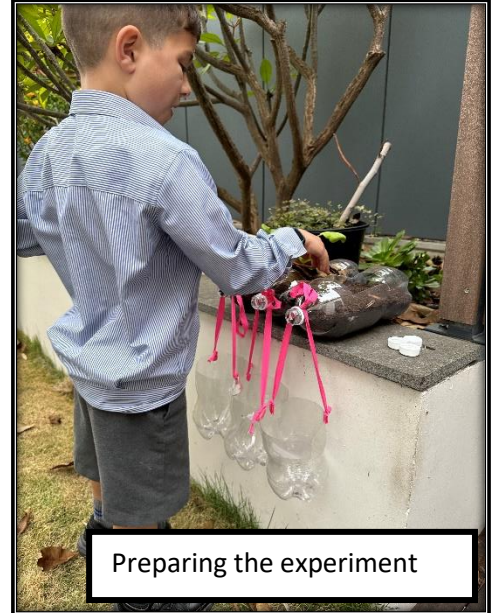
Materials:

- 6x 2L bottles (empty)
- Soil
- Scissors
- String
- Plants (I used radishes)
- Bark, leaves
- Water
- Measuring jug
- Spray bottle
- Marker pen and paper

Method:

1. Cut out a rectangle shape 10x20cm from the side of three 2L bottles and fill with equal amounts of soil and take the lids off the bottles,
 - a. Bottle A: plant radishes/other plants
 - b. Bottle B: put leaves and sticks and bark on the soil

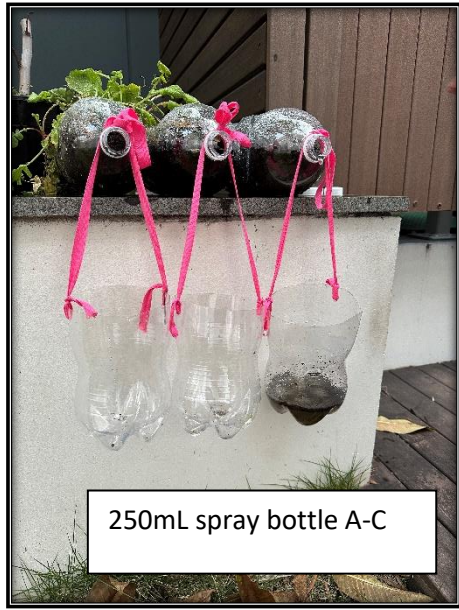
- c. Bottle C: soil only
2. Prepare the other 3 bottles
 - a. Cut the 3 bottles in half
 - b. Make two small holes in each bottle near the cut edge
 - c. Tie string 25cm long onto the half bottles to make a handle
3. Put the string of the bottles over the other bottle spouts A-C
4. Slowly pour equal amounts of water into each of the bottles at the far end.
5. Measure the amount of water and the colour of the water that drains into the under bottle.
6. Test with different flow rates and amounts.
 - a. 100mL spray bottle
 - b. 250ml spray bottle
 - c. 250ml slow pour water from cup
 - d. 250ml fast pour water from cup
 - e. 500ml fast pour water from cup
7. Record results



Preparing the experiment

Results

	Bottle A- plants		Bottle B- leaves		Bottle C-soil only	
	Volume in bottom bottle	Colour	Volume in bottom bottle	Colour	Volume in bottom bottle	Colour
100ml spray bottle water	0	-	0	-	50mL	Clear with small dirt
250mL spray bottle water	0	-	0	-	100mL	Clear with small dirt
250ml slow water	10ml	Clear with small dirt at bottom	50ml	Clear with small dirt at bottom	100mL	Very dirty water
250ml fast water	50ml	Clear water with dirt at bottom of container	100ml	Slightly brown water with lots of dirt at bottom of container	175ml	Very dirty dark water with lots of dirt mixed in
500ml fast water	100ml	Dirty water	300ml	Less dirty water than the plant water	350ml	Very dirty dark water with lots of dirt mixed in



Observations

When I used the spray bottle, it was like very light rain slowly going onto the soil. I then tried to see what would happen with heavier rain fall by using faster pouring and larger amounts of water. I also tried to test what a fast running flooded river would be like on the banks of a river by using 500 millilitres of fast flowing water.

