Turtle Troubles

Grade Level: 3-5 but the discussion can be scaled for different grade levels

Time: 30 minutes

Objective: The students will be able to describe some of the threats turtles face and actions which they can take to help turtles.

VA SOL: Scientific and Engineering Practices such as asking questions; defining problems; interpreting data via modeling; and constructing conclusions and explanations are also touched on throughout this activity

K 6a-b-7a and 11c 1.5a, 1.8b 2.5a-c 3.5a-b, 3.8a 4.3a/c, 4.8a-d

6.8d, 6.9a/e/f LS 6b/d, 8a-c, 9a-c BIO 8a/d, ES 8

ENV 5, 6, 8, 9, 10, 11, 12 ECO II, III, IV

Materials:

Bog Turtle Habitat and Hazard Tiles- if possible, printed on card stock and laminated

The 6 Scenario Cards and 1 Wrap Up Card- if possible, printed on card stock and laminated

Turtles (1 per student)- either turtle cut outs or plastic turtles- numbered on the bottom

Small clipart pictures of 4 raccoons and 2 dogs

Plastic Tub – for turtles stolen for the pet trade

2 sheets of colored paper

Background Information

Reptiles are a group of vertebrate animals that are **ectothermic** (cold-blooded), have scaly skin and breathe using lungs. Most reptiles also lay leathery eggs and, with the exception of snakes, have claws. A few reptiles, such as alligators, guard their nests, while most simply lay their eggs and move on. Since their skin is covered in scales, all reptiles must periodically shed their skin as they grow. Reptiles can be carnivores, omnivores or herbivores. The oldest living group of reptiles are the turtles or Testudines.

Turtles are differentiated from other groups of reptiles by their shell and presence of a beak rather than teeth. The upper shell of a turtle is called the **carapace**, while the lower is called the **plastron**. The two are joined by bony structures called bridges. The inner layer of a turtle's shell is made up of about 60 bones including portions of the backbone and the ribs, so turtles cannot crawl out of their shells. In most turtles, the outer layer of the shell is covered by horny scales called **scutes** made up of fibrous keratin (that also makes up the scales of other reptiles). The term “terrapins” is sometimes used for turtles that are semi-aquatic and live near **brackish** waters or in swampy regions, such as the diamondback terrapin.

The bog turtle (*Glyptemys muhlenbergii*) is the smallest turtle found in the United States. The largest bog turtle ever found measured only 4.5 inches and weighed about the same as a bar of soap. Bog turtles are identified by the patches of orange found along the side of their heads. The bog turtle is one of the rarest turtles found in the United States. The current bog turtle population is unknown but estimates range from 2,500 to 10,000. Virginia's population of bog turtles occurs in the southwest portion of the state and is part of the southern population of bog turtles. Bog turtles are currently listed as critically endangered throughout their range meaning they are considered at an extremely high risk of becoming extinct in the wild.

Bog turtles live in saturated, usually spring-fed wetlands such as bogs, fens and wet meadows preferring relatively open wetlands with slowly flowing streams or surface seeps. These wetlands are usually dominated by clumps of grasses and sedges, and have soft muddy bottoms where turtles hibernate. Bog turtle numbers have dramatically declined since 1980. The decline has been linked to the loss and degradation wetlands due to drainage, development and **invasive plant** species. Increased fragmentation of their habitat has made bog turtles more vulnerable to **predation** from raccoons, foxes and dogs. Development and roads also makes travel for male turtles seeking mates extremely hazardous and limit the possibility of migration to new habitat.

As more of their remaining habitat has become protected, the greatest threat to bog turtles is now illegal collection for the pet industry. Laws banning the collection of the turtles for sale have done little to stop the practice with bog turtles being a prized species in many animal black markets.

Female bog turtles build their nests and lay their clutch of 1-6 eggs in late spring and early summer. The turtle chooses a sunny spot for **incubation** and then leaves the eggs. Incubation takes 45-65 days until baby turtles less than 1-inch-long **hatch**. Bog turtles reproduce at around 5-7 years and may live for 30- 40 years.

Vocabulary

Bask: to lie exposed to warmth and light, typically from the sun.

Brackish: slightly salty water such as the mixture of river water and seawater in estuaries.

Carapace: the hard upper shell of a turtle.

Ectothermic: an organism that regulates its body temperature largely by exchanging heat with its surroundings, also known as cold-blooded.

Habitat: the natural home of a living organism considered to have four elements: food, water, shelter and space.

Hatch/ Hatchling: emerge from its egg / a young animal that has recently emerged from its egg.

Incubate: keep eggs at a suitable temperature so that they develop. With turtles this is achieved by the location of the nest.

Invasive: An invasive species is a plant, fungus, or animal species that is not native to a specific location,

and that has a tendency to spread to a degree that it causes damage to the environment, human economy or human health.

Plastron: the underside of a turtle's shell.

Predation: when an animal (the predator) naturally kills and eats another animal (the prey)

Scutes: the scales that cover a turtle shell.

Procedure:

Before the Activity:

1) Place the sections of habitat next to each other on the floor (each section is numbered) and keep the housing, roads and invasive plant sections to add during the activity.

2) Have a tub ready to remove the turtles that are stolen for the pet trade. To help keep track of how many turtles "resting" (die), you can add a border around the habitat in colored paper where turtles that are removed during each scenario can be put.

During the Activity:

3) Give one turtle (cutout or plastic) to each student (tell students they need to remember their turtle's number so students have a stronger stake in the turtle's survival). Tell students that they will become a bog turtle during this activity and give them background information about the bog turtle.

4) Explain that the green areas in the habitat represent wet marshy grass that would provide good habitat for a bog turtle. Bog turtles travel only a few feet each day and can live their whole lives in an area as small as a football field, so can be put close together if the students wish.

5) Each student should then choose a good place for their bog turtle to live. Emphasize that once their home is chosen, the turtles have to remain in place unless told to move.

6) Tell the students that these turtles represent all the turtles that lived in Virginia about 30 years ago. Unfortunately since then, the population has declined, and we are going to investigate why they are now endangered.

7) Select 2 volunteers. Have one student read the 'Meadow Brook Homes' scenario, and have the other volunteer help choose 4 of the habitat sections to cover with the housing development. Any turtles in these areas die and should be removed from the habitat and placed in the turtle 'resting' zone

8) Ask for a second pair of volunteers to read the 'Fast Cars' scenario, add the 2 road sections and remove any turtles in those sections.

9) Ask students what they can do to help a turtle cross the road. Explain that if it is safe, they can stop and carry the turtle across the way it was going (don't turn the turtle around even if it is headed towards a bad habitat area as the turtle will just try to cross the road again when you have left.) Also, remind students to leave turtles where they find them. If you move a turtle it will try to find its way home and wander in circles crossing more roads in the process.

10) Select a third set of volunteers. Have one read the 'Trash Attracts' scenario. Explain that bog turtles

are so small that their eggs, baby turtles and even the adults can be eaten by predators. Have the other volunteer remove turtles in two sections adjacent to the housing development. Place the pictures of the raccoons and dogs in these areas. Explain this is no longer suitable habitat for turtles.

*Depending on student age and time available, the activity can be simplified by removing the 'Invasive Plants' scenario. In this case, use the alternative 'Goats to the Rescue' card.

11) Ask for another pair of volunteers. Have one read the 'Invasive Plants' scenario. Ask class if they know what an invasive plant is. An invasive plant or animal is one that gets introduced to a new place where it does not normally live and where it then causes harm. Tell the students the word ''invasive,'' is like the word ''invade'', because the plants invade and take over. Purple loosestrife is an example of an invasive plant (show pictures). It naturally grows in Europe, but people brought it to plant in yards in America because it has pretty purple flowers. However, seeds blow from people's yards into wild places where it can take over and grows so thickly (compare with bamboo which many students know) that turtles cannot push through to find food. Have the other volunteer pick 3 of the habitat squares to cover with the invasive plant sheets. Any turtles in the affected areas have to leave their habitat and travel to an adjacent habitat area.

12) Have another volunteer read 'Goats to the Rescue'. Explain that any turtle with two dots on it that is in the resting zone can return to the restored habitat. These turtles represent baby turtles that survive in the habitat.

13) Ask for a volunteer to read the 'Pet Trade' scenario. Have the students find the habitat section with the most turtles and remove all the turtles on that section. Place these turtles in the plastic tank to show they are being taken away to be pets. Explain to the students that people will pay a lot of money for bog turtles to keep them as pets because they are rare and very cute. Even though bog turtles are protected by law, people steal them from their habitat to sell. As well as threatening the survival of bog turtles as a wild species, most wild turtles die in captivity – about 9 out of 10 wild turtles usually die in their first year kept as a pet. Explain that turtles do not make great pets – they can carry salmonella, live a long time and don't show affection or come when called.

14) Ask students how many turtles survived our scenarios. In Virginia, the number of turtles has declined significantly (by about half) in the last 30 years. How did the survival rate in our habitat compare? Have students collect up the remaining turtles and habitat cards and return to carpet or seats.

After the Activity

15) Are there things students could do to help protect turtles? They can write ideas on the outlines of the bog turtles provided on the follow-up document.

Have students consider:

- What caused the greatest decline in turtles?
- Should dogs be let off the leash in places where wild animals live?
- How can we help turtles that are trying to cross the road?
- Why might wild animals not make good pets?
- Why are turtles difficult pets to keep? (consider their longevity, carry salmonella, need to clean tank, do not respond to name or show affection)

Scenario Cards for Bog Turtle Habitat Threats Activity

1. Meadow Brook Homes

New houses are built with lovely views over the river.

Place the 4 new housing areas over 4 of the habitat areas - the houses must all be next to each other.

Any turtles that lived in these areas die and have to be removed from the bog turtle habitat.

2. Fast Cars

A new road is built to access the new houses.

Place the two road sections on the map so they meet the houses

The turtles that lived in these habitat areas try to cross the road and are hit by cars. Remove these turtles from the bog turtle habitat.

3. Trash and Predators

Trash left out at the new homes attract more raccoons to the area. One family lets their dog run off the leash. The raccoons and dog find turtles that live close to the houses and kill them.

Place the dog and raccoon pictures each in a habitat area next to the houses. Any turtles that live there are killed and have to be removed

4. Invasive Plants

Meadow Brook homeowners have planted lots of flowers and trees in their yards. Unfortunately some of these plants are invasive and their seeds spread into the turtle habitat. Thick bushes grow and shade the ground, stopping the turtles from basking in the sun. Although the flowers of purple loosestrife look pretty, the plants grow so closely that the turtles cannot push through to find food.

Add 3 invasive plant areas on top of the bog turtle habitat.

Any turtles that live in these areas have to move to a habitat next to them

5. Goats to the Rescue

Department of Natural Resources' scientists work to help bog turtles by restoring their habitat. They bring in goats that eat the invasive plants and make open, muddy areas for the turtles again.

Any turtle with two dots can be added back into the habitat (as new baby turtles)

6. Pet Trade

Bog turtles are so cute that people will buy them as pets even when they have been stolen from the wild. A robber comes to the area to take turtles.

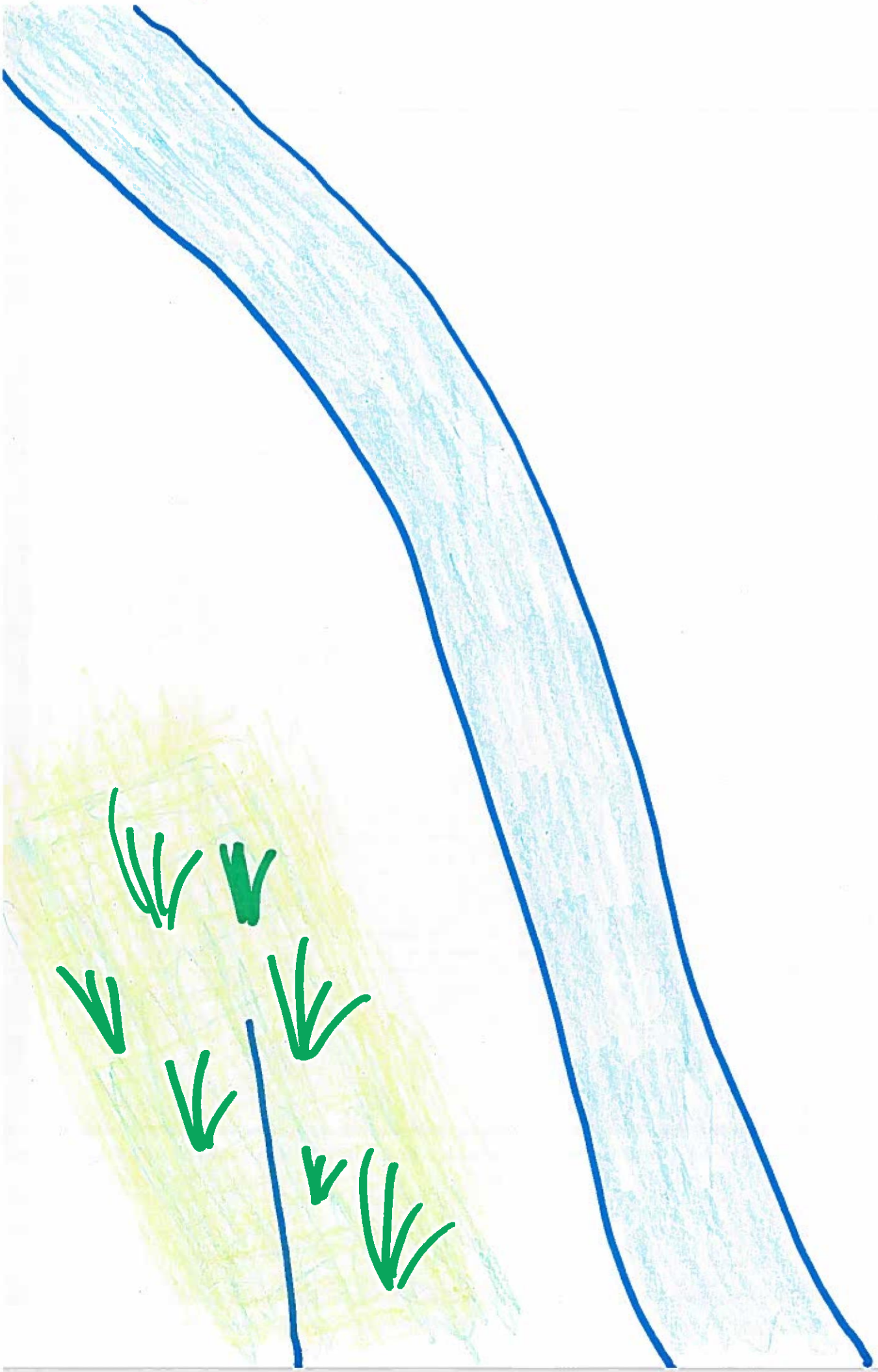
Look for the habitat section with the most turtles. All of the turtles in this section are taken and put in the tank to go to the pet store. Most of the turtles will die in their first year kept as a pet.

