

Dear teachers:

This board game was developed by Studio SaJo in cooperation with Dewathang Primary School and Garpawoong middle school. Studio SaJo is a student waste management project that is part of the Problem Based Learning South Asia initiative which is co-funded by the Erasmus+ Programme of the EU. The project took place in spring 2020 as a cooperation of Aalto University, Finland and Jigme Namgyel Engineering College (JNEC) of the Royal University of Bhutan. We want to express our gratitude for the great help we received from Khem P. Thapa, Dechen Lhamo and Dorji Wangmo, the countless students who have tested the game and the great support from JNEC and Aalto University.

This board game was designed for Garpawoong middle schools and shall assist you in teaching waste-management in a fun way. It is tailored to the Samdrup Jongkhar district and is printable to allow easy access and diffusion.

As the game is printable, it needs some work from you - but feel free to include the help of your students. Below you will find the materials you would use under optimal conditions, but feel free to improvise with what is available to you.

Printable templates:

- Board (A3)
- Cards: People; Health and Environment; Materials; and Waste Management (A4)
- Instructions (A4)

Materials needed:

- 18 A4 (thick) paper sheets
- 1 normal A4 paper
- 1 A3 paper
- Cardboard, preferably in A3 size
- 1 token per two players

Instructions:

- Print one board on an A3 paper for 4-10 students and glue it to cardboard. Preferably use adhesive spray.
- Print the cards on thick paper:
 - Glue and cut the final cards (use adhesive spray if available).

Tips:

- Make sure to stay around while your students play to assist them if necessary.
- Play outside. Draw a similar track as on the ground and let the students be the tokens.

Finally, we want to explicitly encourage you to modify the game in the way you see fit. You are the expert and know your students best. Feel free to add questions and be creative – there are some empty cards which you may use as a template. In case you are located outside the Samdrup Jongkhar district, have a look at the stakeholder cards - these will need adjustments. We do not claim any rights to this board game, so feel free to copy, imitate and adjust - this game was created for YOU and we want it to be spread.

In case of any questions or need assistance - feel free to contact us under <https://www.instagram.com/studiosajo/> or mona.fritz@aalto.fi

Have fun and best regards!
Studio Sajo

The Waste Dragons Game

Overview

Players: 2–3 per team,
in total max 10 players

Age: middle-school

Playing time: 25–70 mins

This is an interactive game where players gain knowledge about waste management in Bhutan in a fun way.

Components

- 1 board
- 1 deck of cards
 - The deck is divided into different topics identified by different patterns on the cards: waste management, materials, health and environment and people
- 5 tokens
- A pen and paper

Setup

- Set the board on an even surface.
- Put the different cards sorted by topic/pattern next to the board.
- Divide yourselves into teams that each have 2 to 3 players. Each team picks a token and places it on the “Start here” circle on the board.

Cards

- *Question cards:* Read the question out loud to the team on your left without revealing the correct answer. If the team guesses the right answer, they get to move on the board the amount of points written on the card. Sometimes there is an option to request a tip if the team doesn't know the answer to the question. If they request it and there is a tip on the card, read it out loud. If the team answers correctly after the tip, they get the amount of points written after the tip and move on the board accordingly.
- *Action cards:* Hand the card to one person in the next team without reading it and without showing it to the other team members. The person that receives the card does as the card says.
- *Event cards:* Read the card out loud and move the token as it says.

How to play

1st round

- The youngest player picks a card from any cards on the deck.
- There are three different types of cards in each pattern. Do as described above depending on the card type.

2nd round

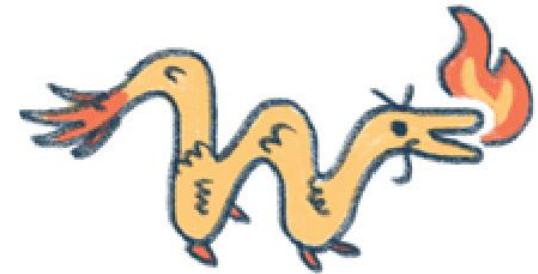
- The pattern of the field your token is placed on determines the card you will get next, i.e. if your field is striped your next card will be also striped – a people card.

Determining the winner

The team that reaches the finish line wins.