The container A which had the plant roots had much less water run-off into the lower container. When the soil was wet with a spray bottle there was no run off of soil or water. The more water and the faster I poured, the more water ran off and the darker and dirtier the water became. The roots of plants hold onto the soil and keep it in place, stopping it running into the bottom container. This showed less erosion of the soil compared to the other containers.

In container B, the soil was covered in sticks, leaves and bark. This container had more run off of water in all my experiments compared to container A, but less than container C that had nothing covering the soil. The water running off became dirtier with larger amounts and faster poured water. This showed that some coverage of the soil with leaves, bark and sticks can help protect the soil from heavy rains and reduce erosion.

Container C only had soil. Even when I sprayed water onto the soil, the water still ran off into the bottom container and always washed off lots of soil. When I poured the 500 millilitres of fast flowing water, like a flood on a river bank, it washed away lots of soil and the bottom container was filled with lots of dirty water and soil. The top container C also had much less soil left at the end compared to container A and B.

Conclusion

Plants help keep the soil in place and reduce erosion more than just covering soil in leaves and sticks. leaves and sticks covering the soil prevent erosion more than leaving the soil bare.

Discussion

To reduce the erosion of the riverbanks on my farm, we can build a wind barrier with trees or sheds to stop the wind blowing the ground. I can plant grass and other plants so the roots hold the soil and rocks together and to suck up any excess ground water. I should be careful to not have too many people or animals walking close to the river banks and causing more erosion. I can also divert the river away from the eroded area whilst the plants are growing.

Bibliography

1. Encyclopaedia Britannica Inc 2024. *Erosion*, accessed 14th May 2024, <<https://kids.britannica.com/kids/article/erosion/399447#:~:text=Water%2C%20wind%2C%20and%20other%20natural,These%20processes%20are%20called%20erosion.>>>
2. Little School 2023. What is erosion? Science for Kids, accessed 14th May 2024, <<https://www.youtube.com/watch?v=pTs9Fb7uGOM>>
3. Sulaeman S and Westhoff T 2020. The causes and effects of soil erosion and how to prevent it, accessed May 14th 2024 <https://www.wri.org/insights/causes-and-effects-soil-erosion-and-how-prevent-it#:~:text=Soil%20erosion%20decreases%20soil%20fertility,can%20eventually%20lead%20to%20flooding.>
4. Norther Virginia Soil and Water Conservation District. Atop Erosion- solving drainage and erosion problems. Accessed May 14th 2024 <https://www.fairfaxcounty.gov/soil-water-conservation/drainage-problem-protect-eroding-land>
5. Bush Heritage Australia 2024. Erosion control. Accessed May 14th 2024 https://www.bushheritage.org.au/what-we-do/landscape-management/erosion?gad_source=1&gclid=CjwKCAjwm_SzBhAsEiwAXE2Cv--QUyZKKP0CA3HU7BcRB5NaZI4ADRNZTjnipQSkyTXx68zElyZGGRoC-rUQAvD_BwE

Acknowledgement

I worked with my mum for weeks and I looked up lots of ideas. My mum helped type the answer to all the questions I thought off and showed me how to make a table on the computer. I did a lot of talking and mum did a lot of typing. Mum took my photos of me doing the experiment and going on a science erosion walk. Mum did the bibliography.

Word count: 953

Scientific Inquiry Workbook

EROSION

13/5/2024

There was a big flood at my farm, the water ran down the hill and filled up the house yard and covered all the grass, it was like a swimming pool in my backyard. When the water dried up the grass looked exactly the same. In the same flood, the river got very high reaching the house yard, when the water level dropped in the river back to the normal height, the river bed looked very different as all the soil had washed off the river beds and side of the river, all that was left was lots of rocks and bare tree roots. Now that the soil is washed away the river is starting to carve into the river walls and the walls of the river are falling in and even some trees have now fallen over because the soil around their roots is gone.

I want to help the river and plants and stop the floods eroding away the land. I think the grass roots are helping hold the soil in place in my backyard but I want to test this because if the grass roots stop the erosion, we can then use this information to plant more trees, grass and plants on the river to stop the erosion.

14/5/2024

For a couple of weeks, I've been learning all about erosion. Some the questions I looked up were:

1. What is erosion?

Erosion is when the wind, water and other natural forces make the rocks, dirt and earth breakdown, move away and reshape the land. In Latin it means "to eat away".