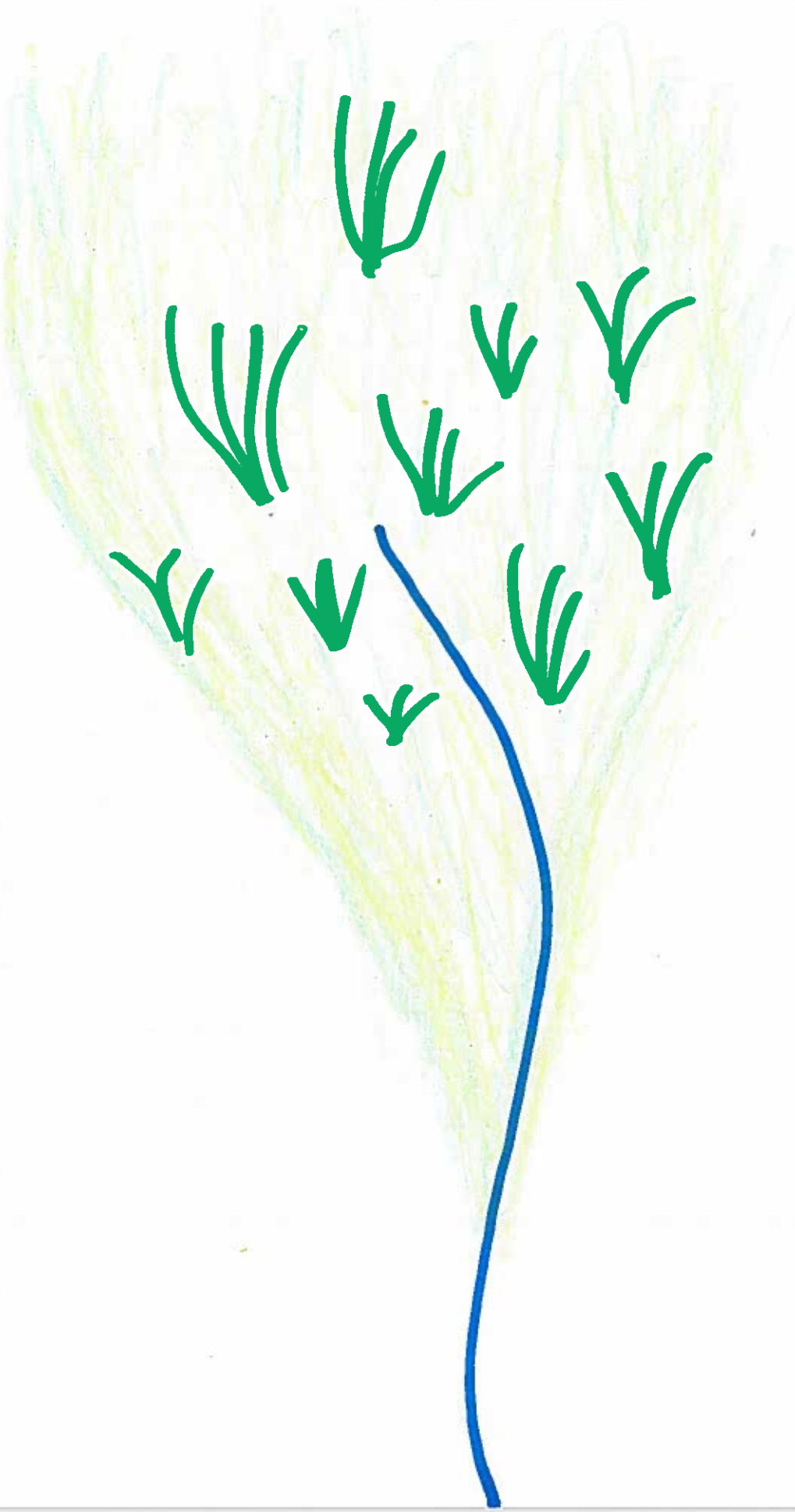
Wrap Up- How Many Turtles Survived?

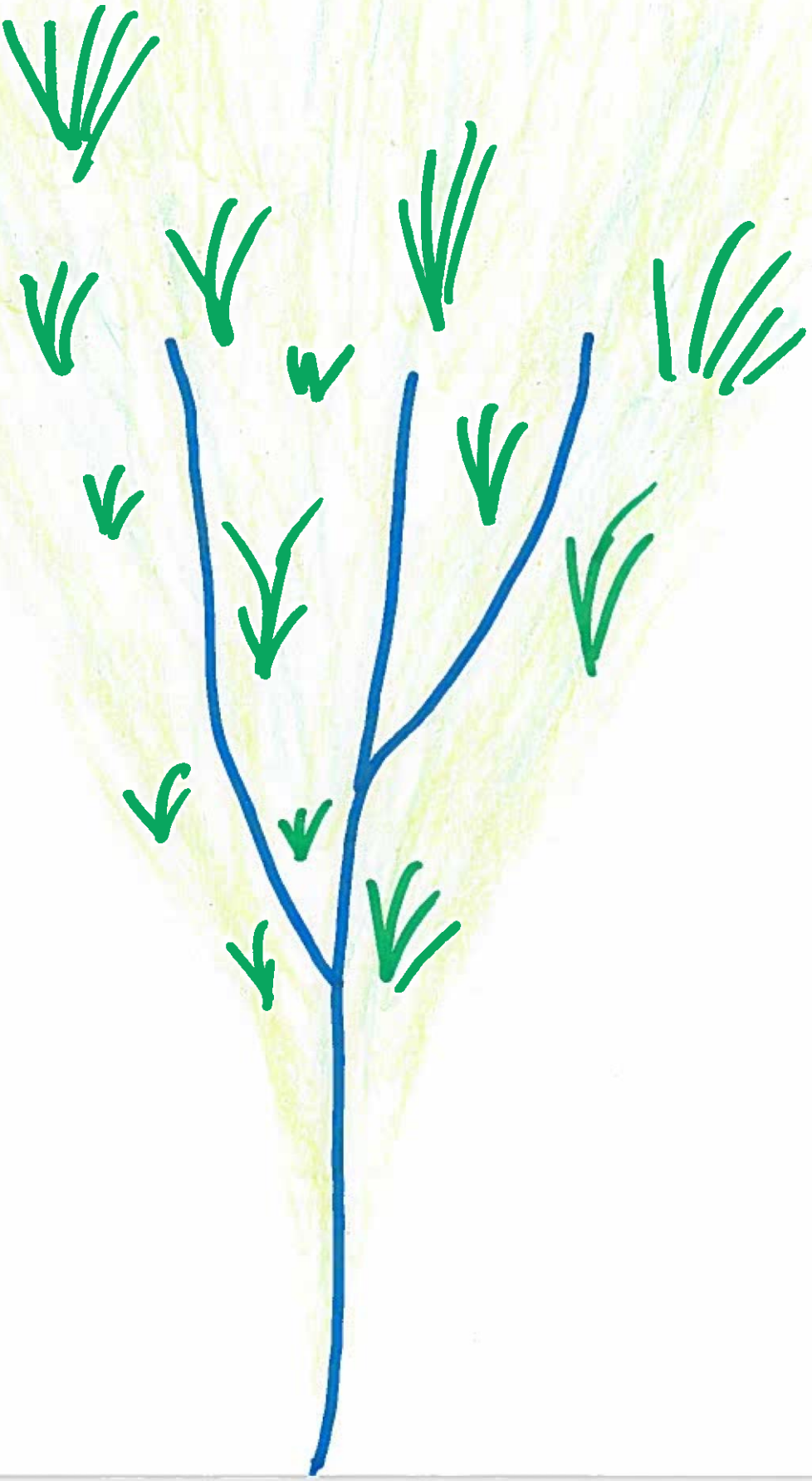
What caused the most deaths?

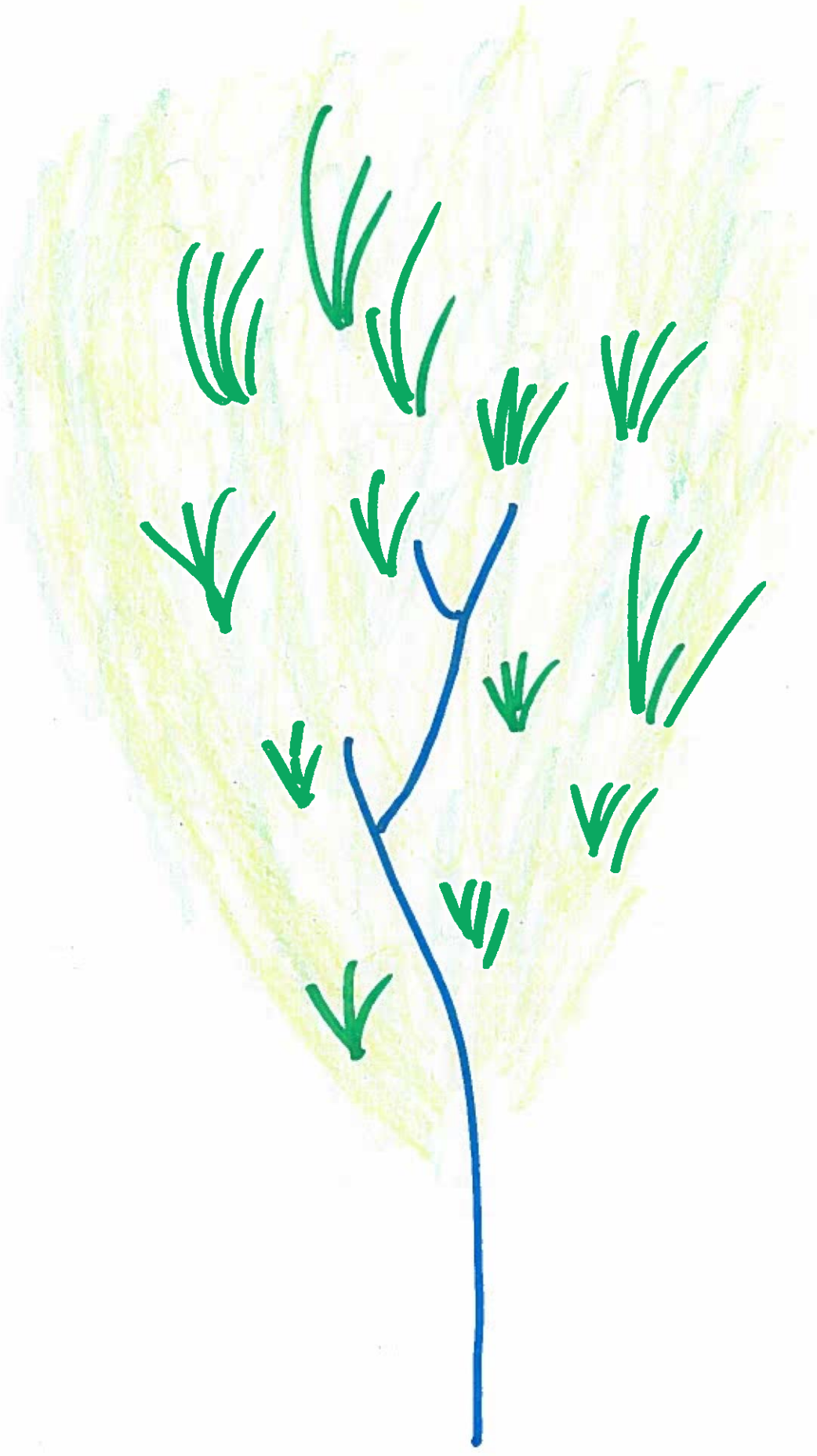
How can we help turtles cross the road? If it is safe to stop, you can pick a turtle up and take it across the road, the way it is trying to go - don't turn them around as they will just try to cross again when you leave.

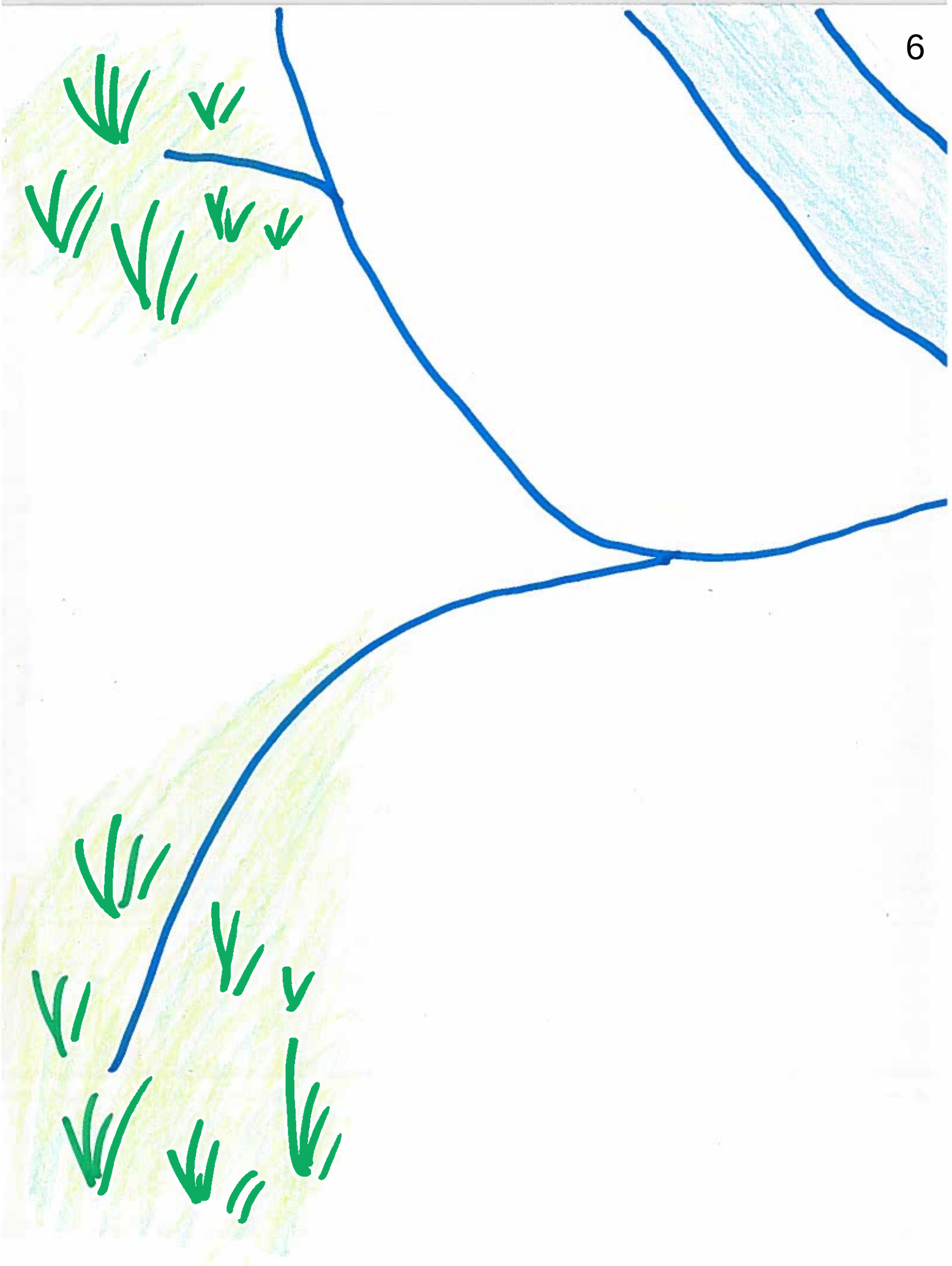
Should you take animals from the wild as pets?