Ideas for modifying the game

- Draw on the ground a similar track than the one on the board. Players can act as tokens.
- Add questions/actions/events that you find interesting.



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of the European Union



**Start
Here**



Finish

LEVEL 2

MATERIALS

3 points

How long does it take for glass to decompose?

Using a tip: 2 points

- A. 50 years
- B. 100 years
- C. 1 million years or more

ANSWER: C

LEVEL 2

MATERIALS

1 point

Name three different types of waste.

ANSWERS:

GOOD: Plastic, cardboard, paper, biowaste, e-waste, metal, glass, hazardous waste, mixed waste, textiles...

BAD: A table, a cat, trees, wrappings ...

LEVEL 2

MATERIALS

3 points

What are the two basic ingredients plastic is made of?

Using a tip: 2 points

- A. Sand and water
- B. Crude oil and gas
- C. Sugar and minerals

ANSWER: B

LEVEL 2

MATERIALS

1 point

Come up with one thing you could make from a glass bottle or jar.

SOME GOOD ANSWERS:

- Flower vases
- Candle holders
- Art crafts

LEVEL 2

MATERIALS

LEVEL 2

MATERIALS

LEVEL 2

MATERIALS

LEVEL 2

MATERIALS

2 points

What is PET?

ANSWER:

A type of plastic

EXTRA INFO:

PET stands for polyethylene terephthalate, which is a form of polyester (just like the clothing fabric). It is extruded or molded into plastic bottles and containers for packaging foods and beverages, personal care products, and many other consumer products.

3 points

How long does plastic take to decay?

Using a tip: 2 points

- A. 100 to 1000 years
- B. 5 to 15 years
- C. 1000 to a million years

ANSWER: A

2 points

Name one type of e-waste.
(The reader can read the extra info box for more information)

SOME GOOD ANSWERS:

- An old phone
- A TV
- A hair dryer
- An old computer

EXTRA INFO:

E-waste means electronic waste, so any discarded electric or electronic device is in this category

2 points

What is hazardous waste?

ANSWER:

Waste that is dangerous for humans' health or bad for the environment if not disposed properly.

LEVEL 2

MATERIALS

3 points

Why is the inside of chip packages made of aluminium (a silver-looking material)?

Using a tip: 2 points

- A. So that you can see your reflection when you open the package
- B. For keeping moisture out of the bag
- C. For keeping heat out of the bag

ANSWER: B

LEVEL 2

MATERIALS

3 points

How much Waste does an average Bhutanese person generate per week?

Using a tip: 1 point

- A. About 3.5 kilos
- B. About 10 kilos
- C. About 1 kilo

ANSWER: A

LEVEL 2

MATERIALS

2 points

What is the main ingredient of glass?

Using a tip: 1 point

- A. Stone
- B. Fiber
- C. Sand

ANSWER: C

LEVEL 2

MATERIALS

2 points

What is the type of waste that is most produced in Bhutan?

Using a tip: 1 point

- A. Paper
- B. Biowaste
- C. Plastic

ANSWER: B

EXTRA INFO:
50% is biowaste, 17% organic and 12% plastic

LEVEL 2

MATERIALS

1 point

ACTION

Find something made of plastic!

LEVEL 2

MATERIALS

1 point

ACTION

Draw an item that is biowaste. Your partner has to guess what it is.

LEVEL 2

MATERIALS

2 points

ACTION

Find used paper and try to make a hat with it as fast as possible.

LEVEL 2

MATERIALS

1 point

ACTION

Draw a plastic bottle. Your partner has to guess what it is.

LEVEL 2

MATERIALS

LEVEL 2

MATERIALS

LEVEL 2

MATERIALS

LEVEL 2

MATERIALS



EVENT

You used a non-reusable plastic plate instead of a banana leaf plate!

You lose 2 points



EVENT

You segregated your biowaste from other waste!

