

Chemical pollution

This game is part of a series of games created in the Games for Goals project.

AQUAHEROES



Find the other mini-games on drought, flooding, water misuse, plastic pollution and more on:

www.gamesforgoals.eu



Co-funded by the
Erasmus+ Programme
of the European Union



Please share feedback on the game
and help measure its impact!



<https://tinyurl.com/GFG-impact-EN>



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Printing instructions

Print pages 5 to 18 single-sided

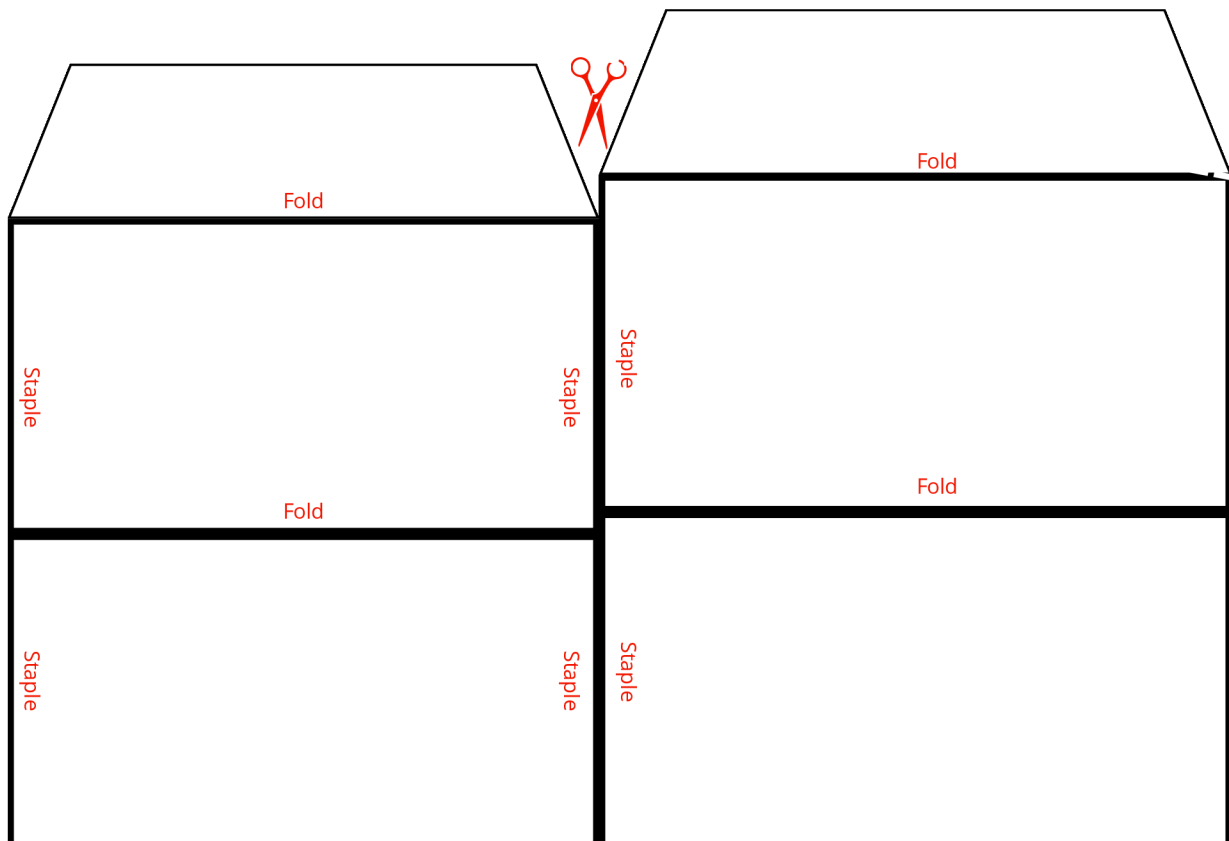
Print pages 1 to 4 and 19-20 double-sided (flip on the long-side)

- Cut, staple and fold the envelopes of pages 5 to 9, following the instructions below
- Cut all task and solution cards and place them in the corresponding envelopes
- Place the solution envelopes in the correspondings task envelopes

If you want to create your own cards : print pages 21 to 26

When you're ready, fold this sheet so that these instructions are on the inner side and add this presentation card to the game materials!

Instructions for the envelopes



Activity Sheet



Sara



30MN



LEARNING OBJECTIVES

- The pupils think about the impact of chemical pollution in water
- The pupils think about how to reduce chemical pollution



MATERIALS

- A board with empty spaces for 5 envelopes
- 5 'task' envelopes
- 5 'solutions' envelopes
- A start card



PREPARATION

- Put the items for each task, or the solutions cards, in the right envelope
- Put the solution envelopes in the corresponding task envelopes
- Put the tasks envelope on the right place on the board, with the *dirty* side up
- Put the start card face up, next to the board

Activity Sheet



ACTIVITY DESCRIPTION

During the game, the pupils will do 5 tasks to understand pollution in the river. Each task is in an envelope, move from one envelope to the next, following the instructions written on each of them.