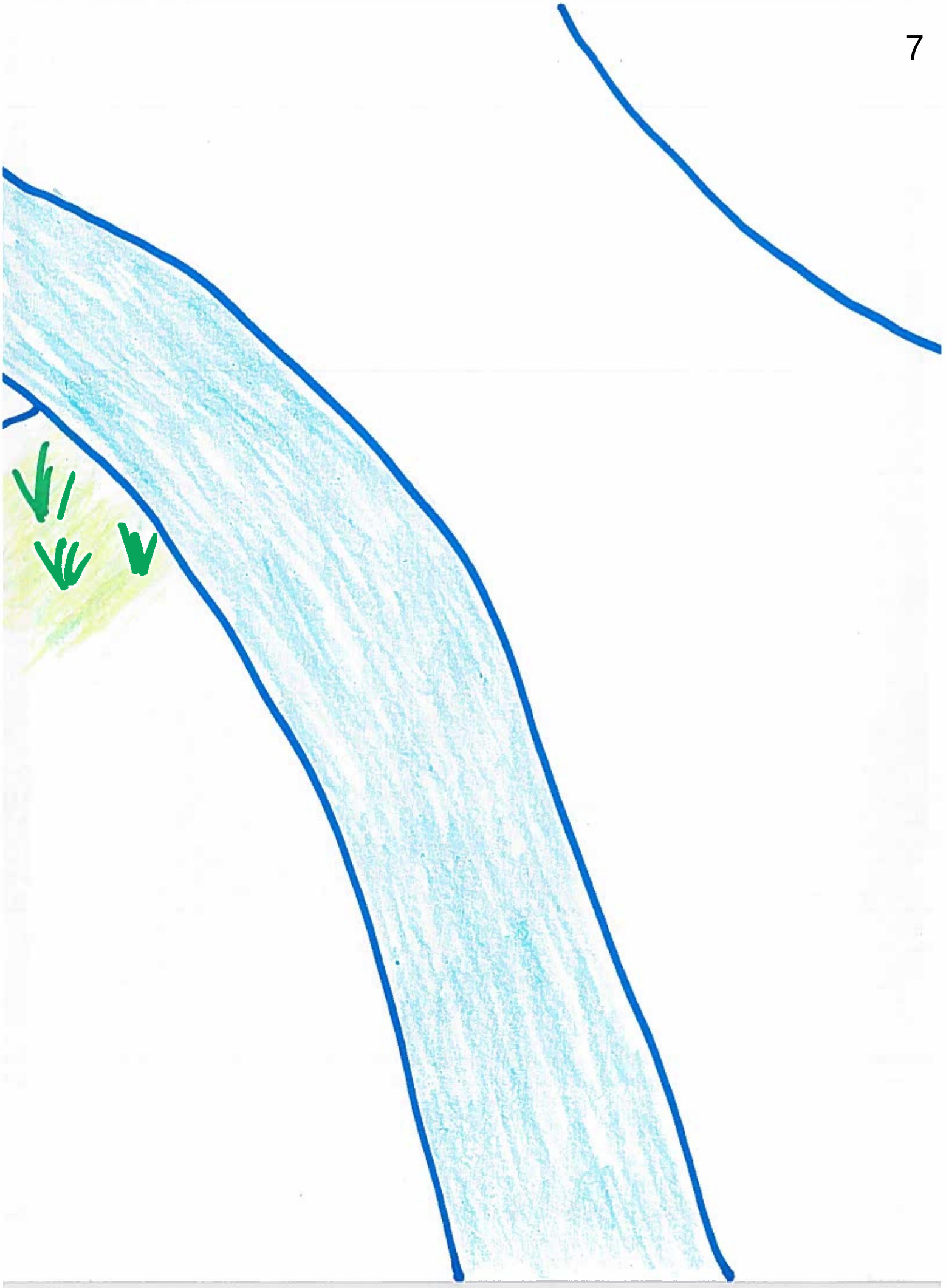


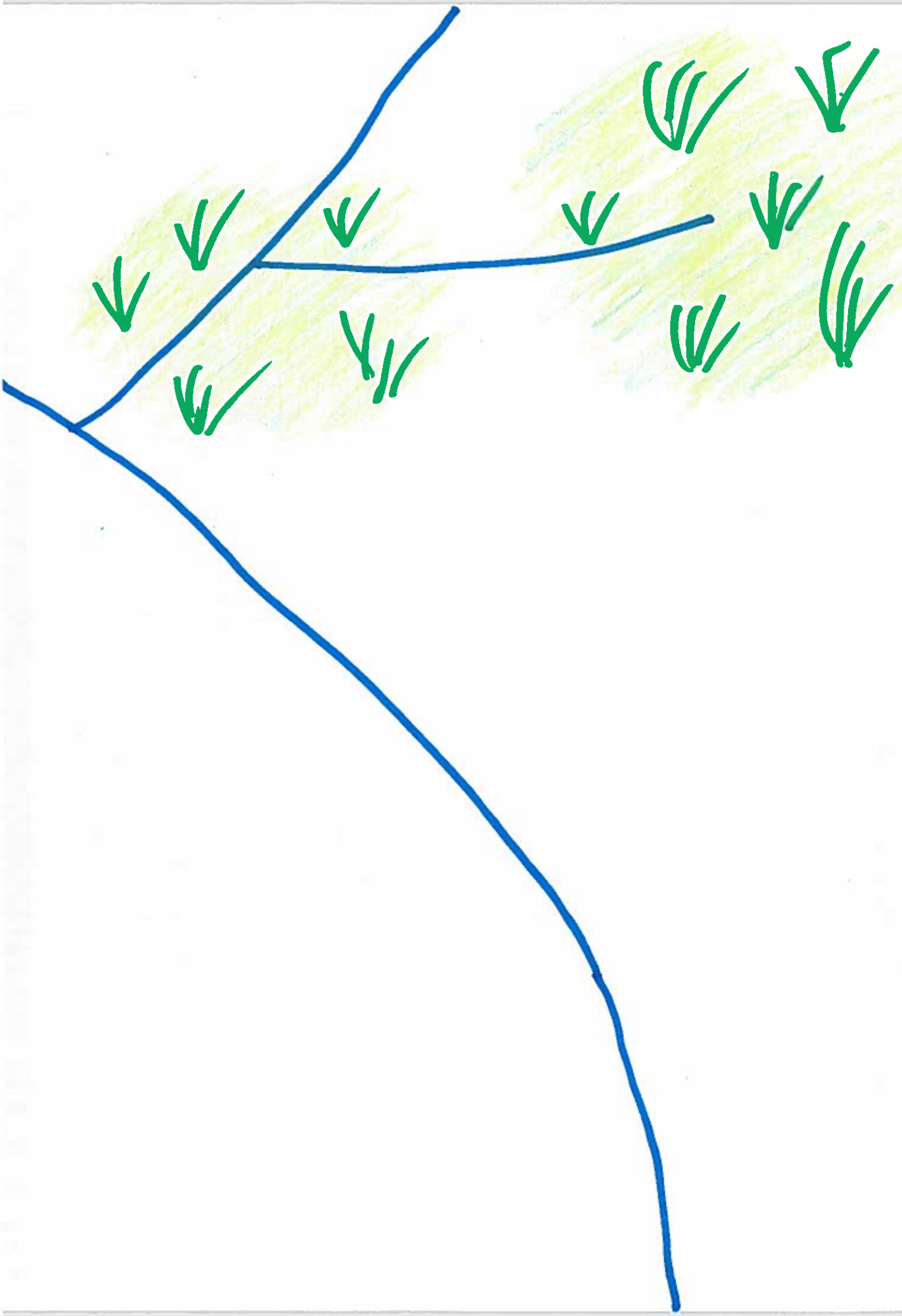


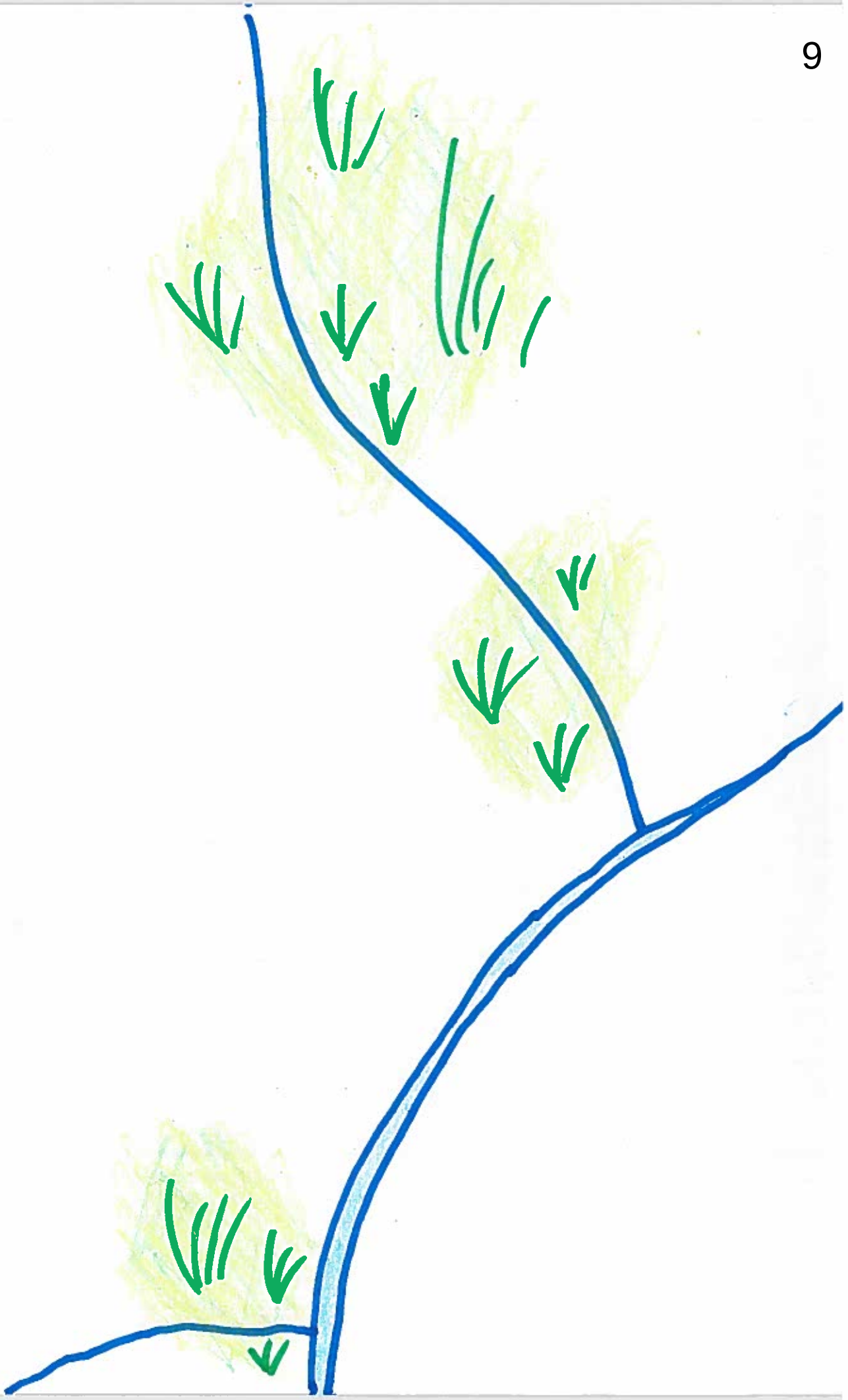


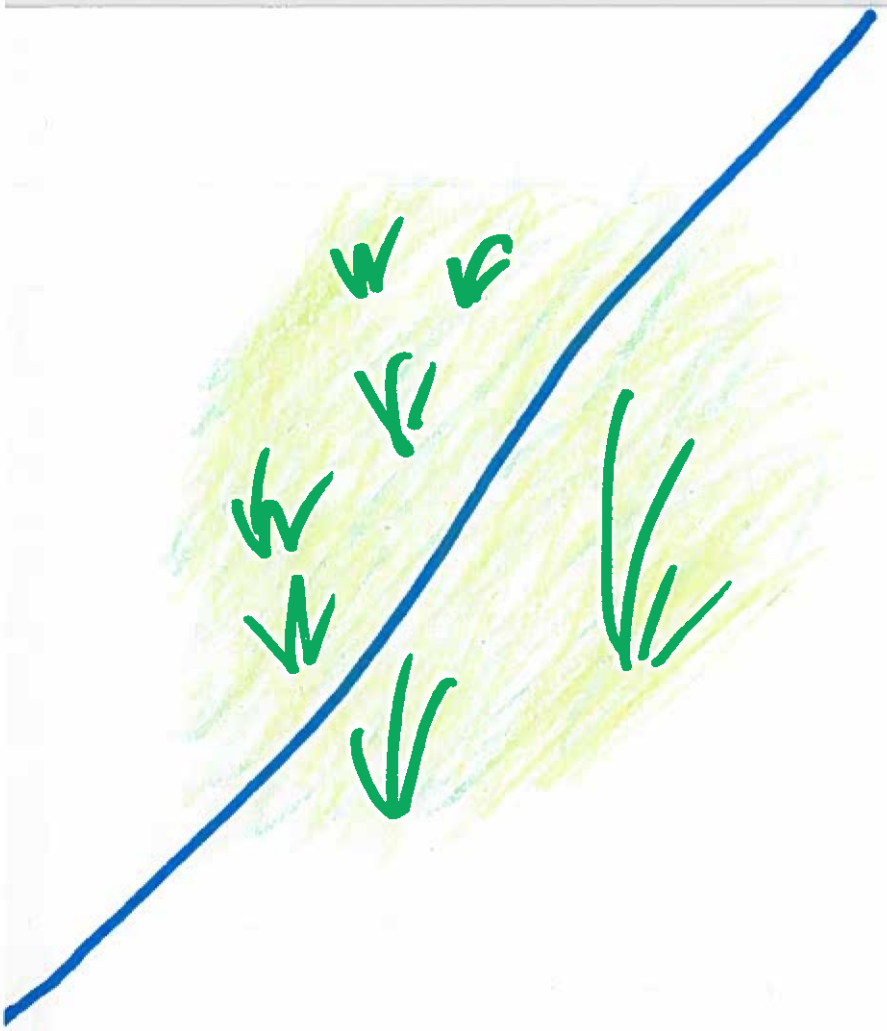


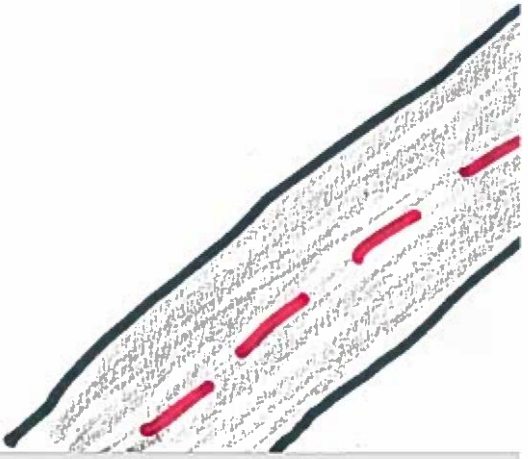


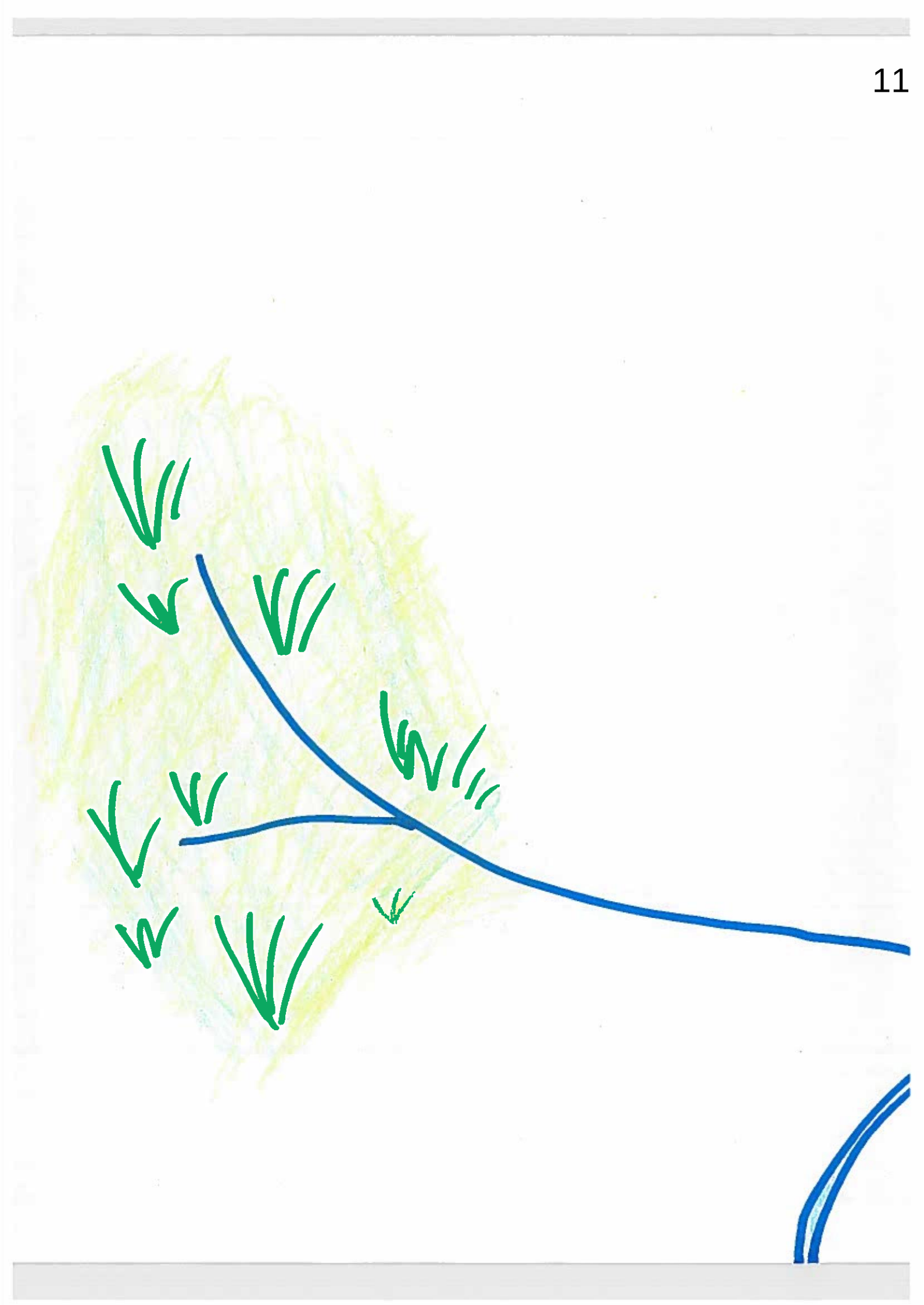