You gain 1 point

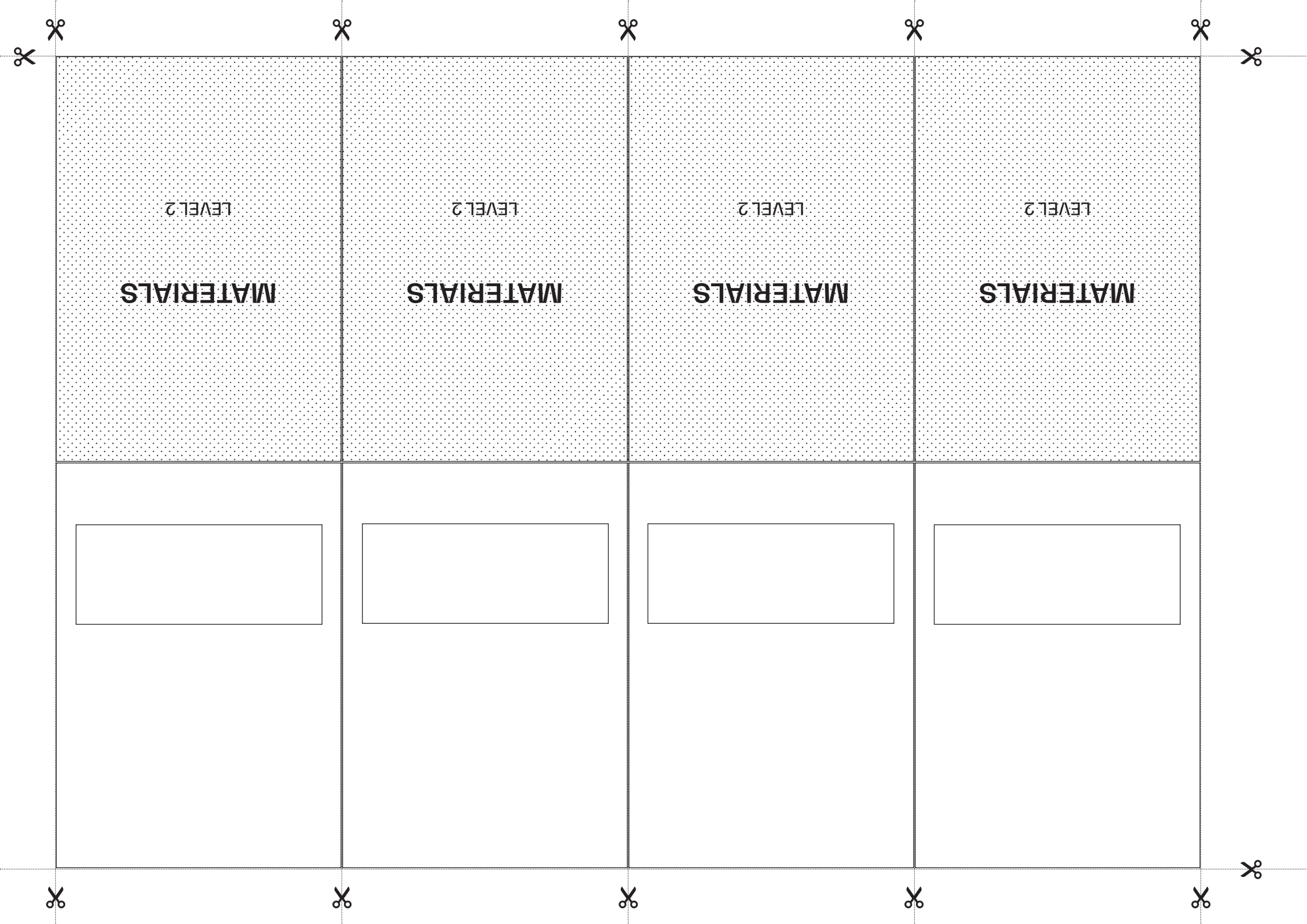


EVENT

You have not properly closed your red plastic bag with hazardous waste inside!

Pass your turn





LEVEL 2

MATERIALS

LEVEL 2

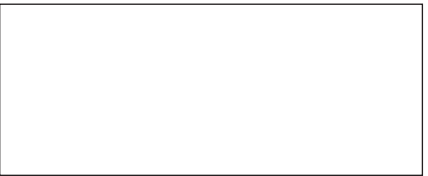
MATERIALS

LEVEL 2

MATERIALS

LEVEL 2

MATERIALS



LEVEL 2

HEALTH

&

ENVIRONMENT

LEVEL 2

HEALTH

&

ENVIRONMENT

LEVEL 2

HEALTH

&

ENVIRONMENT

LEVEL 2

HEALTH

&

ENVIRONMENT

2 points

What happens if biowaste ends up in the landfill?