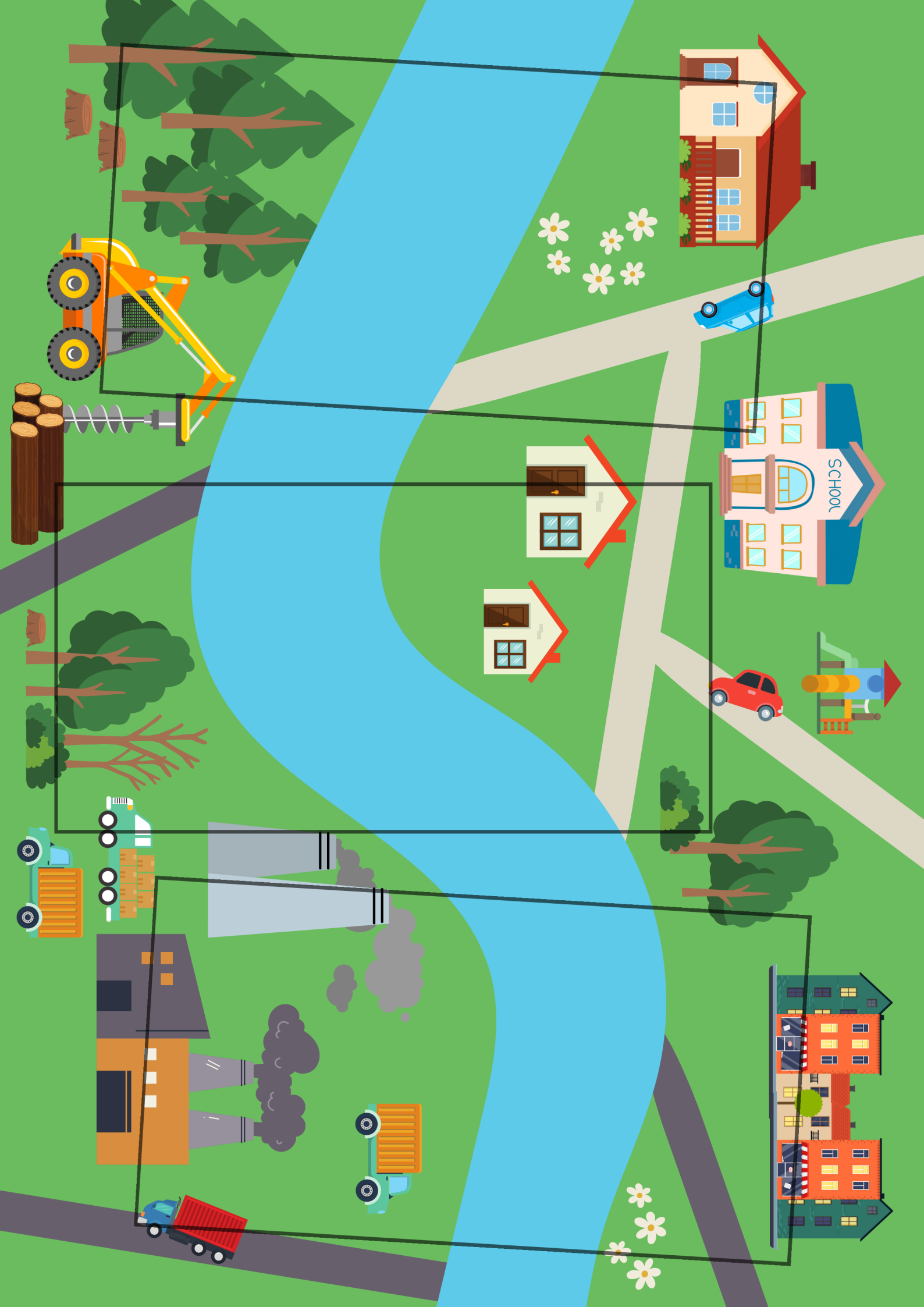
When the pupils have completed a task, they can turn over the envelope to make the river clean again.

After solving all the tasks, they will go to the central board to join the other players.



KEYS TO LEAD THE DISCUSSION

- What is the main problem in the village?
- What are the causes of this problem?
- What solutions did you find?
- What activities generate chemical pollution? Why & How?
- What can you do to reduce chemical pollution?
- Why is it important not to pollute water?