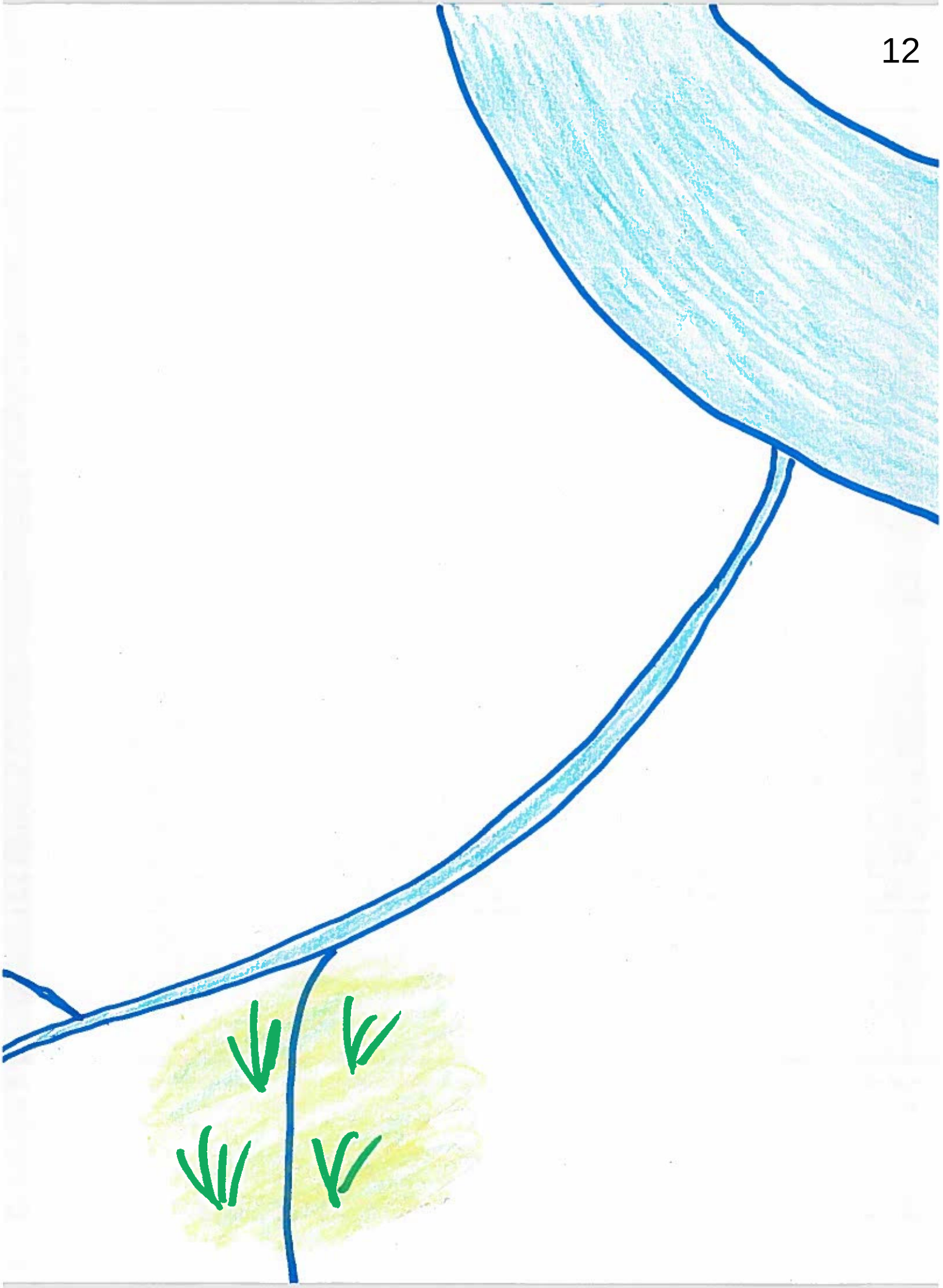


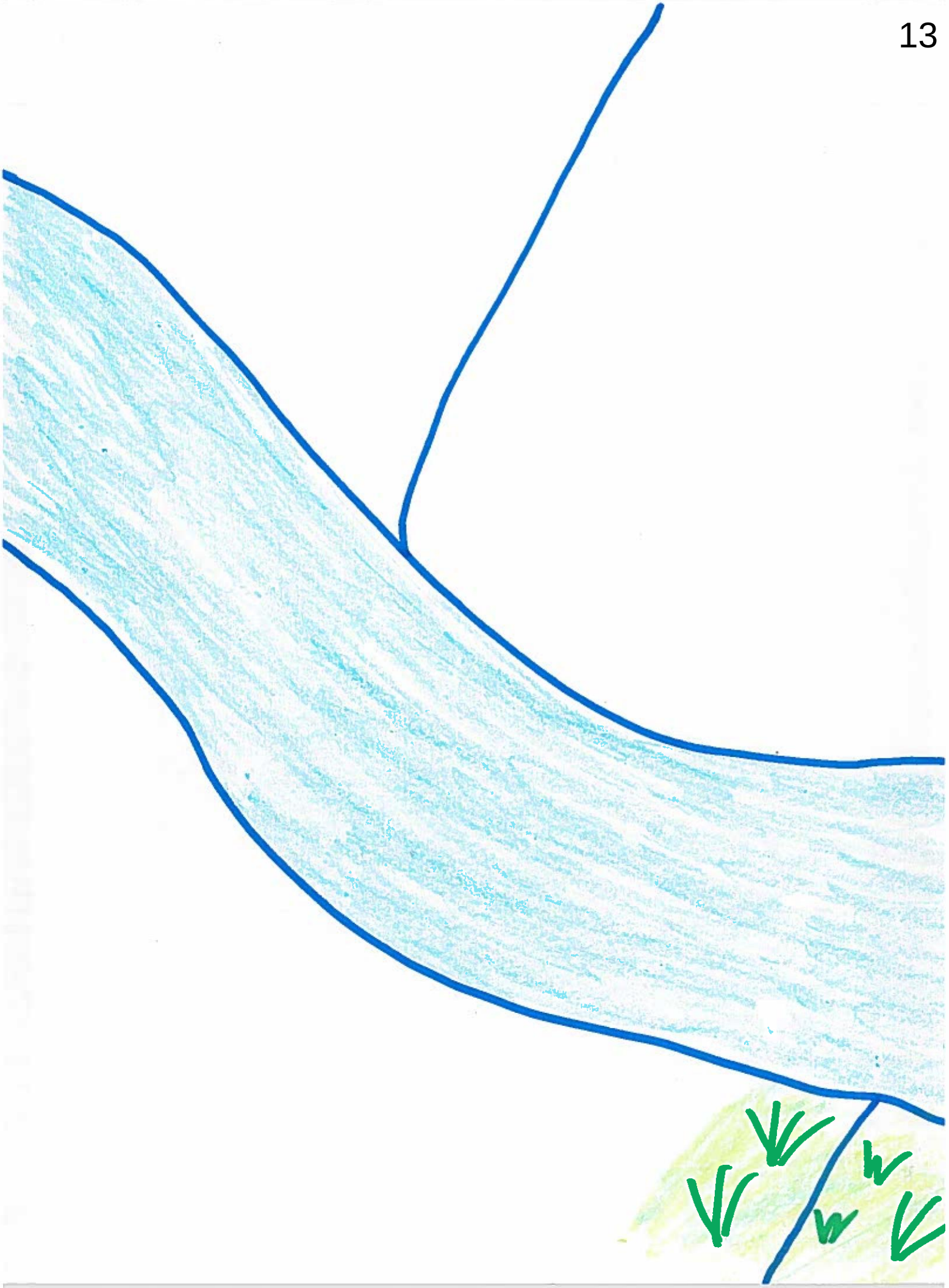


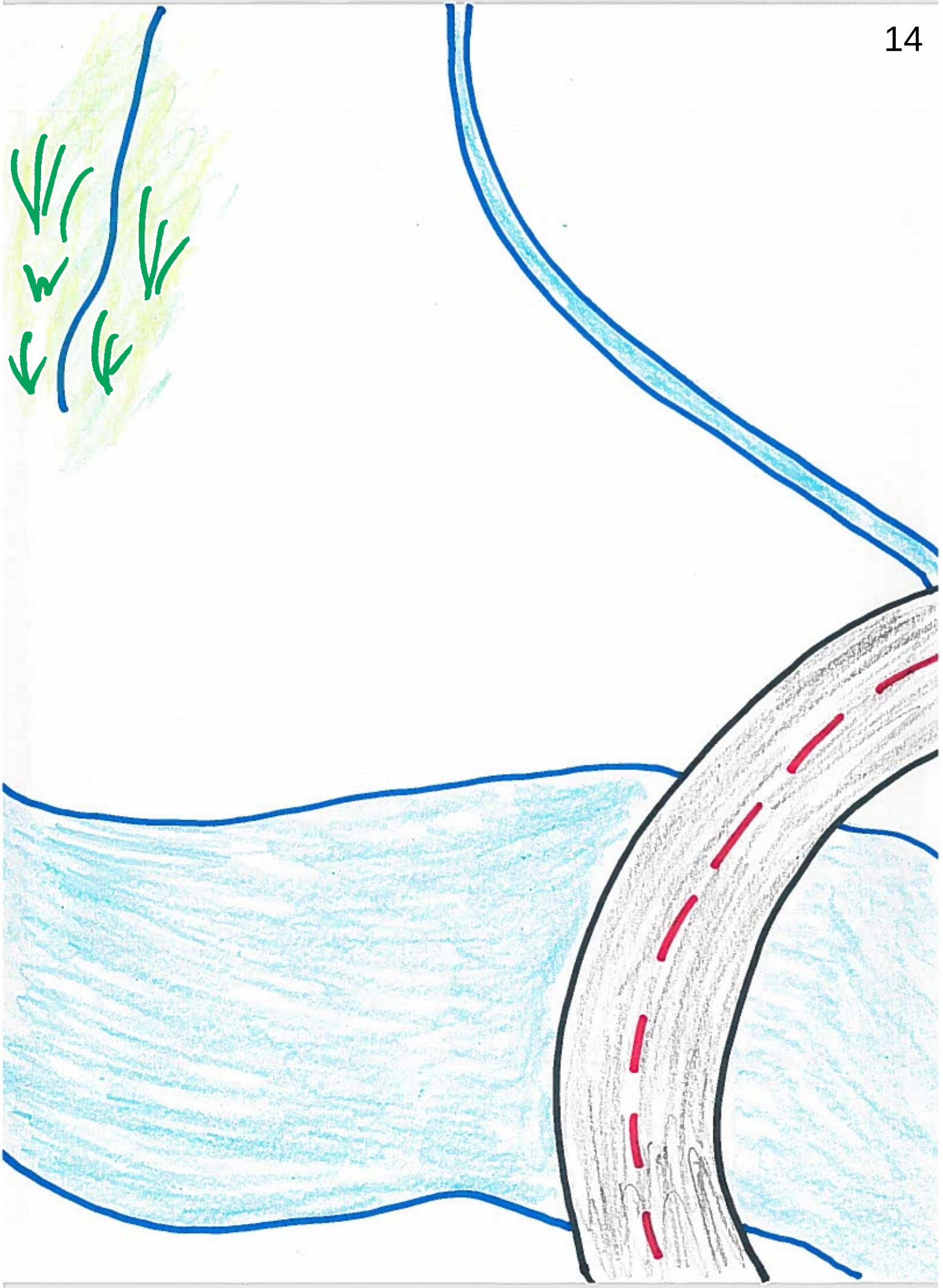


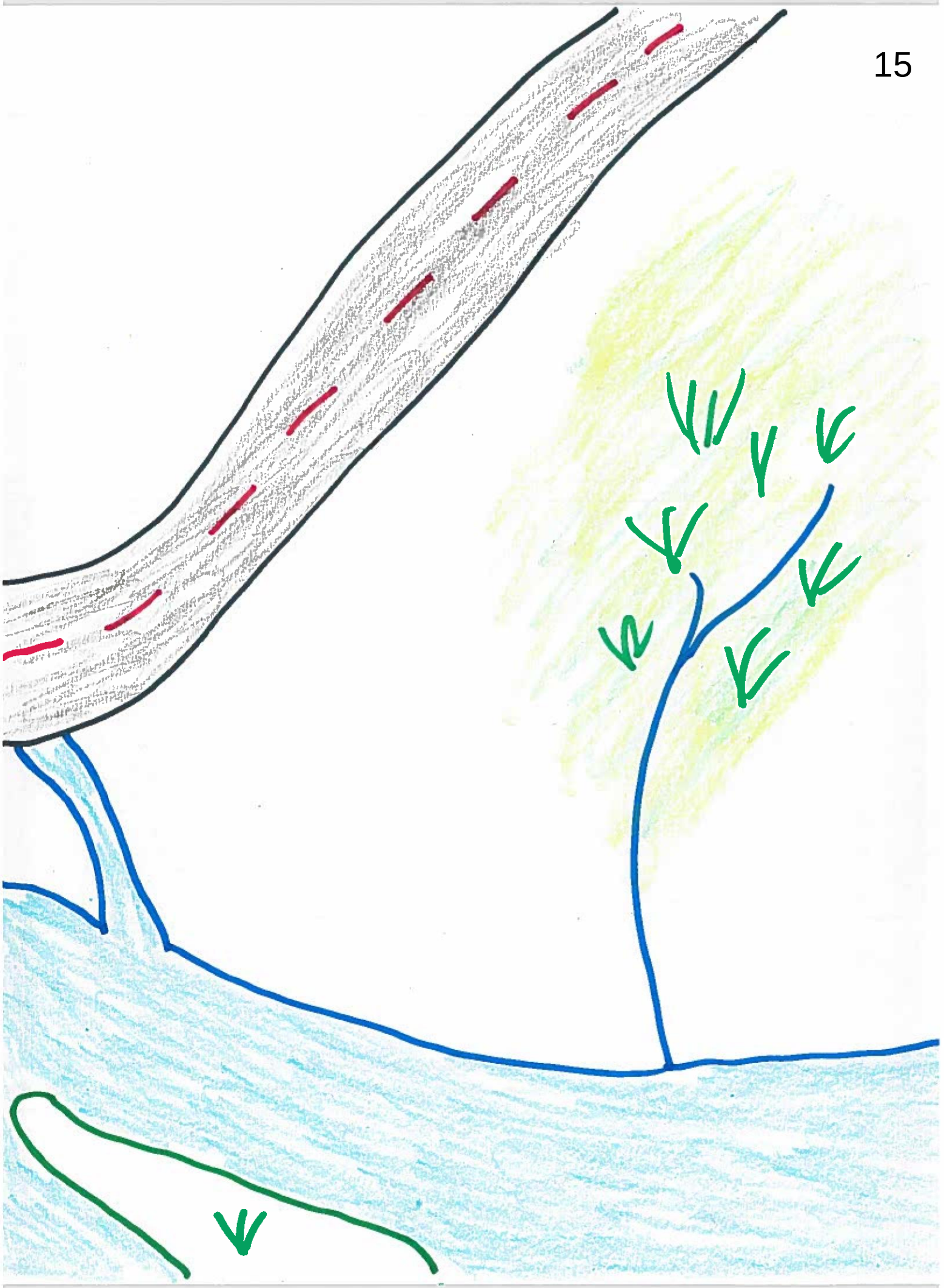


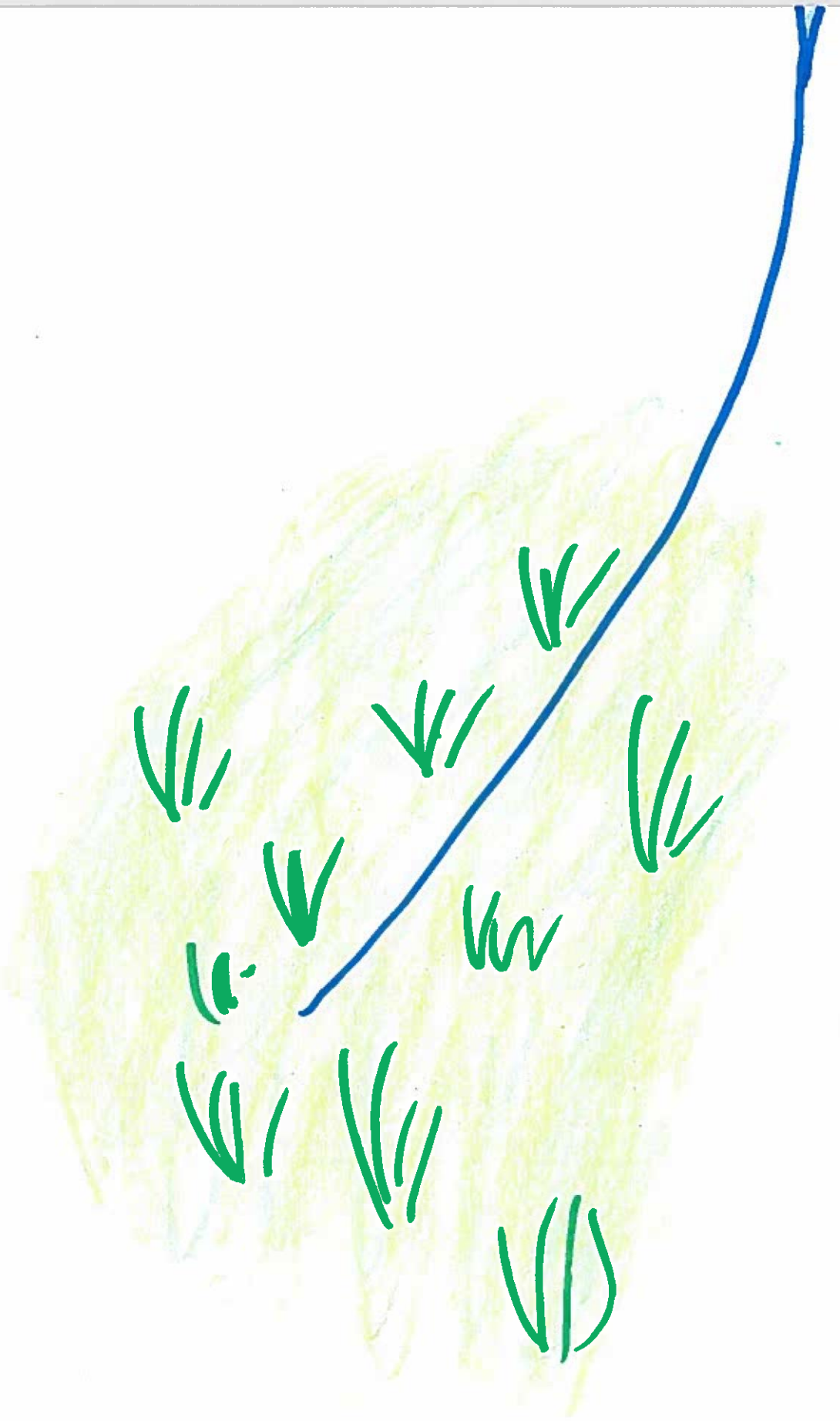