Using a tip: 1 point

- A. It decays within 6 months
- B. It stays there forever
- C. It is picked up by scrap dealers and then sold

ANSWER: A

1 point

What is biowaste?

ANSWER:

Waste made from living organisms

3 points

What is a planetary boundary?

Using a tip: 2 points

- A. The earth has limited resources and sinks.
- B. Any of these: Freshwater use, biosphere integrity, climate change, stratospheric ozone depletion, ocean acidification, land-system change, biochemical flows, atmospheric aerosol loading, novel entities.
- C. The universe beyond our atmosphere.

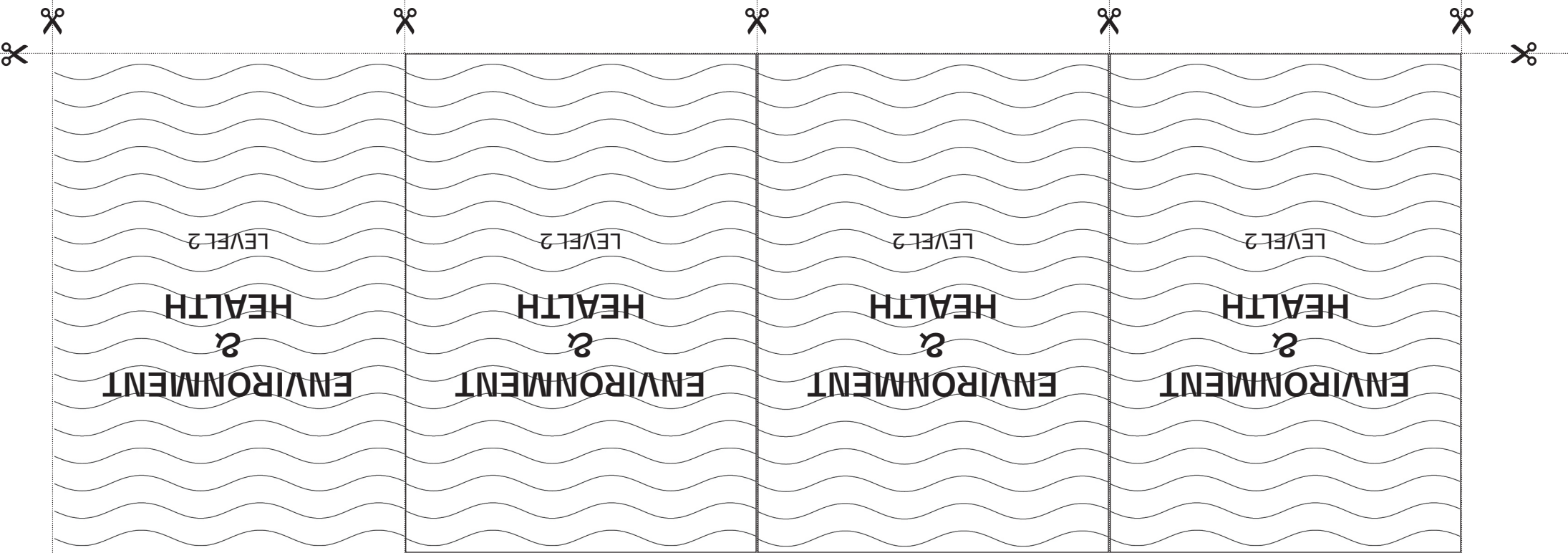
ANSWER: A & B

2 points

What happens if you don't collect the leachate from the landfill?

ANSWER:

It contaminates the groundwater



2 points

What is leachate?

ANSWER:

A liquid that drains from landfill

2 points

What does a landfill do to the atmosphere/ air?

ANSWER:

It emits Greenhouse Gases

1 point

Name 3 living beings that are impacted by CO2 emissions ?

ANSWER:

Every living being is accepted (types of plant, types of animal, humans, ...)

3 point

Tell three disadvantages of greenhouse gases

ANSWER:

Any of these: They heat up the atmosphere, diminish the melting of permafrost, enhances the disparition of glaciers, contribute to the loss of biodiversity, impact the probability of natural hazards

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

3 points

Name two reasons why a poorly managed landfill is dangerous for the biodiversity (the plants and animals around the landfill)?