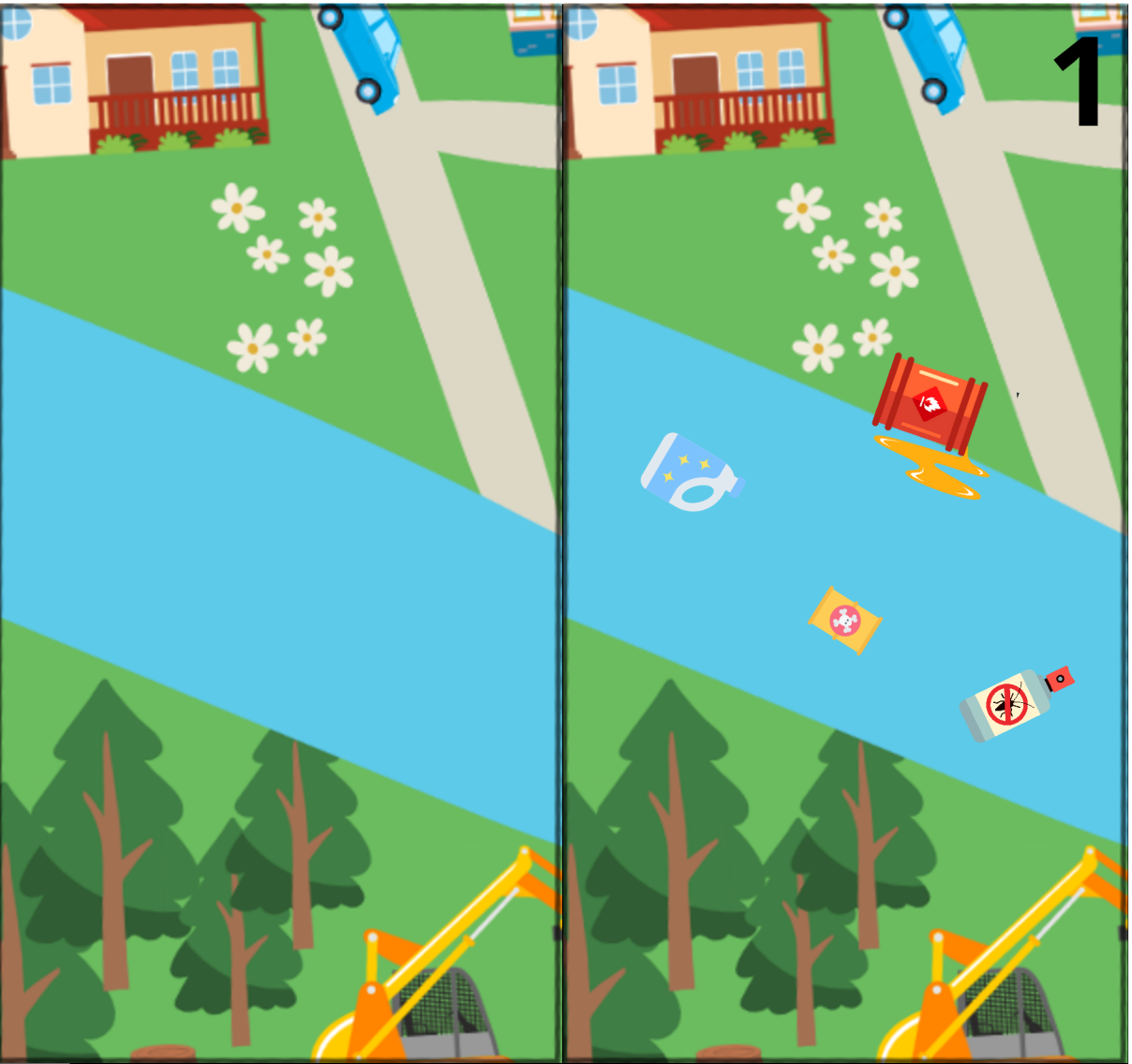
AQUAHeroes



Erasmus+



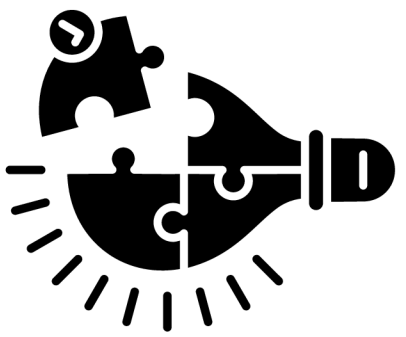
Chemical pollution



Task 1

You see lots of rubbish in the river; like plastic bottles, cans and plastic bags. To understand the pollution better, sort the picture cards into two piles: one for plastic and one for other kinds of rubbish. Then check your results in the solution envelope.

SOLUTION 1
DO NOT OPEN BEFORE SOLVING THE TASK!



Great job taking the first step! You identified and separated different kinds of trash. You learned that plastic pollution and chemical/ industrial pollution both are part of the environmental problem. Take the next envelope and explore the causes of the river's pollution.

2

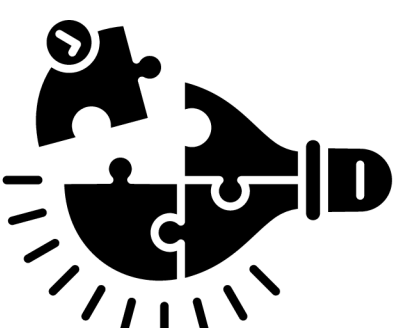


Task 2

You have already found out that there are harmful chemicals in the river. Now you should find the origin of this type of rubbish in the river: Find 5 examples of the causes of chemical and industrial pollution. Use the picture cards and sort them into two piles: one for natural causes and one for human causes.