Encyclopaedia Britannica Inc 2024. *Erosion*, accessed 14th May 2024,
<[Little School 2023. What is erosion? Science for Kids, accessed 14th May 2024,
<\[>\]\(https://www.youtube.com/watch?v=pTs9Fb7uG0M\)>](https://kids.britannica.com/kids/article/erosion/399447#:~:text=Water%2C%20wind%2C%20and%20other%20natural,These%20processes%20are%20called%20erosion.>></p></div><div data-bbox=)

2. Why is erosion bad?

It is not always bad, it is also a natural thing to happen that helps reshape the earth. Erosion causes little bits of dirt and rock to slowly breakdown and then it washes away or is blown away to a new place. When the rivers flow, they are always moving bits of dirt, rocks and pebbles down stream with the water flow and wash up further along the river onto the river banks. when the wave on the beach

crash against the rocks, over time they break down the rocks to form new sand which can be carried back out to sea.

But sometimes erosion can be bad and cause problems. The top of the soil is full of nutrients that allow the flowers and grass and plants to grow. When the wind and rain washes or blows this soil away the land is left with no good soil and this makes it hard to grow things. When the rivers flood and eat away and erode the river banks, it can make the trees and river banks unstable and cause then river banks and to collapse and trees to fall over. Erosion can also cause landslides, where massive parts of the soil and rocks suddenly move, this can be dangerous to anything in its path and will destroy what is on top, even moving houses!

Sulaeman S and Westhoff T 2020. The causes and effects of soil erosion and how to prevent it, accessed May 14th 2024 <https://www.wri.org/insights/causes-and-effects-soil-erosion-and-how-prevent-it#:~:text=Soil%20erosion%20decreases%20soil%20fertility,can%20eventually%20lead%20to%20flooding.>

3. Can we stop erosion?

We can plant trees and grass to help hold the soil in place. We can make wind barriers. We can change where the water flows by making a track for the water to flow so it follows the track instead of water running all over the paddocks. We can fill the paths with rocks or concrete.

Norther Virginia Soil and Water Conservation District. Atop Erosion- solving drainage and erosion problems. Accessed May 14th 2024 <https://www.fairfaxcounty.gov/soil-water-conservation/drainage-problem-protect-eroding-land>

Bush Heritage Australia 2024. Erosion control. Accessed May 14th 2024 https://www.bushheritage.org.au/what-we-do/landscape-management/erosion?gad_source=1&gclid=CjwKCAjwm_SzBhAsEiwAXE2Cv--QUyZKKP0CA3HU7BcRB5NaZI4ADRNZTjmipQSkyTXx68zElyZGGRoC-rUQAvD_BwE

9/6/2024

After talking lots and learning about erosion, I walked around my farm today with my mum and brother, we played at the river and on the river banks. We walked along the river and looked at the steep cliff faces on some parts of the river bank, we even found a bit of a cave. We walked along the tracks made by the cows, it was a bit muddy and slippery but on both sides of the tracks was grass and no mud. We used water pistols to squirt the areas of erosion and watched as muddy water ran down. Some of the questions my mum asked and I answered were:

1. What is erosion?

- a. When the wind blows or the water washed the soil away from the ground. It can also happen when people or animals walk across the ground.

2. Where did we find erosion?

- a. Along the river bank, I could see where the last flood level of the river was because there was a cave formed along the river bank and half way up the river bank had rocks and no dirt as all the dirt had washed away.
- b. At the edges of the river, my feet made the water there muddy as they eroded the bank more with my stomping.
- c. Along the land where the cows keep walking the same track.
- d. Under the tree on the riverbank.

3. How did you know it was eroded land?

- a. The cow track- it was muddy and the ground was lower than the ground around it.
- b. River bank- the sides only had rock as all the dirt had been washed away. I could also see the tree roots.

4. How did you show your brother an example of how erosion happens?

- a. I squirted water onto the eroded river bank and muddy water ran down the bank, leaving a small hole path where the water went.