ANSWER:

The groundwater gets polluted; there are greenhouse gas emissions that accelerate climate change; the waste ends up in the surrounding environment; animals might accidentally eat some waste...

1 point

What is groundwater?

ANSWER:

Water stored beneath the surface of the ground that has filled all the available space in the soil.

2 points

What is biodiversity?

ANSWER:

The existence of many different plant and animal species.

3 points

Name two reasons why burning waste is harmful for the environment?

ANSWER:

Burning waste (incineration) produces smoke that contains many harmful substances; The produced ash can contain substances that harm you and your environment; Burning waste discourages waste reduction and recycling.

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

3 points

What is another source of water contamination besides dumping of waste in rivers and leakage from landfills?

ANSWER:

Any of these: Domestic sewage (waste water produced by a community of people); Uncontrolled seepage (the slow escape of a liquid or gas through porous material or small holes); Overflows from septic tanks.

3 points

ACTION

Draw an animals affected by the waste. Your team member has to guess.

3 points

ACTION

Draw how waste can affect your health. Your team member has to guess.

2 points

ACTION

Mimic what open dumping is. Your team member has to guess.

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

LEVEL 2

HEALTH

2

ENVIRONMENT

3 points

ACTION

Draw a simple version of the Greenhouse Gas effect.



EVENT

A landslide has damaged the landfill!

Every player loses one point



EVENT

Your dog has eaten plastic someone dumped on the street and gets very sick.

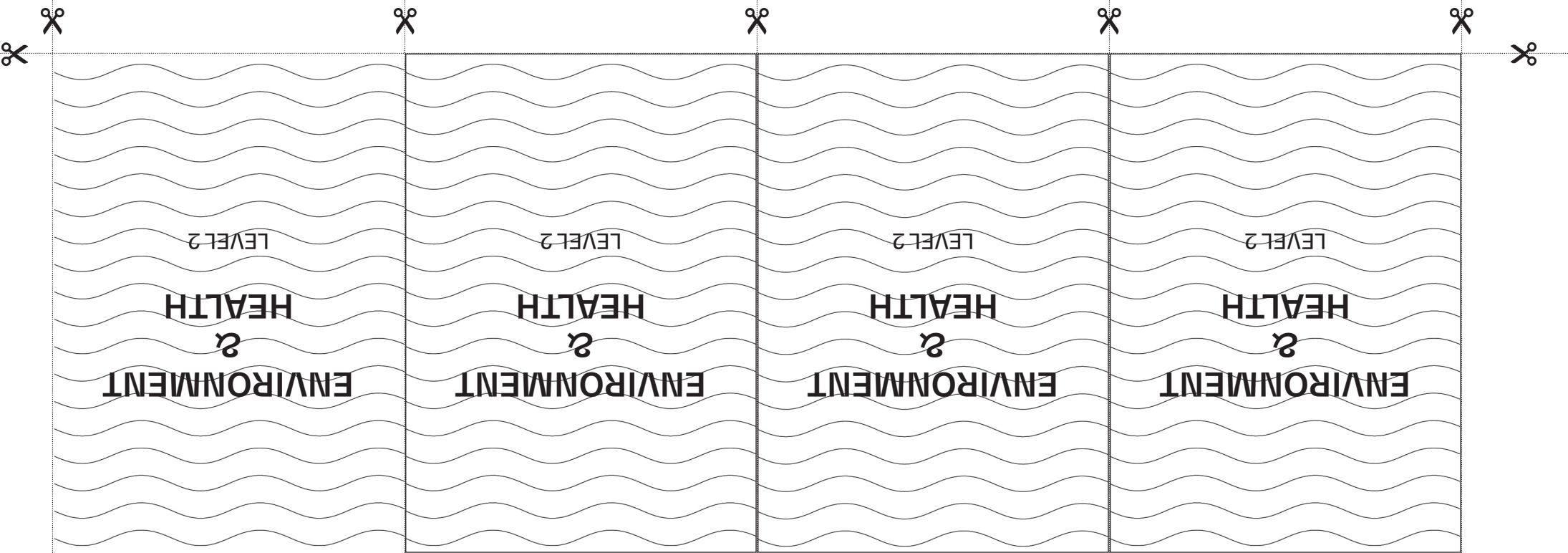
Pass your turn



EVENT

You organise a ZERO WASTE HOUR to clean the area!