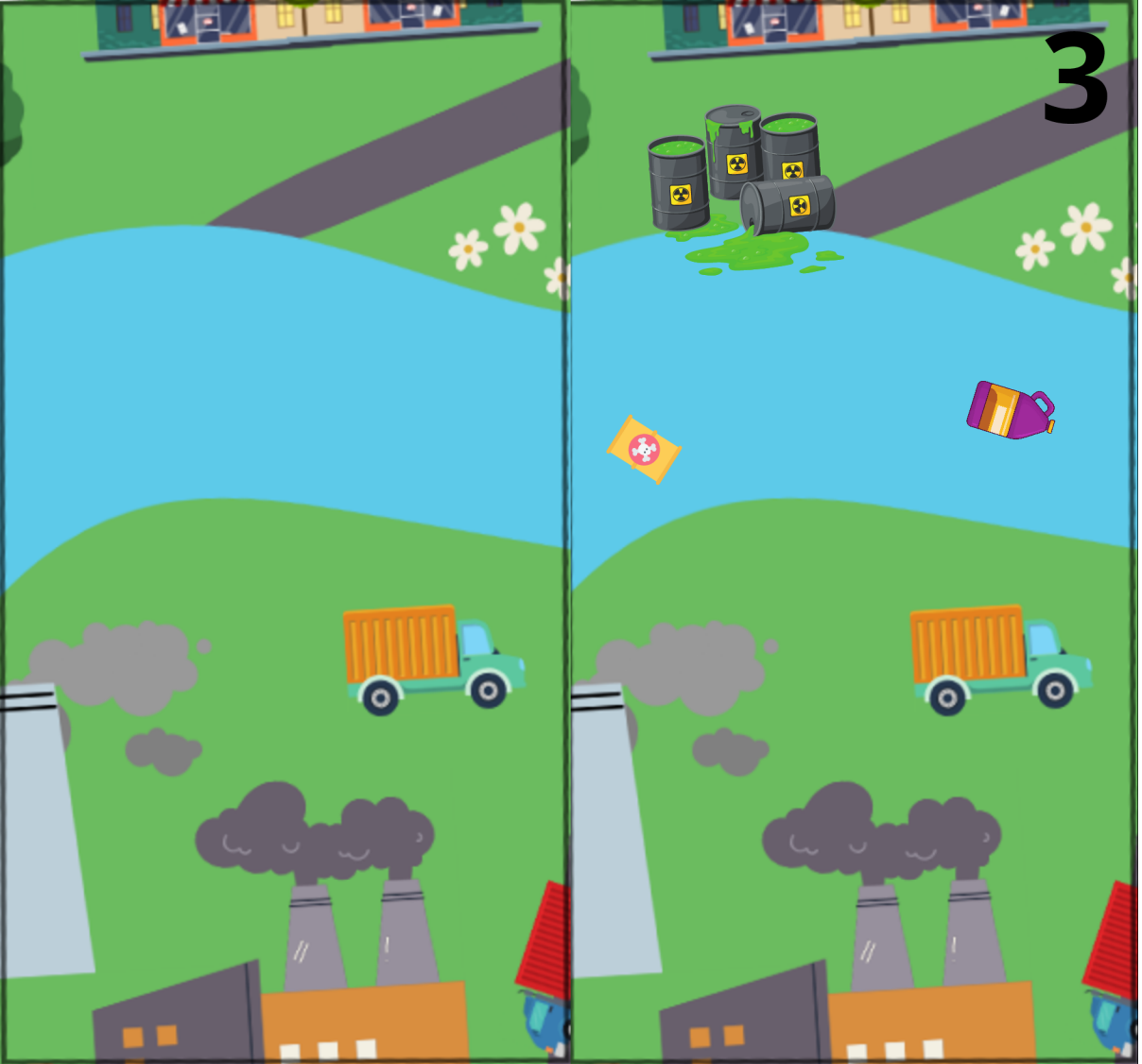
SOLUTION 2

DO NOT OPEN BEFORE SOLVING THE TASK!



Well done! You found examples of pollution caused by nature and people. This discovery brings you closer to understanding the extent of chemical pollution. You can move on to the next challenge.

3

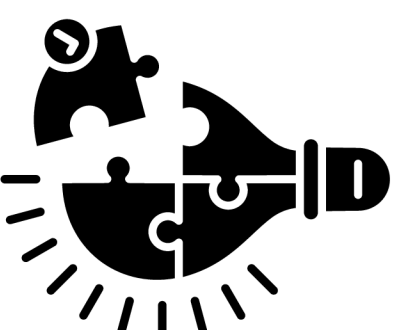


Task 3

Continuing your journey, you see a majestic water spirit blocking your path. With a voice as melodic as flowing water, they say you must prove your knowledge before you are allowed to pass. Get ready for this quiz about pollution and write the correct answer on the given sheet.

SOLUTION 3

DO NOT OPEN BEFORE SOLVING THE
TASK!



Congratulations! You passed the magical quiz and impressed the water spirit. They now allow you to continue your journey.

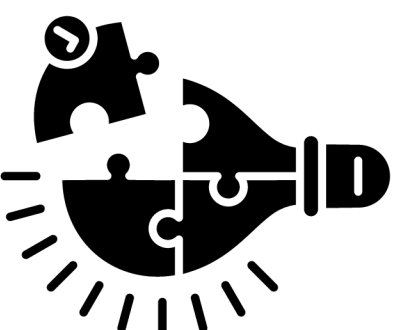


Task L

You see a farm boy named Luis. He tells you about his dog that fell ill after drinking water from the river. Together you decide to find solutions to these problems to keep the water clean for all life forms. Identify threats on the cards and then match them with the proper solutions.