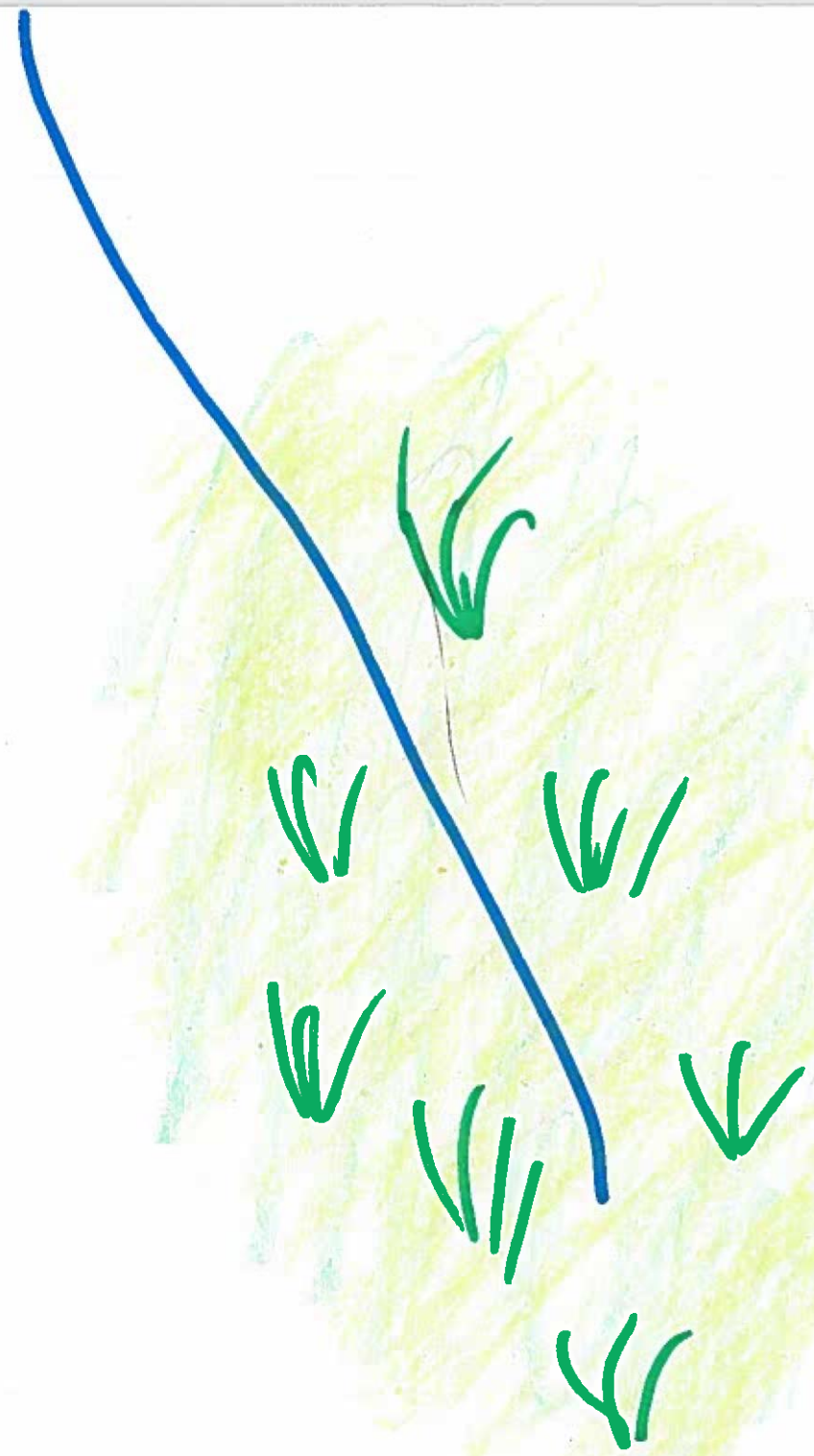


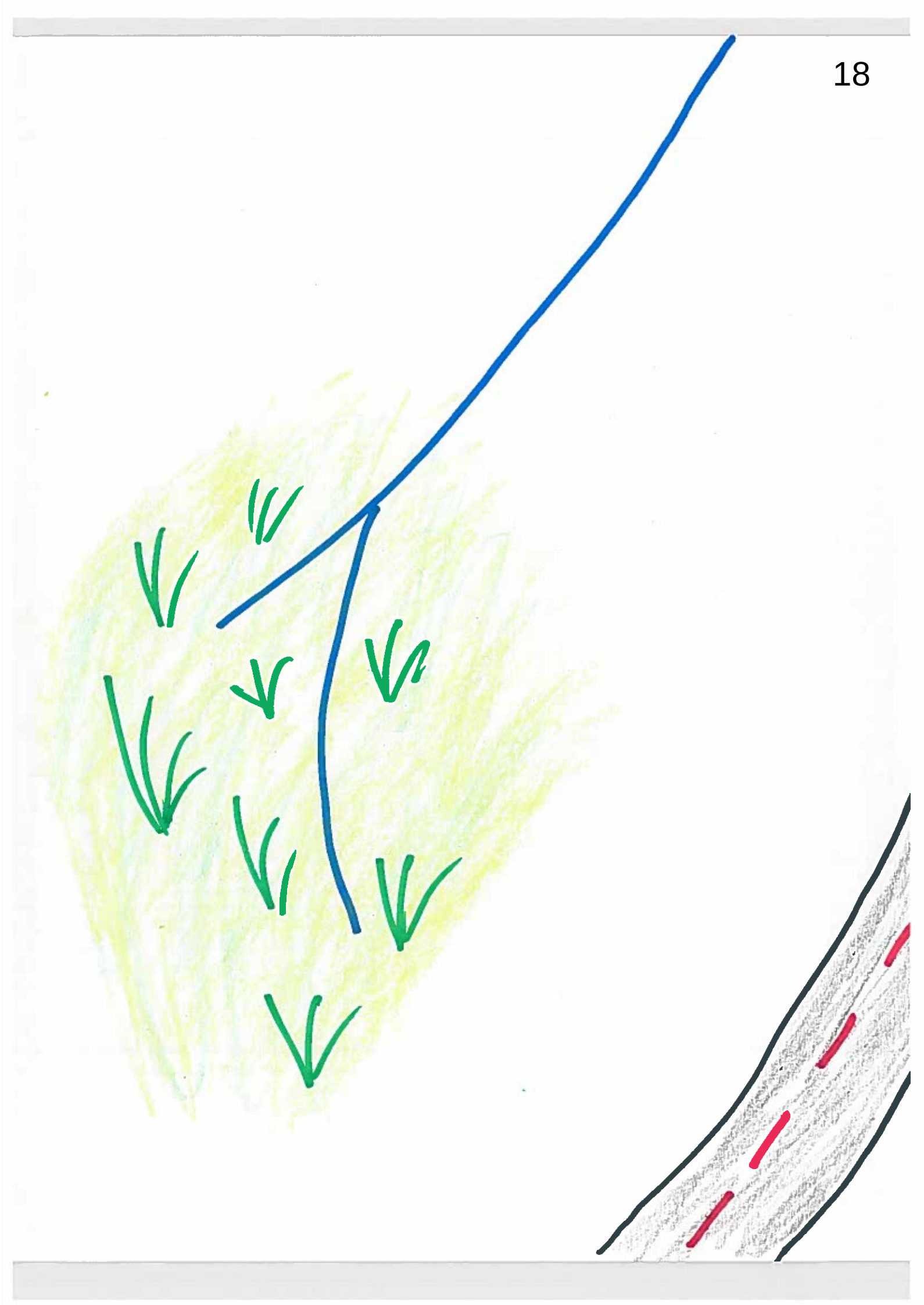


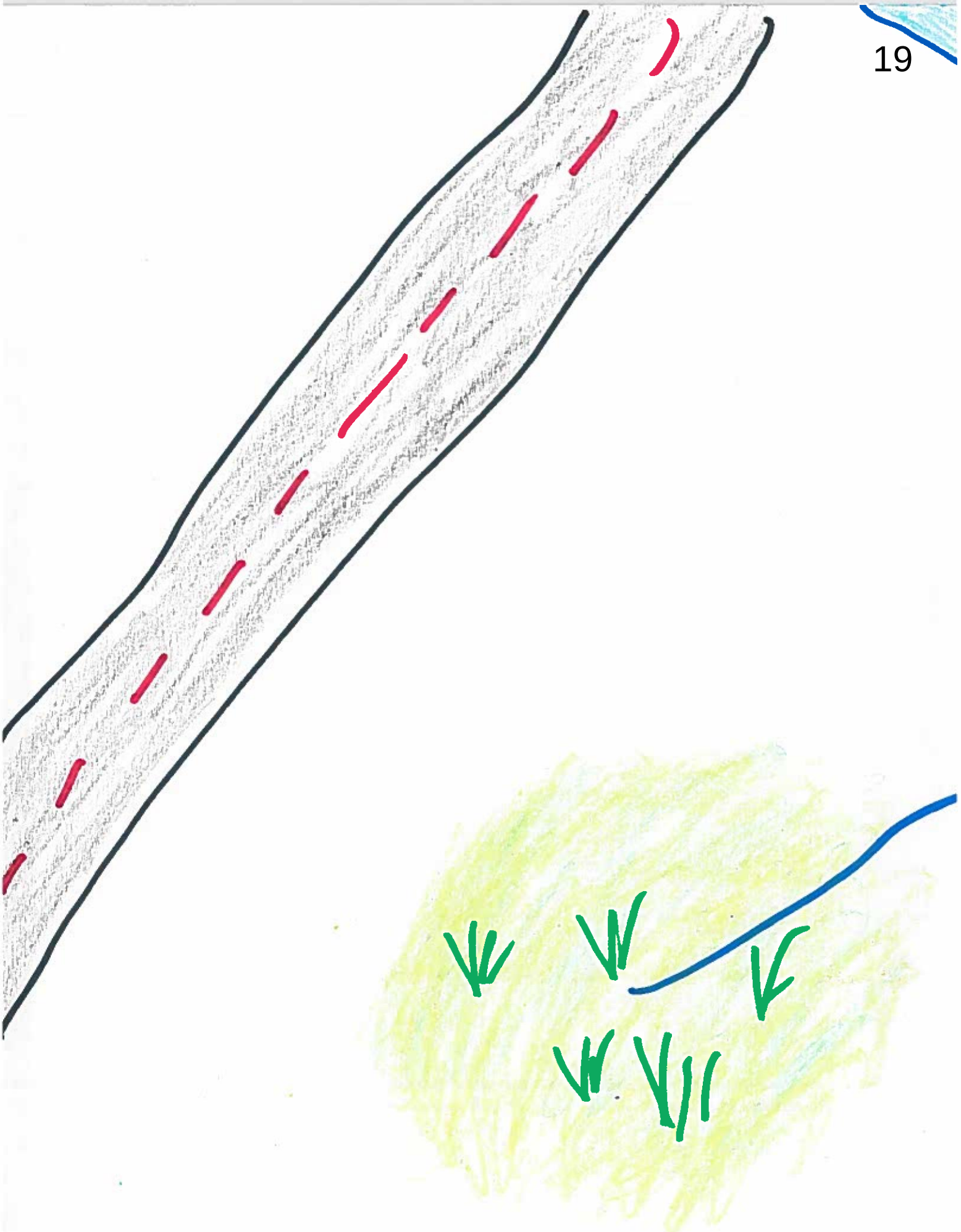


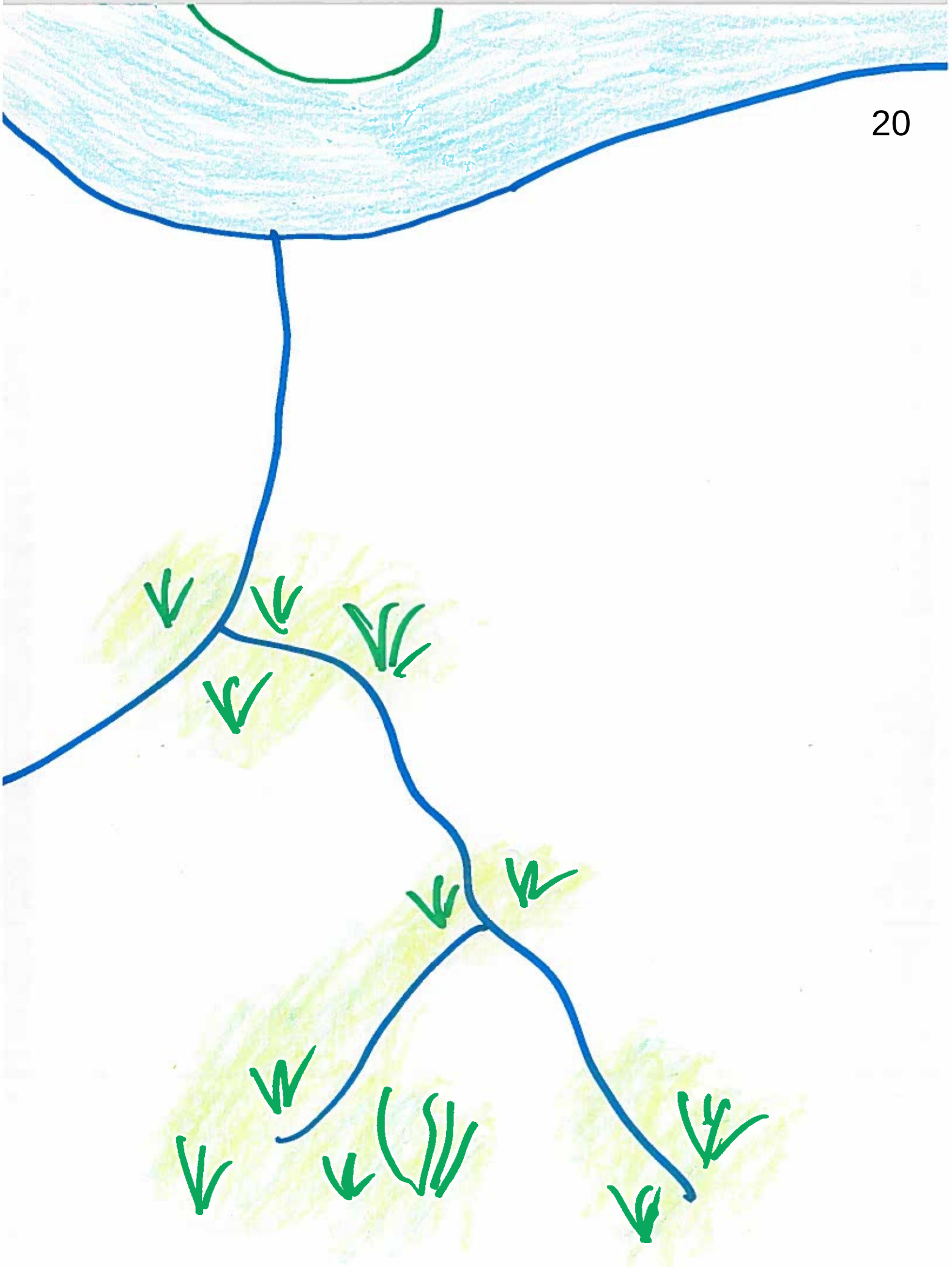


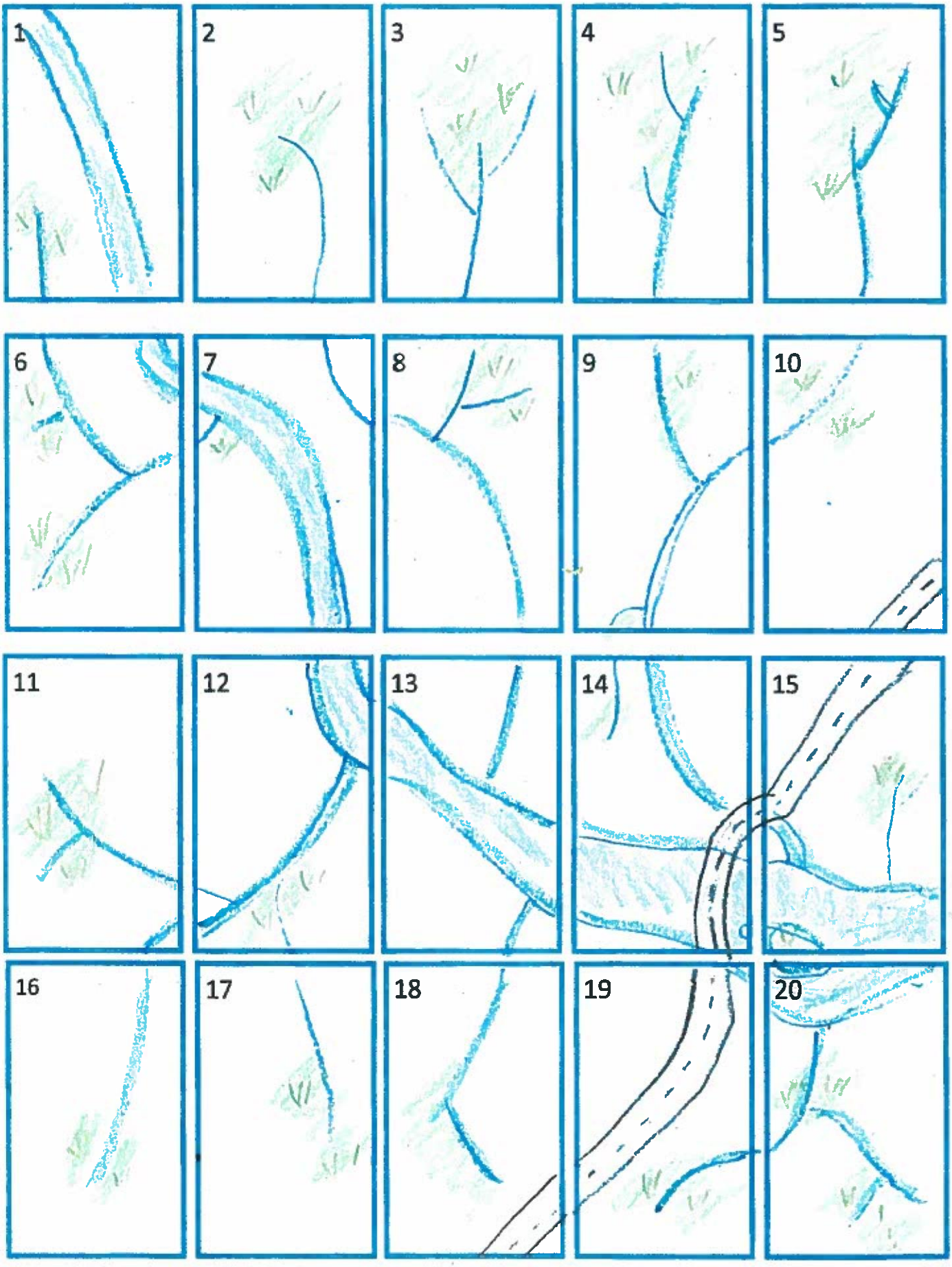








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