You gain 3 points



EVENT

Leachate has contaminated the groundwater, the drinkable water is impacted in the area!

You lose 2 points and your opponents lose 1 point



EVENT

You finished your plate and did not produce any leftovers!

You gain 1 point



EVENT

You dumped a plastic bottle in the forest.

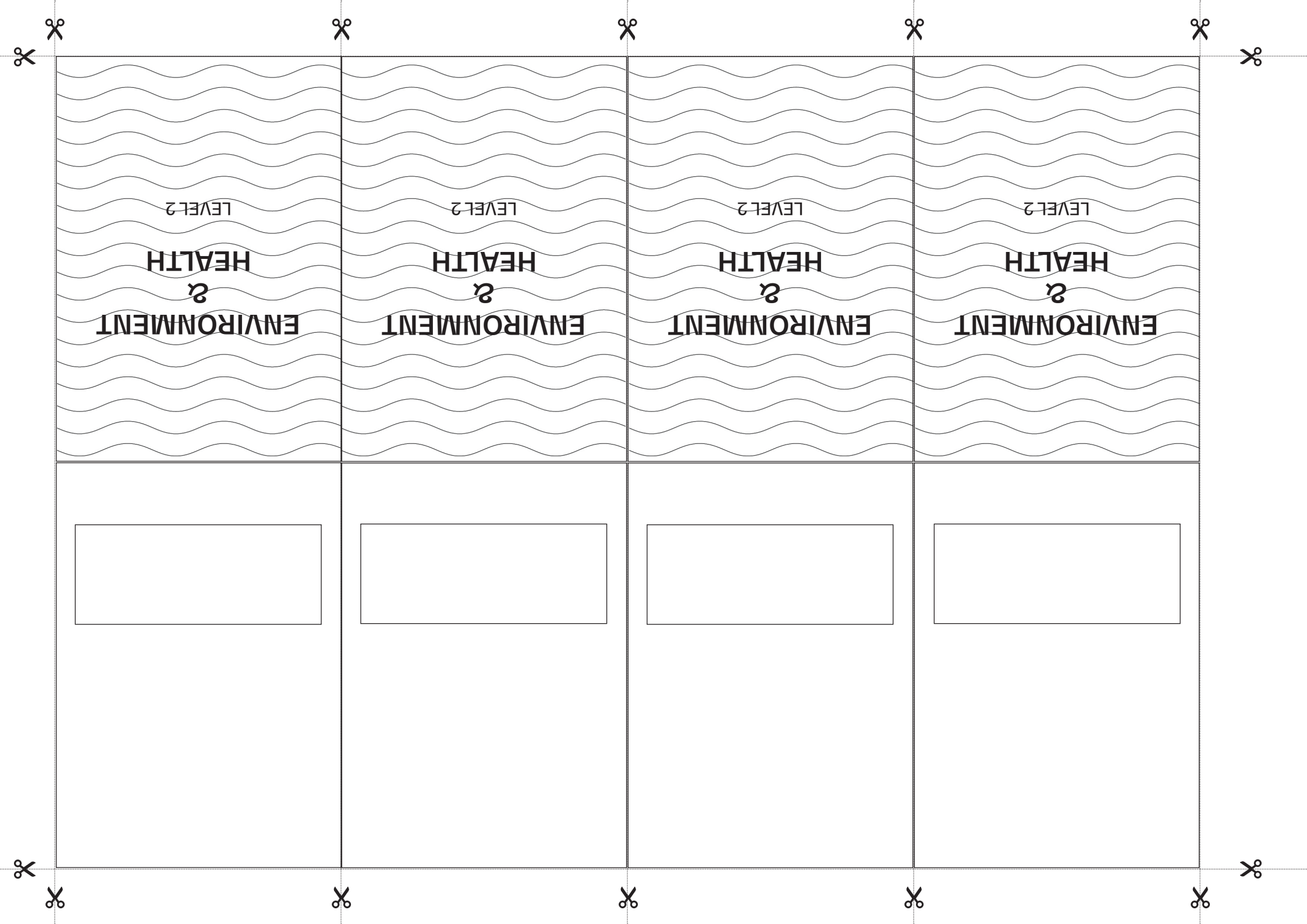
You lose 2 points for bad behaviour



EVENT

You had a picnic near a river and threw the plastic wrappings of food in the river. The plastic goes with the rivers all the way to Brahmaputra river and further on to the Indian Ocean.