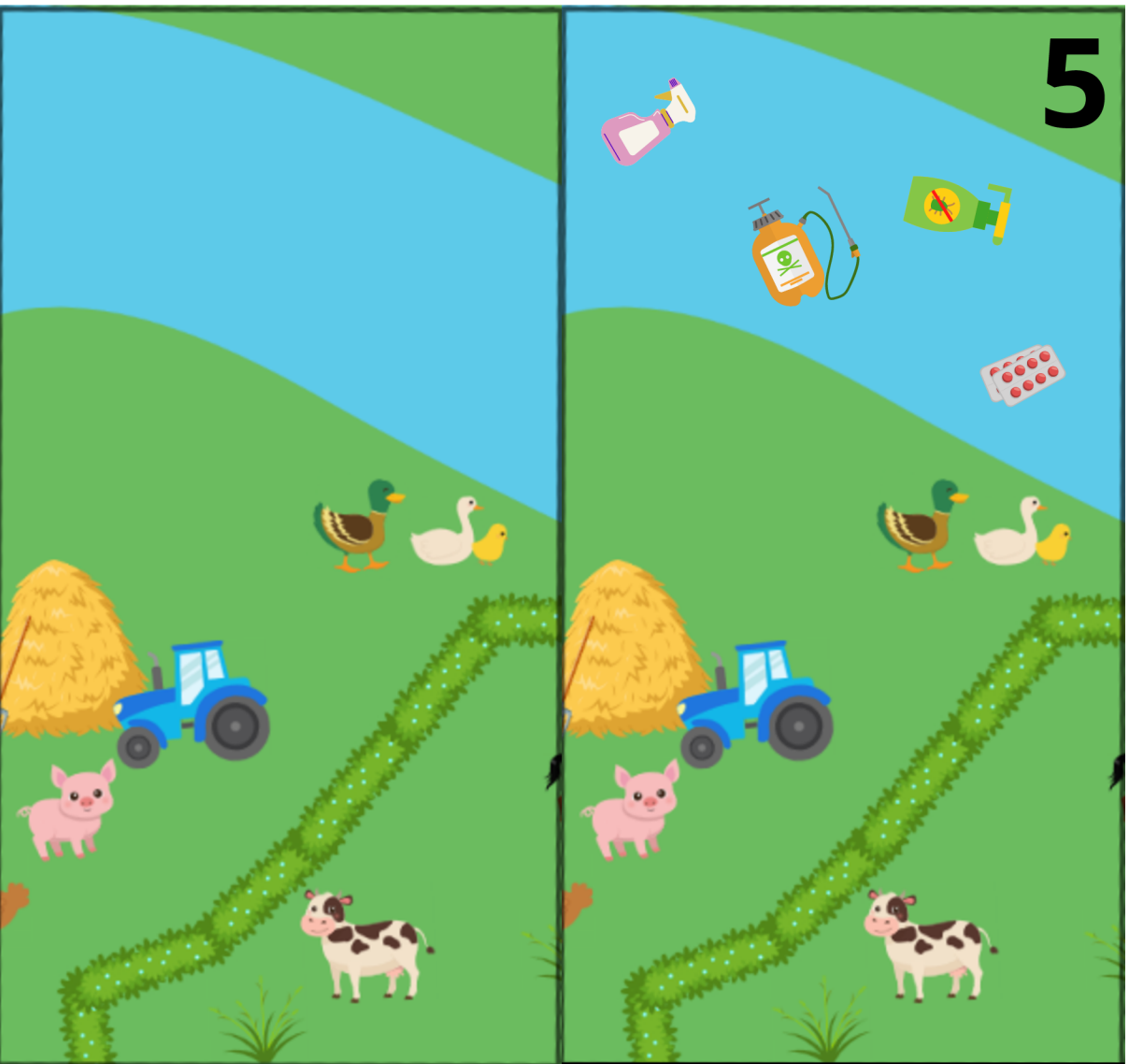
SOLUTION L

DO NOT OPEN BEFORE SOLVING THE TASK!



Awesome! You now know how to protect our water sources. With renewed energy, you can continue your journey to restore the river's health.

5

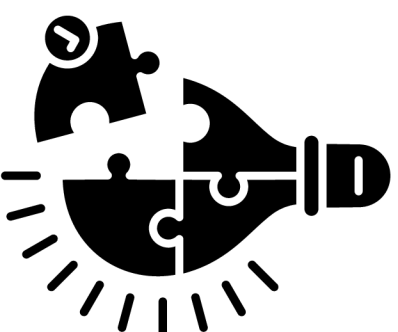


Task 5

As you continue your journey, you find out that industrial fertilizer is causing problems. Maybe that's why Luis' dog fell ill. You want to find a solution: Take out all puzzle pieces from the envelope and solve it. Use only eco-friendly elements for the fertilizer. Check your result by looking at the hidden picture on the back of the completed puzzle.

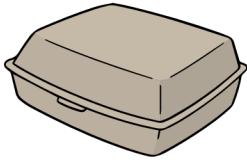
SOLUTION 5

DO NOT OPEN BEFORE SOLVING THE TASK!