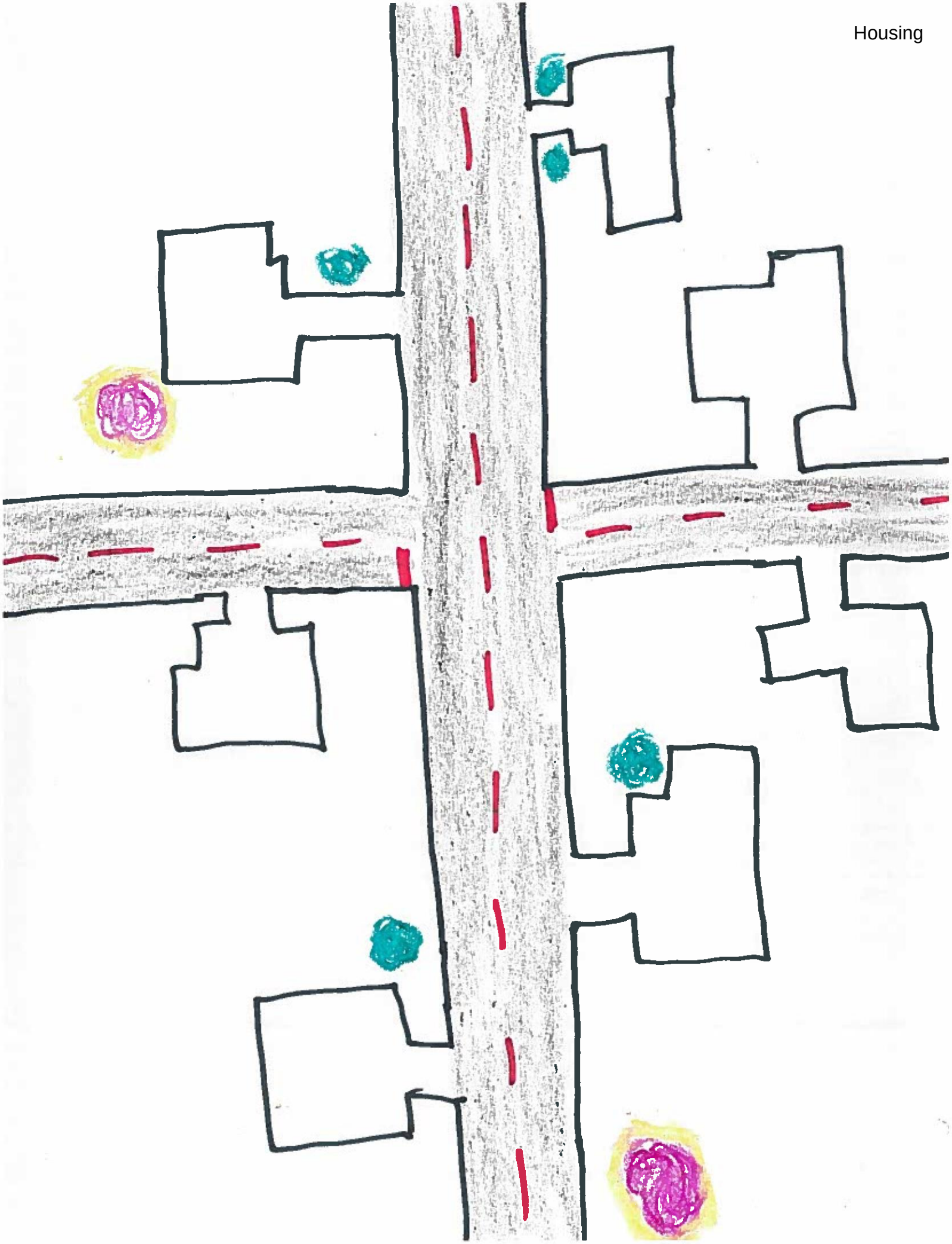

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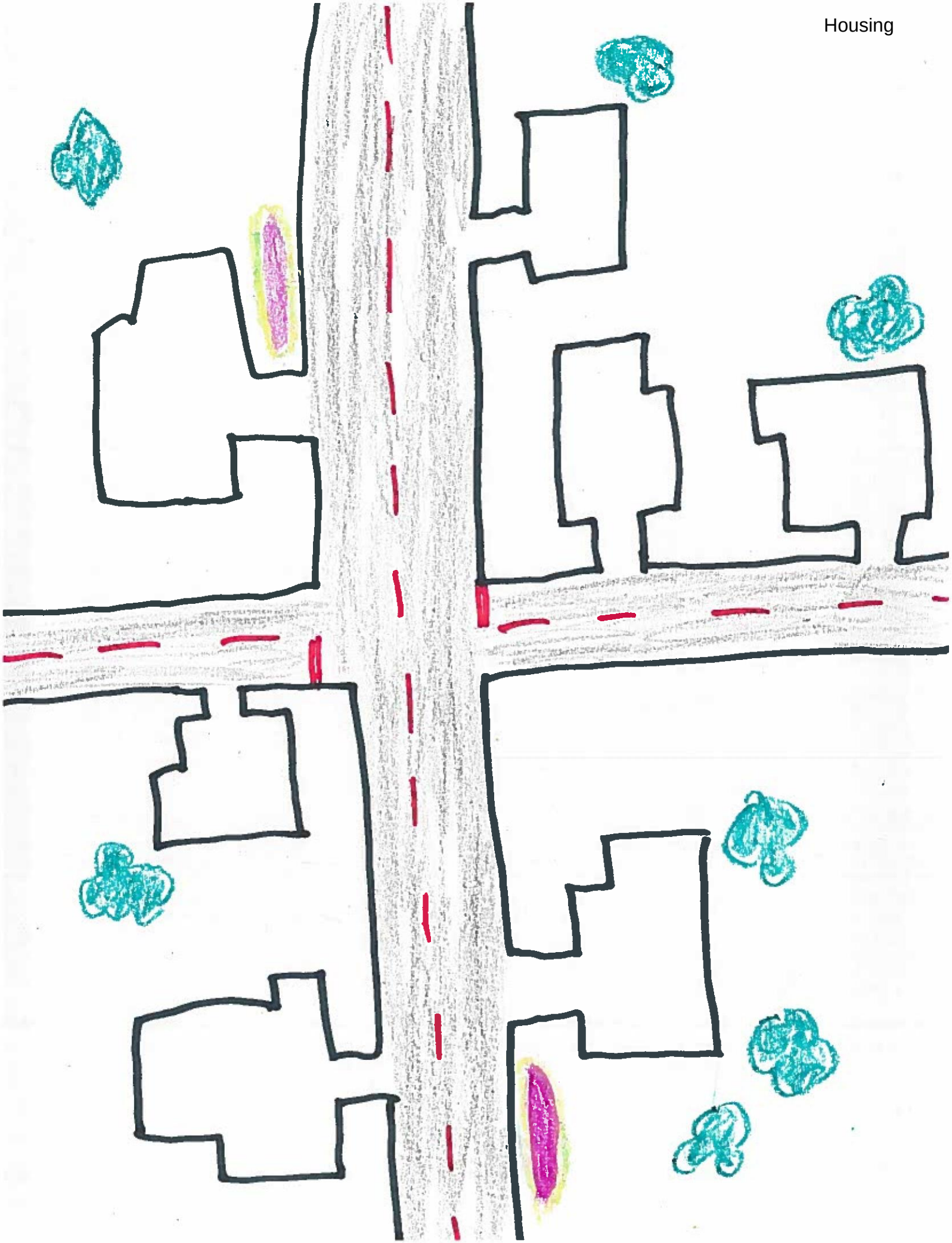

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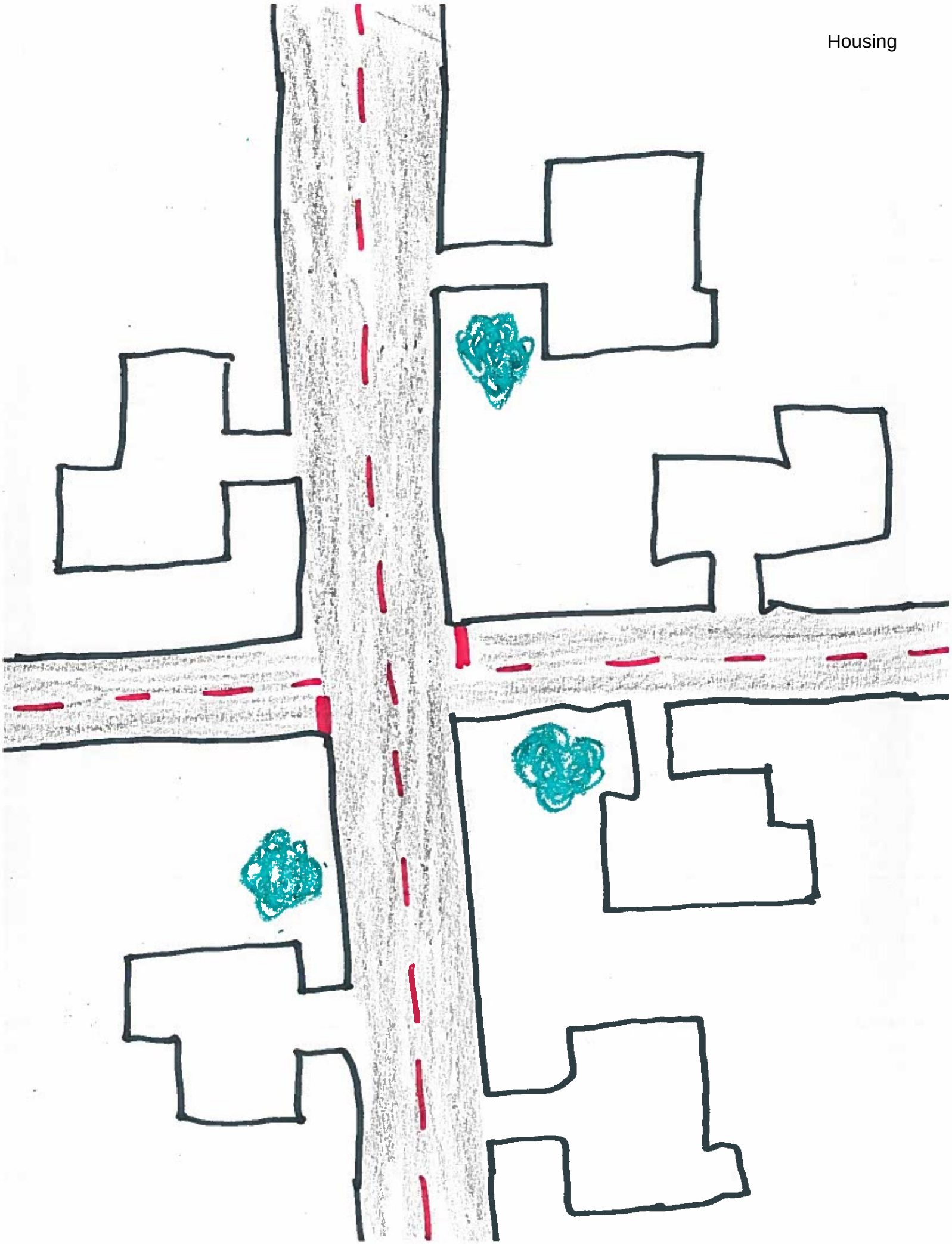