5. What might happen if we don't fix the erosion?

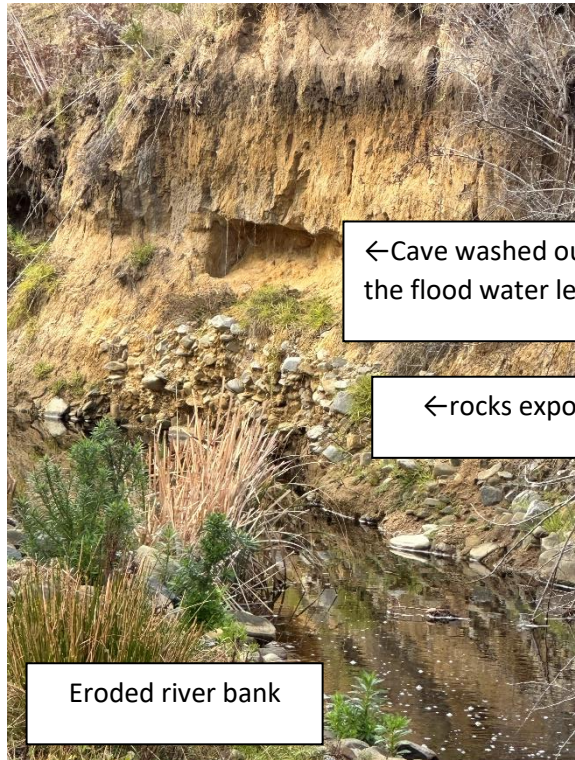
- a. River bank- the river bank might fall into the river, as well as the fence and cows.
- b. Cow tracks- the tracks might get deeper and cause a gully which can be dangerous for the cows.

6. What can we do to stop erosion?

- a. We can build a barrier of concrete to stop the water reaching the eroded areas.
- b. We can divert the river away from the eroded river bank.
- c. We can plant lots of grass and plants to make root systems to hold the dirt together and stick it to the ground. The plants can also suck up any water sitting on the dirt.
- d. We can build a wind barrier with trees or sheds to stop the wind blowing the ground.
- e. We can stop people and the animals walking on the tracks they've created so the grass can grow back.



Squirting water against the eroded area made more erosion with brown water run off



←Cave washed out by the flood water level

←rocks exposed

Eroded river bank



← cow tracks eroding the soil

←Exposed rocks- soil washed away

←muddy water edge from my feet eroding the river bank

←Grass preventing erosion



14th-15th June 2024

I have been getting my experiment ready.

Aim: To test if having ground coverage helps slow down erosion.

What I needed and how I did it.

Materials:

- 6x 2L bottles (empty)
- Soil
- Scissors
- String
- Soil
- Plants (I used radishes)
- Bark, leaves
- Water
- Measuring jug
- Spray bottle
- Marker pen and paper

Method

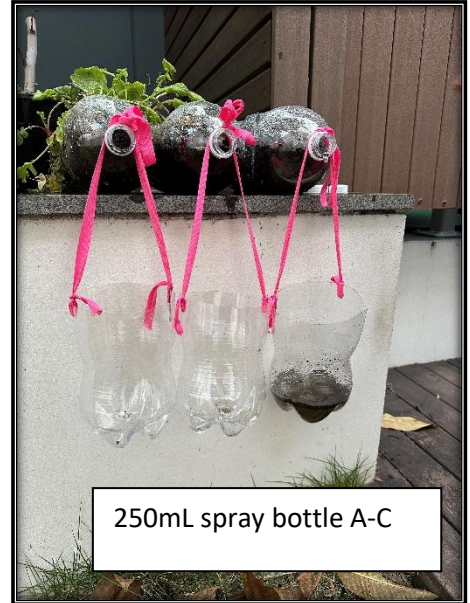
- Cut out a rectangle shape 10x20cm from the side of 3 bottles and fill with equal amounts of soil
 - o Bottle A: plant radishes
 - o Bottle B: put leaves and sticks and bark on the soil
 - o Bottle C: soil only
- Prepare the other 3 bottles
 - o Cut the 3 bottles in half
 - o Make two small holes in each bottle near the cut edge
 - o Tie string 25cm long onto half bottles to make a handle
- Put the string of the bottles over the other bottle spouts A-C
- Slowly pour equal amounts of water into each of the bottles at the far end.
- Measure the amount of water and the colour of the water that drains into the under bottle.
- Test with different flow rates and amounts.
 - o 100mL spray bottle
 - o 100ml slow pour water from cup
 - o 250ml slow pour water from cup
 - o 100ml fast pour water from cup
 - o 250ml fast pour water from cup
 - o 500ml fast pour water from cup
- Record results