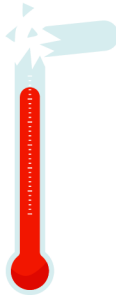
Amazing! You solved the puzzle and know what eco-friendly fertilizer can be made of. Continue to the central board to discuss with everyone how to keep the water clean!

Food containers



Task 1

Broken thermometer



Task 1

Tooth brush



Task 1

Beverage containers



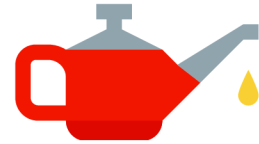
Task 1

Cleaning products



Task 1

Used engine oil



Task 1

Spray cans



Task 1

Plastic bags



Task 1

Weathering of rocks and minerals



Task 2

Factory waste water



Task 2

Volcanic activity



Task 2

Accidental chemical spills



Task 2

Underground water sources



Task 2

Erosion and sedimentation



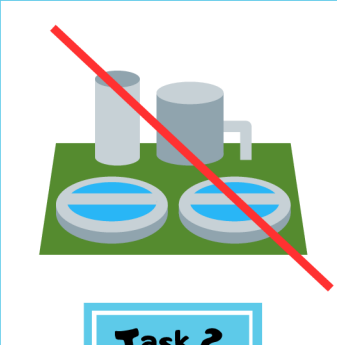
Task 2

Agricultural runoff



Task 2

Broken sewage treatment plants



Task 2

Algal blooms



Task 2

Improper waste disposal



Task 2

Question 2:

What are the most common chemical and industrial pollutants to water? (2 correct answers)

- Industrial fertilizer from farms and oil spills from ships
- Mercury and lead from factories, mining, and improper waste disposal
- Rainwater and clouds
- Water fairies who sprinkle water with glittery pollution dust

Task 3

Question 1:

What is chemical or industrial water pollution ?

- Making the water dirty with leaves and sticks
- Contaminating the water with harmful substances from factories, industries and homes
- Mixing different colors of water together

Task 3

Question 3:

How many liters of water can a single droplet of oil from vehicles pollute?

- One small glass of water
- Five bathtubs filled with water
- A swimming pool for an elephant

Task 3

Question 6 :

Which of the following statements is true about oil pollution in water ?

- It only affects water, not land
- It doesn't have any long-term effects
- It can harm the environment and human health

Task 3

Question 4 :

What are the consequences of chemical or industrial water pollution for plants?

- Increased growth of healthy plants
- Nutrients from fertilizers cause algae to grow strongly, depriving other aquatic plants of oxygen
- Formation of beautiful rainbows in the water

Task 3

Question 5 :


How can chemical and industrial water pollution affect animals?

- Accumulating in animal bodies and causing long-term health problems
- Making them lose their sense of direction
- Dancing dolphins throwing parties in the water

Task 3

Problem

Polluted water from a factory flows into a river and kills the fish



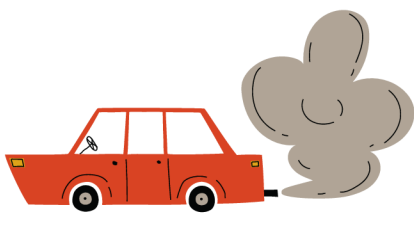
Task 4

1

3

Problem

Cars leave oil on the road and exhaust fumes in the air




Task 4

4

Problem

Large container ships leak oil into the sea from their engines

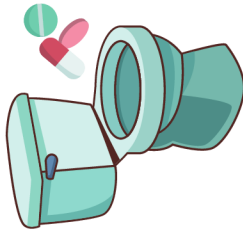


Task 4

Problem

People throw expired medicines into the

toilet



Task L

5

Problem

People throw paint, varnish & engine oil into the normal rubbish bin



Task L

6

7

Problem

People wash their car on the grass and leave oil traces



Task L

8

Problem

People throw their batteries away into the countryside



Task L

A

Solution

E-cargo transport ships are more environmentally friendly



Task L

2

Problem

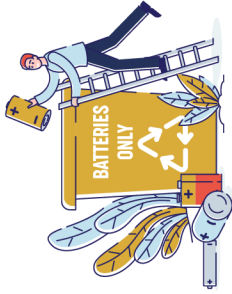
A farmer spreads chemical fertilizer into a field



Task L

Solution

People recycle their batteries in a battery recycling bin



Task L

B

Solution

People take their expired medicines to a proper chemical waste station



Task L

C

D

Solution

People take their car to an eco-friendly car wash (max. 2X per year)



Task L

E

Solution

Use natural methods to encourage plant growth



Task L

F

Solution

People take their paint, varnish & engine oil to a proper chemical waste station

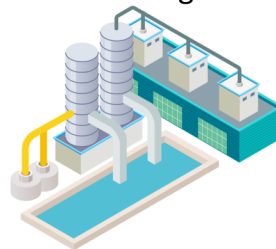


Task L

G

Solution

Install a filter next to the factory to clean the water before it goes into the river



Task L

Solution Task 1

Chemical waste :



Solution Task 1

Plastic waste :



Solution Task 2

Natural :



Solution Task 2

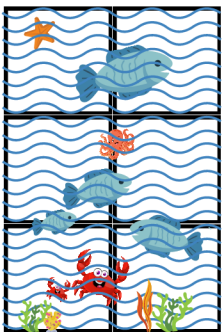
Industrial :



Solution Task 5

Natural elements

Check the puzzle!