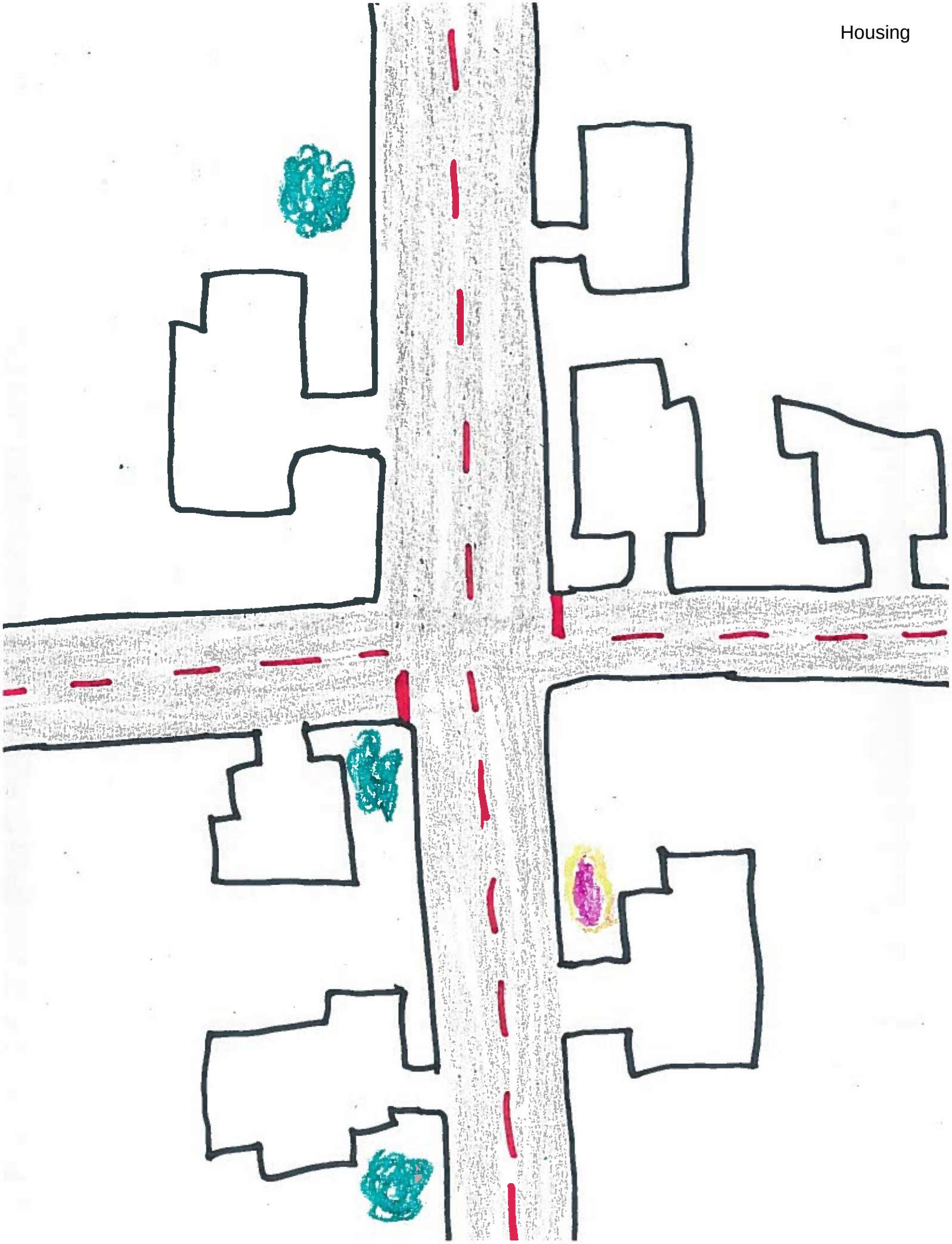
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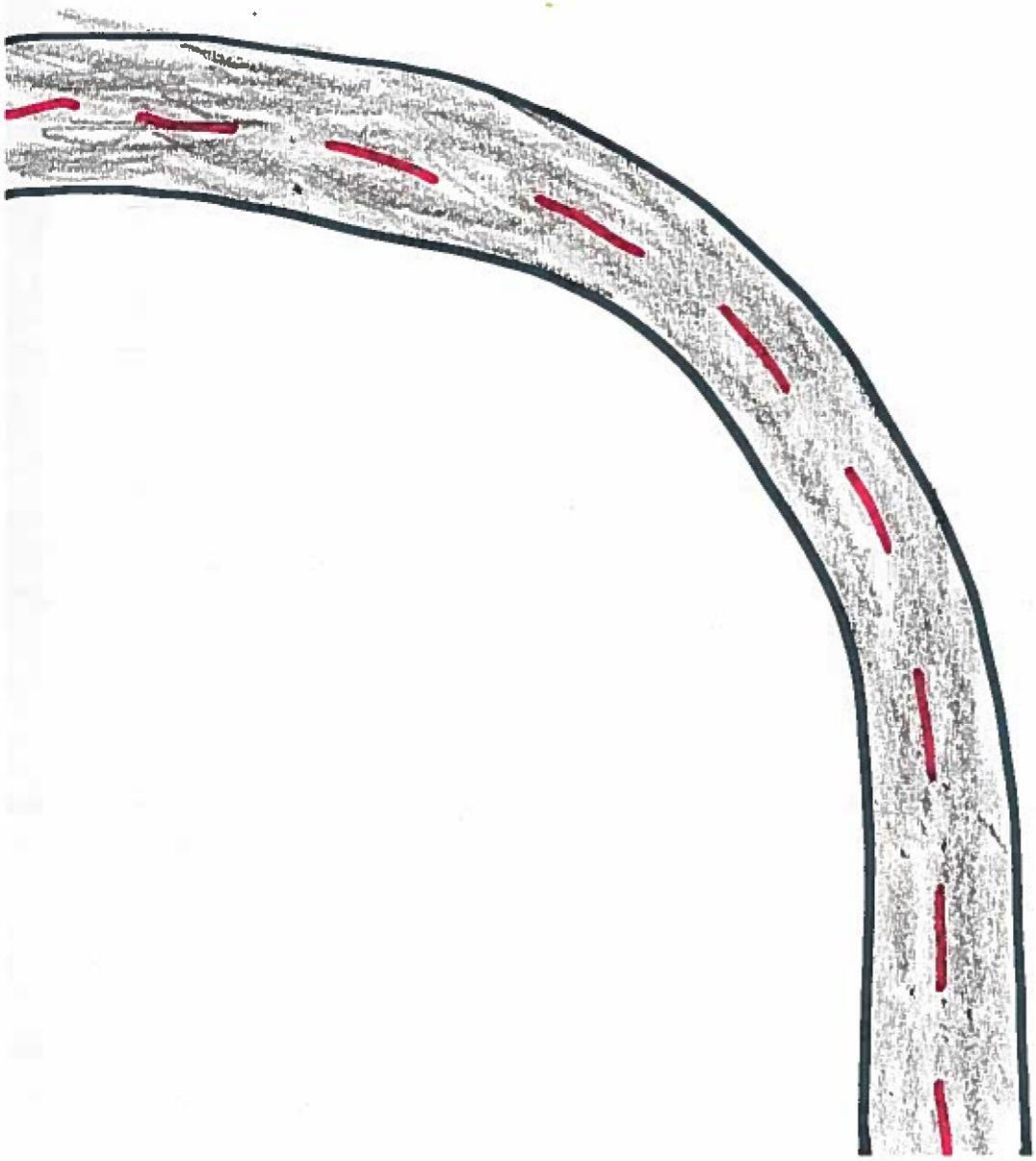
Road



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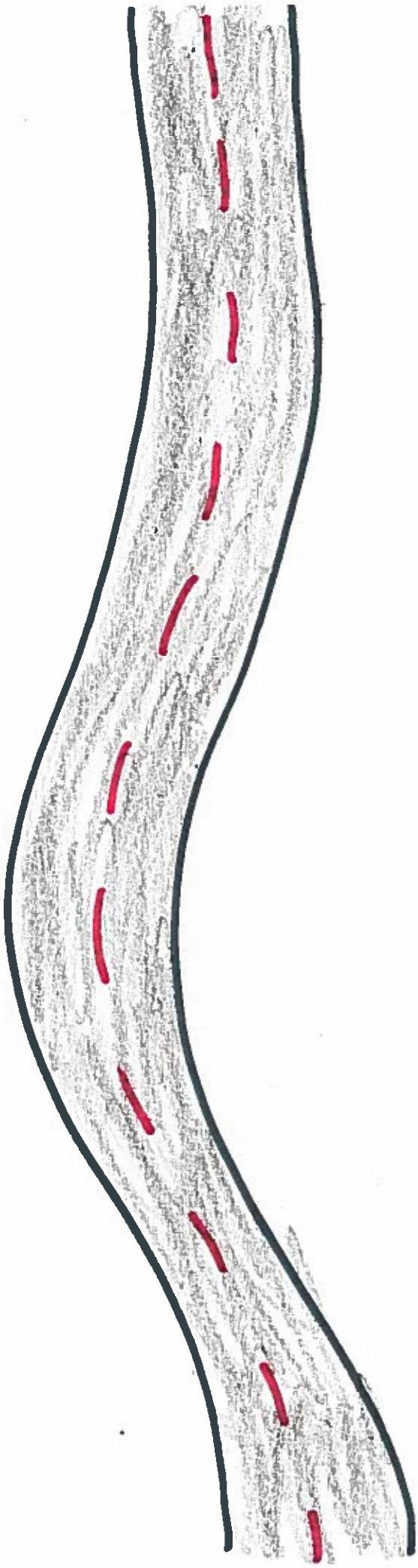

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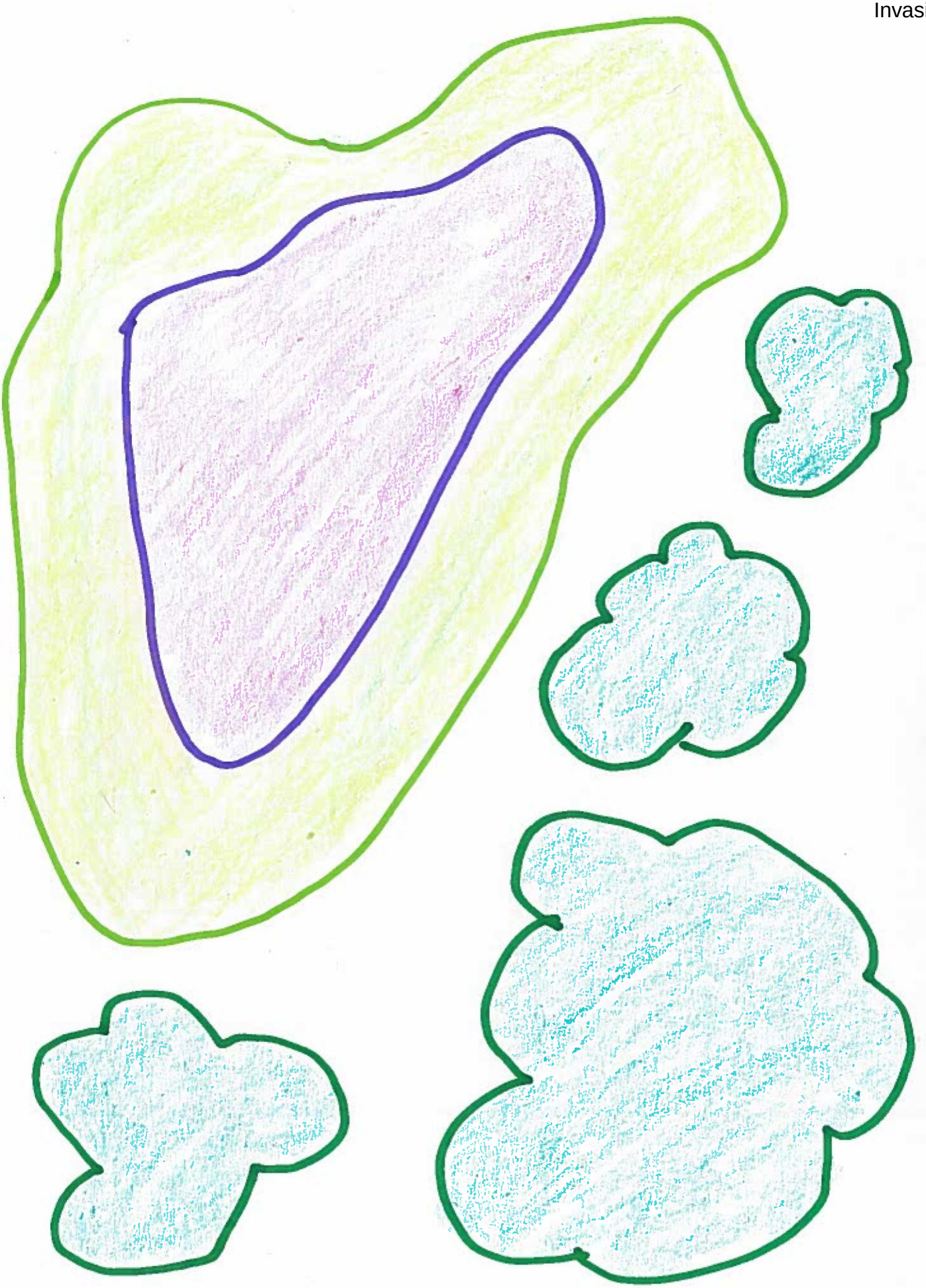