June 17th 2024- experiment day

Results

	Bottle A- plants		Bottle B- leaves		Bottle C-soil only	
	Volume in bottom bottle	Colour	Volume in bottom bottle	Colour	Volume in bottom bottle	Colour
100ml spray bottle water	0	-	0	-	50mL	Clear with small dirt
250mL spray bottle water	0	-	0	-	100mL	Clear with small dirt
250ml slow water	10ml	Clear with small dirt at bottom	50ml	Clear with small dirt at bottom	100mL	Very dirty water
250ml fast water	50ml	Clear water with dirt at bottom of container	100ml	Slightly brown water with lots of dirt at bottom of container	175ml	Very dirty dark water with lots of dirt mixed in
500ml fast water	100ml	Dirty water	300ml	Less dirty water than the	350ml	Very dirty dark water

				plant water		with lots of dirt mixed in
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Observations

When I used the spray bottle, it was like very light rain slowly going onto the soil. I then tried to see what would happen with heavier rain fall by using faster pouring and larger amounts of water. I also tried to test what a fast running flooded river would be like on the banks of a river by using 500 millilitres of fast flowing water.

Overall the container A which had the plant roots have much less water run off into the lower container. When the soil was wet with a spray bottle there was no run off of soil or water. The more water and the faster I poured, the more water ran off and the darker and dirtier the water became. The roots of plants hold onto the soil and keep it in place, stopping it running into the bottom container. This showed less erosion of the soil compared to the other containers.

In container B, the soil was covered in sticks, leaves and bark. This container had more run off of water in all my experiments compared to container A, but less than container C that have nothing covering the soil. The water running off became more dirty with large amounts and faster running soil. This shows that some coverage of the soil with leaves, bark and sticks can help protect the soil from heavy rains and reduces erosion.

Container C only had soil. Even when I sprayed water onto the soil, the water still ran off into the bottom container and always washed off lots of soil. When I poured the 500 millilitres of fast flowing water, like a flood on a river bank, it washed away lots of soil and the run off water was lots and had lots of soil in it. The top container also had much less soil left at the end compared to container A and B.

Conclusion

Plants help keep the soil in place and reduce erosion more than just covering soil in leaves and sticks. leaves and sticks covering the soil prevent erosion more than leaving the soil bare.

18-21st June 2024

Report writing

My mum typed and we talked about what I did and how I learnt, I used lots of the sections in my workbook that we already talked about and typed.

OSA RISK ASSESSMENT FORM

for all entries in Models & Inventions and Scientific Inquiry

This must be included with your report, log book or entry. One form per entry.

STUDENT(S) NAME: Haider Chalooob ID: 0683-008

SCHOOL: St Peter's Woodlands Grammar School

Activity: Give a brief outline of what you are planning to do.

There was a big flood at my farm that washed away part of our riverbank, this was erosion, I am going to learn more about erosion and design an experiment to teach my class about how to prevent erosion.

Are there possible risks? Consider the following:

- Chemical risks: Are you using chemicals? If so, check with your teacher that any chemicals to be used are on the approved list for schools. Check the safety requirements for their use, such as eye protection and eyewash facilities, availability of running water, use of gloves, a well-ventilated area or fume cupboard.
- Thermal risks: Are you heating things? Could you be burnt?
- Biological risks: Are you working with micro-organisms such as mould and bacteria?
- Sharps risks: Are you cutting things, and is there a risk of injury from sharp objects?
- Electrical risks: Are you using mains (240 volt) electricity? How will you make sure that this is safe? Could you use a battery instead?
- Radiation risks: Does your entry use potentially harmful radiation such as UV or lasers?
- Other hazards.

Also, if you are using other people as subjects in an investigation you must get them to sign a note consenting to be part of your experiment.

Risks	How I will control/manage the risk
Water risk	I will be supervised by my parents as I work close to water and the river. I will hold my parents hand near the water edge.
Scissors	I need to use scissors to cut my soil pots, my parents will supervise and help if I need help.

(Attach another sheet if needed.)

Risk Assessment indicates that this activity can be safely carried out

RISK ASSESSMENT COMPLETED BY (student name(s)): Haider Chalooob

SIGNATURE(S): Haider

By ticking this box, I/we state that my/our project adheres to the listed criteria for this Category.

TEACHER'S NAME: Mr Kennedy

SIGNATURE: David Kennedy DATE: 24.6.2024