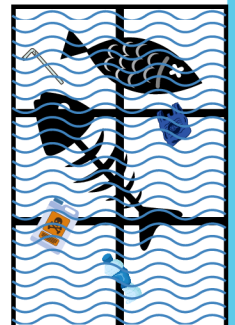
Fruit and vegetable waste Task 5	Grass Task 5
Seaweed Task 5	Eggshells Task 5
Banana peels Task 5	Coffee grounds Task 5

Solution Task 5

Undesired elements

Check the puzzle!

Pesticide Task 5	Insecticide Task 5
Medicines Task 5	Herbicide Task 5
Industrial fertilizer Task 5	Cleaning products Task 5



Solution Task 3

- 1 ▲
- 2 ○ ▲
- 3 ▲
- 4 ▲
- 5 ○
- 6 □

Solution Task 4

1G, 2E, 3H, 4A, 5C, 6F, 7D, 8B

Answer sheet :

Question 1 :
Question 2 :
Question 3 :
Question 4 :
Question 5 :
Question 6 :

Task 3

H

Solution

E-cars are more environmentally friendly



Task L

Start

Sara lives in a small village near a river with her grandparents. They tell her stories about how wonderful the river was when they were children. But this makes Sara feel sad. The river now is very dirty. The colourful fish struggle to breathe and there is smelly algae floating on the surface. Her grandparents are also sad about the polluted river. They ask her to find out what is causing the pollution. So she starts her journey upstream to explore and understand.



Instructions

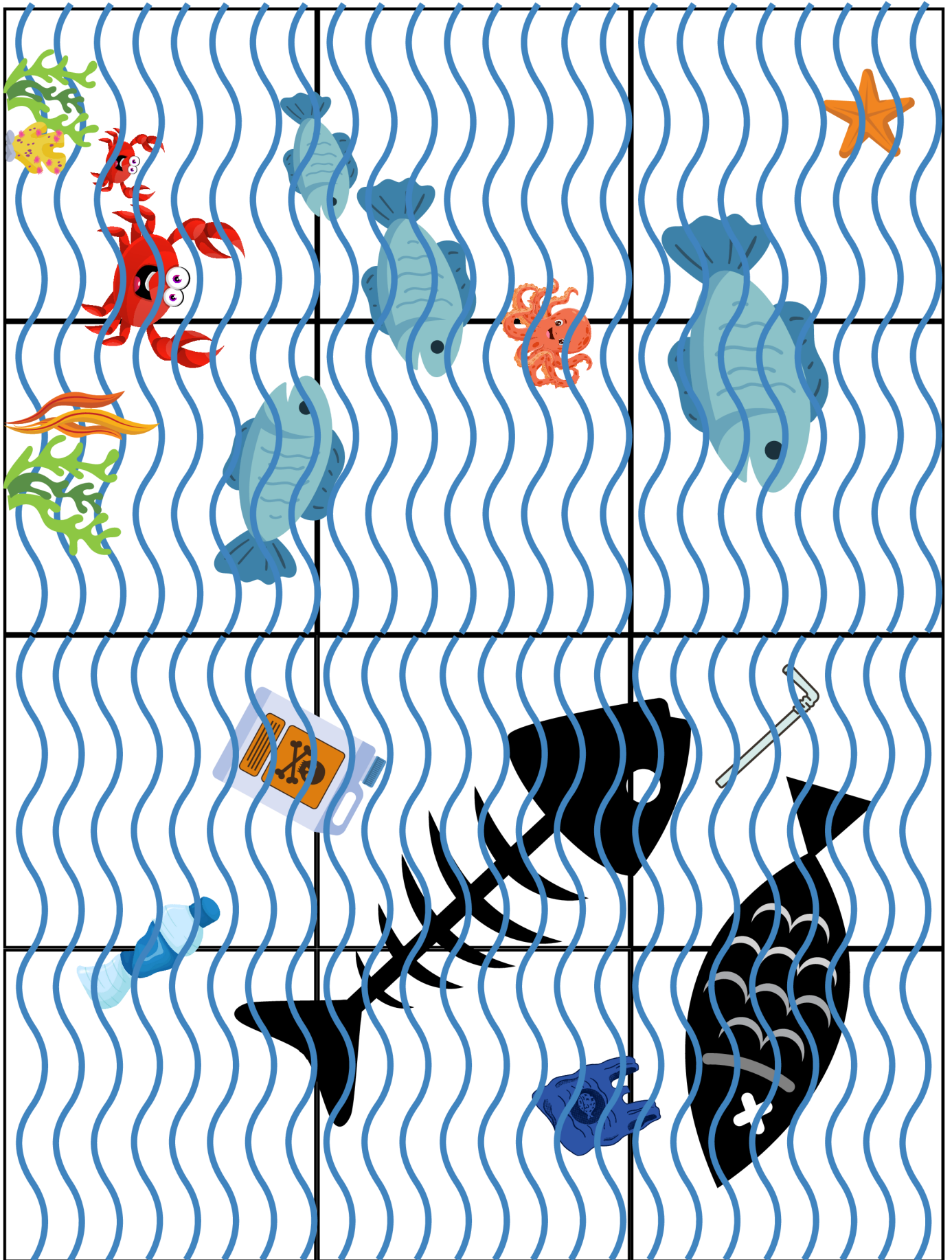
Starting the game : You will do 5 tasks to understand the pollution of the river. Each task is in an envelope with instructions on the inner lid. Inside you find materials and a small solution envelope. When you complete a task, turn over the envelope so you can make the river clean again. Let's start with the first envelope.