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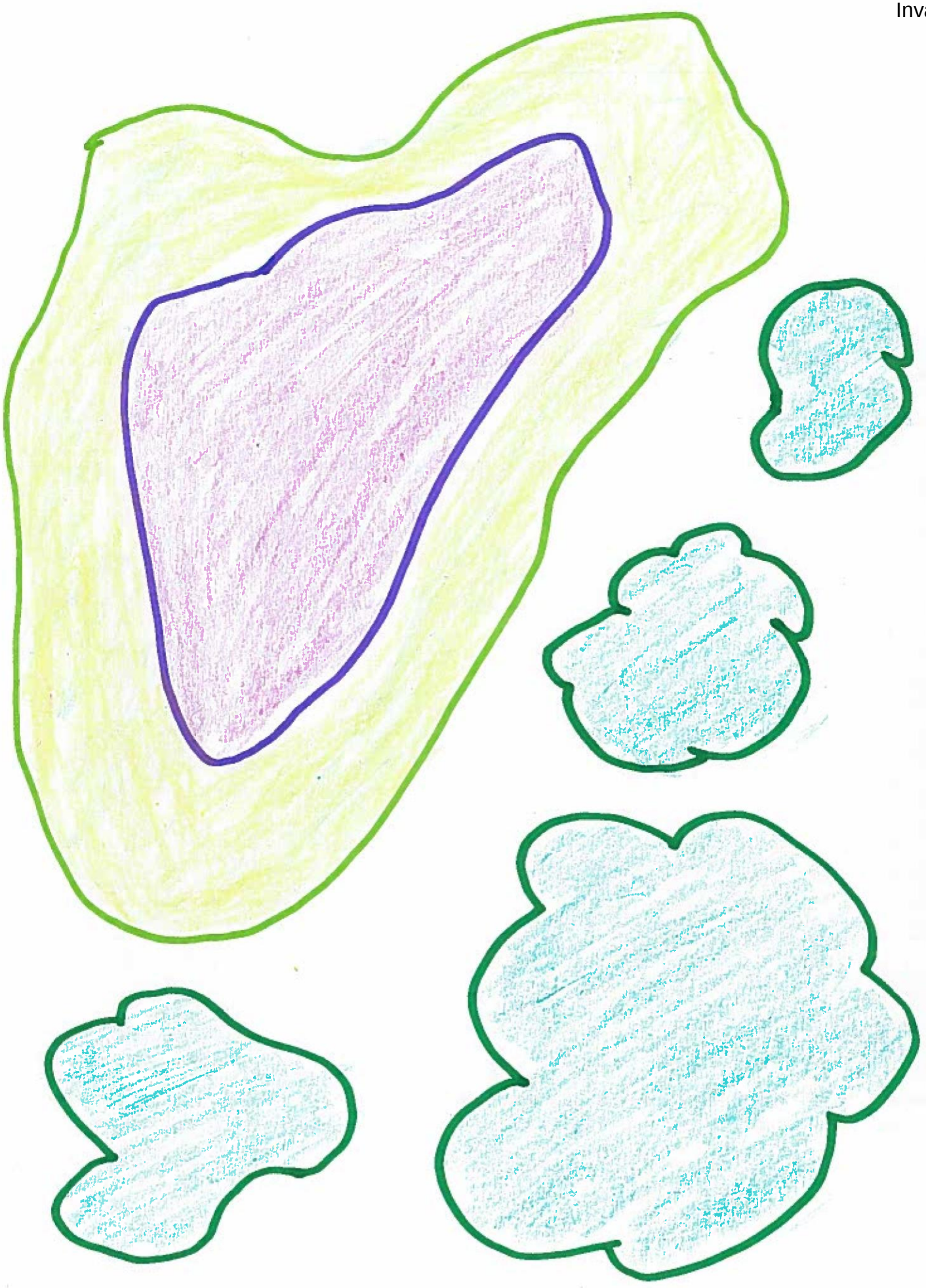

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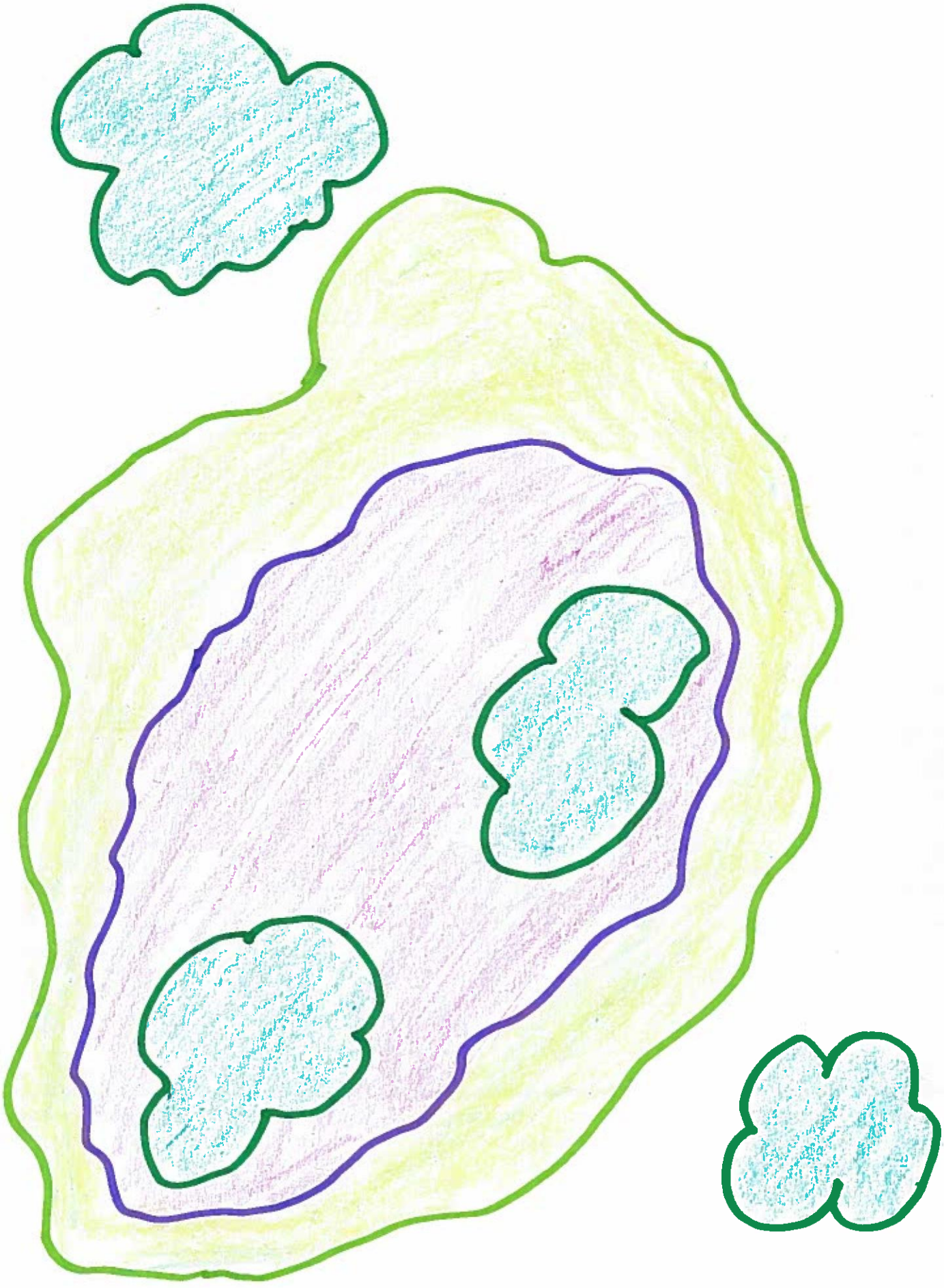

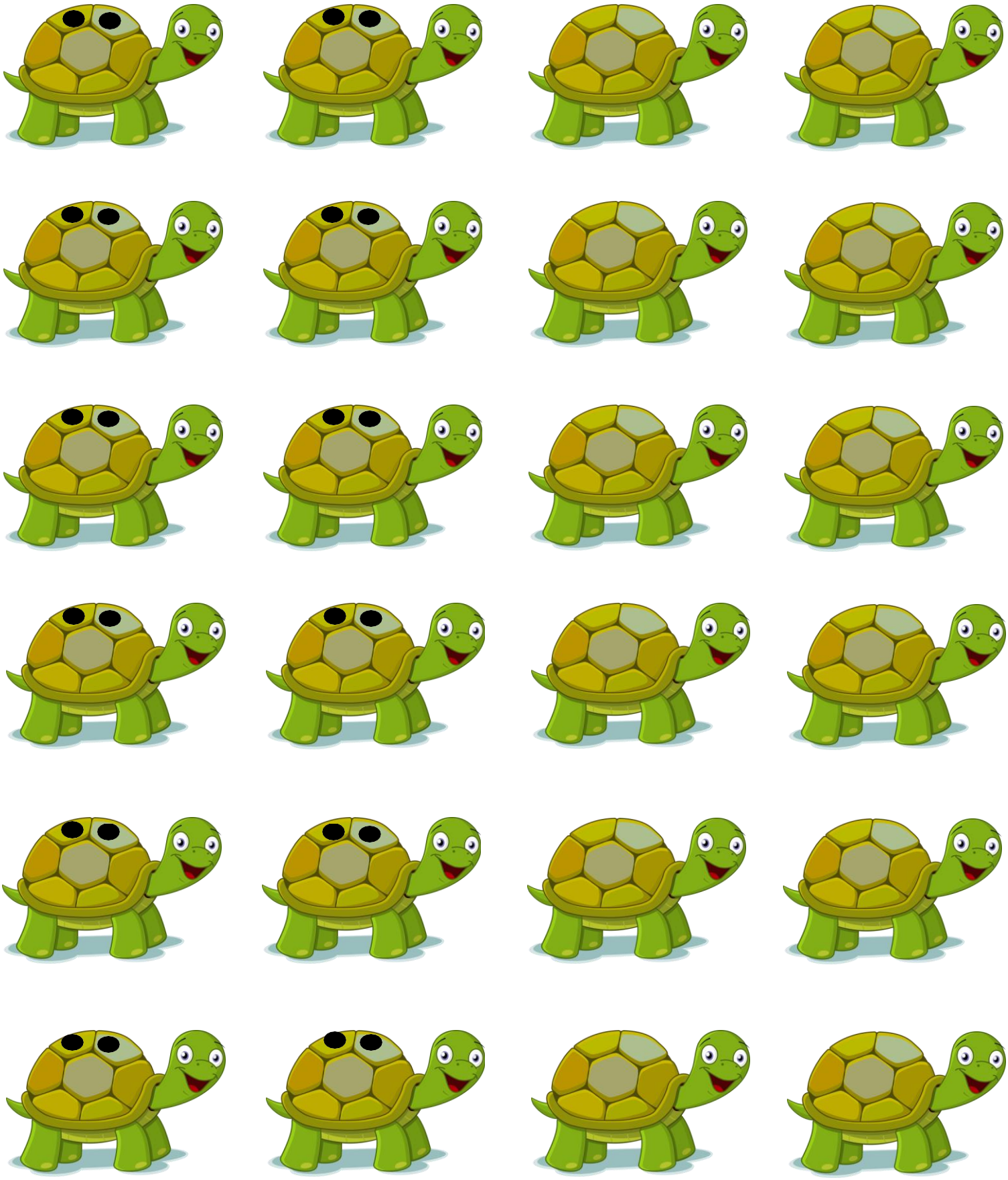

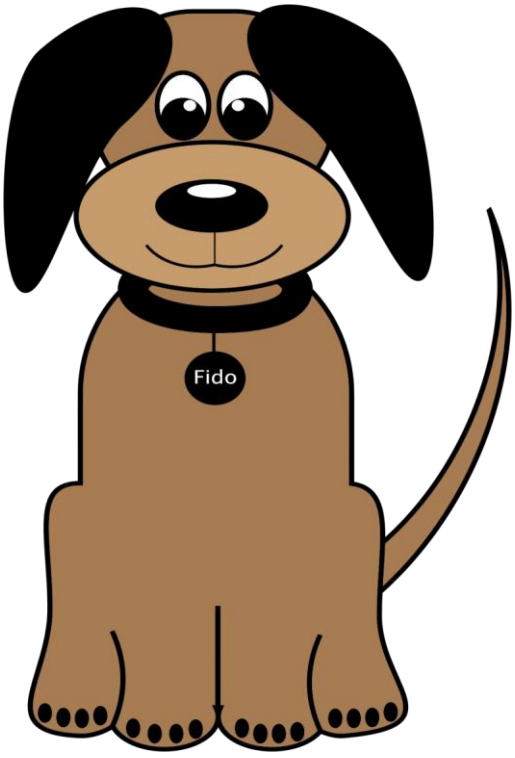
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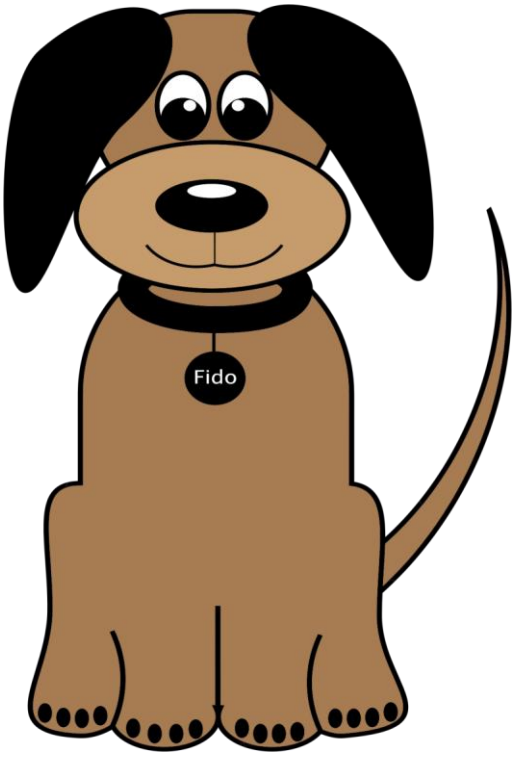
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Turtle Troubles Follow-Up Activity Ideas

Many activities and lesson plans about turtles can be found online. This activity provided an introduction to the some of the problems turtles face by using the bog turtle as an example. Many of the threats that bog turtles face, all turtles face. Some of these follow up activities deal with additional threats to turtles such as climate change and trash (especially plastic bags and balloons).

1. **Outdoor Connections:**
    a. Have students survey the schoolyard to count the total number of pieces of trash that they find (remember to check trees for wind-blown bags). Categorize the trash as plastic / non-plastic. Students can consider questions such as: What percentage of trash is plastic? What is the source of the trash? Where are storm drains at the school? Where will trash that washes into the storm drain go? Where is the closest stream? Which river does it flow into? Where does the river go? Students can collect data using a brand audit form: https://www.breakfreefromplastic.org/wp-content/uploads/2018/08/BFFP_Brand_Audit_Form-Aug-2018-1.pdf
    b. Consider stenciling storm water drains with messages or painting designs to remind people that any litter they drop ends up flowing into nearby rivers/bogs, and will eventually flow into the ocean.
    c. Students can track plastic trash with apps such as NOAA's marine debris tracker: https://marinedebris.noaa.gov/partnerships/marine-debris-tracker

2. **STEM activities:**
    STEM challenges: students can brainstorm and design solutions to some of the problems that turtles face such as;
    - Safe ways for turtles to cross roads
    - Alternatives to releasing balloons at graduations and other events
    - A replacement for plastic drinking straws
    - Tools for removing plastic from the ocean or preventing it from entering (such as Mr. Trash Wheel in Baltimore City)
    - Cleaning up an oil spill

    Ideas can also be found at PBS Design Squad such as designing a safe holder for 6 soda cans http://pbskids.org/designsquad/build/harmless-holder/

3. **Science Connections**
    a. Classes can follow the migration of leatherback and other sea turtles on the Sea Turtle Conservancy web site. Some of the turtles such as 'Lincoln' visit the coast of Maryland https://conserveturtles.org/sea-turtle-tracking-active-sea-turtles/
    b. Activities on turtle migration can be found here: http://www.tourdeturtles.org/teachers.php

c. Have students draw a food web for a bog turtle or leatherback turtle.
d. Have students describe the internal and external adaptations of turtles that help them survive.
e. Learn more about bog turtles: https://www.marylandzoo.org/animal/bog-turtle/

4. Writing & Art Connections

a. Have students research other species of turtles and the threats that they face.
b. Have students write a persuasive letter. Write to local politicians about the problems turtles face and actions that could be taken. Write letters to local stores that sell helium balloons asking them to provide information about the dangers of releasing balloons outdoors. More information about and suggestions to remedy the problems caused by balloons can be found at https://balloonsblow.org/alternatives/

c. Have students design a poster for NOAA's annual marine debris program art contest.

5. Math connections:

a. Whether many turtle egg hatches into a male or female turtle depends on the temperature the egg was incubated at. Students can calculate the different ratios of male to females that will hatch at different temperatures.

How to Help Virginia's Bog Turtles

Write the ways you can help Virginia's Bog Turtles inside the turtle shell below