Playing the game : Move from one envelope to the next, following the instructions written on each one of them. Don't forget to check the solutions at the end of each task!












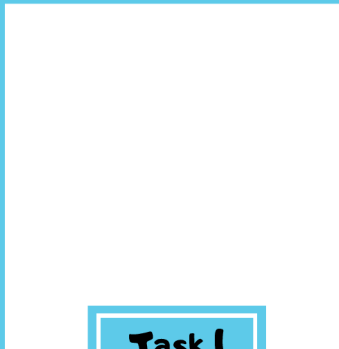
Ending the game : After solving all the tasks, you go to the central board and meet other children who care about pollution too. You promise to work together to make the rivers clean and healthy.

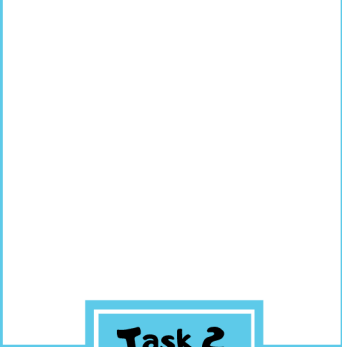
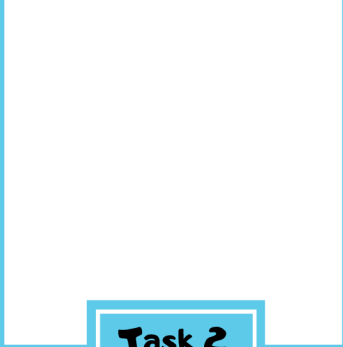
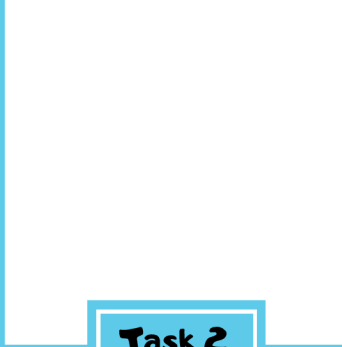








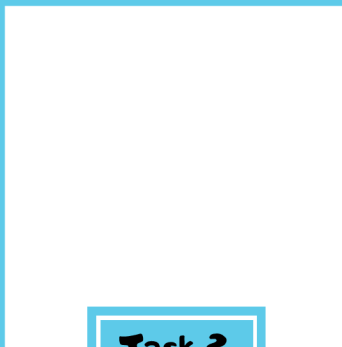
Print this page and the next double-sided (flip on the long-side),
and cut around each card.

 <p>Task 5</p> <p>Banana peel</p>	 <p>Task 5</p> <p>Saeweed</p>	 <p>Task 5</p> <p>Fruit and vegetable scraps</p>
 <p>Task 5</p> <p>Coffee grounds</p>	 <p>Task 5</p> <p>Eggshells</p>	 <p>Task 5</p> <p>Grass</p>
 <p>Task 5</p> <p>Industrial fertilizer</p>	 <p>Task 5</p> <p>Medicines</p>	 <p>Task 5</p> <p>Pesticide</p>
 <p>Task 5</p> <p>Cleaning products</p>	 <p>Task 5</p> <p>Herbicide</p>	 <p>Task 5</p> <p>Insecticide</p>



Extra pages for customisation below.

 Task 1	 Task 1	 Task 1
 Task 1	 Task 1	 Task 1
 Task 1	 Task 1	 Task 1
 Task 1	 Task 1	 Task 1

 Task 2	 Task 2	 Task 2
 Task 2	 Task 2	 Task 2
 Task 2	 Task 2	 Task 2
 Task 2	 Task 2	 Task 2

Question :

Task 3

Question :

Task 3

Question :

Task 3

Question :

Task 3

Question :

Task 3

Question :













Task 3

Question :

Task 3

Question :

Task 3

 <p>Task 5</p>	 <p>Task 5</p>	 <p>Task 5</p>
 <p>Task 5</p>	 <p>Task 5</p>	 <p>Task 5</p>
 <p>Task 5</p>	 <p>Task 5</p>	 <p>Task 5</p>
 <p>Task 5</p>	 <p>Task 5</p>	 <p>Task 5</p>

Solution Task 1

Chemical waste :

Solution Task 1

Plastic waste :

Solution Task 2

Natural :

Solution Task 2

Industrial :

Solution Task 3

Solution Task 4

Solution Task 5

Natural ingredients :

Solution Task 5

Innapropriate ingredients :