You lose 3 points

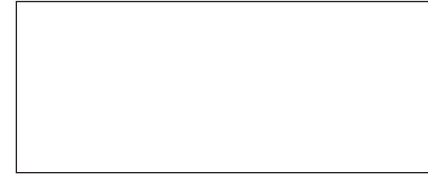
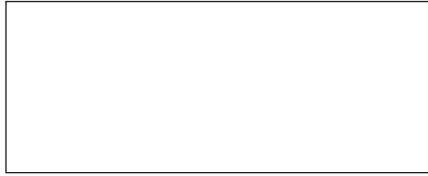


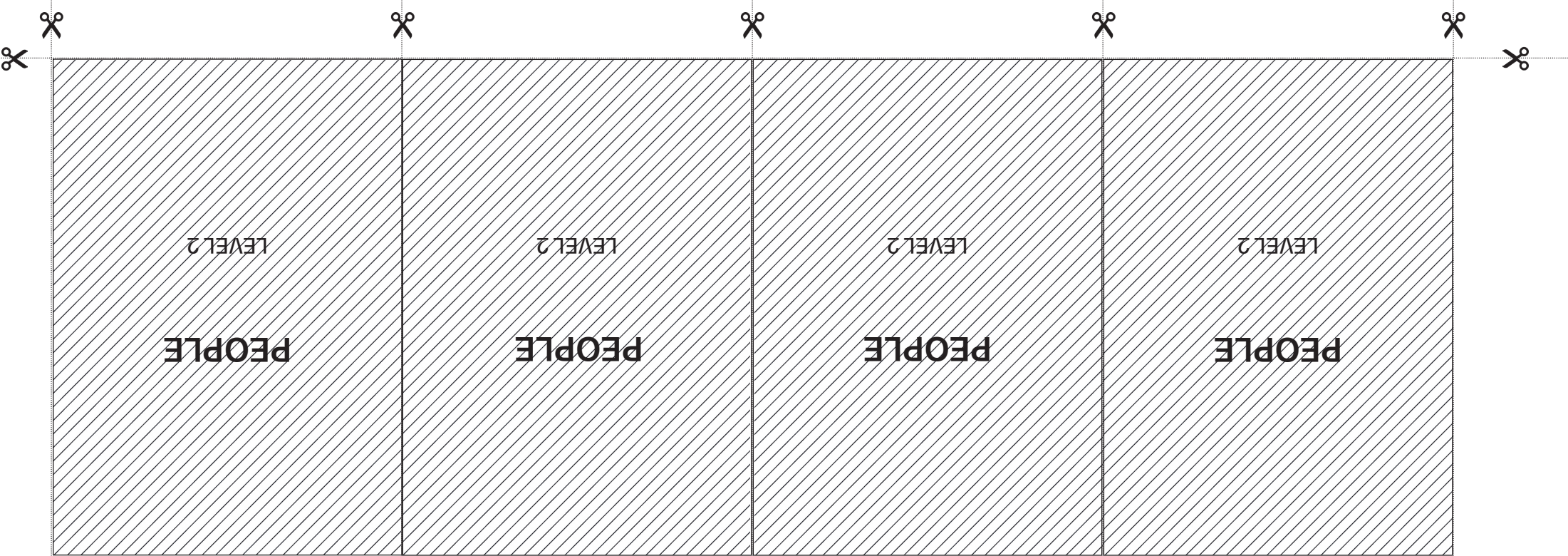
ENVIRONMENT
HEALTH
LEVEL 2

ENVIRONMENT
HEALTH
LEVEL 2

ENVIRONMENT
HEALTH
LEVEL 2

ENVIRONMENT
HEALTH
LEVEL 2





2 points

What types of waste do scrap dealers buy?

Using a tip: 1 point

- A. Glass and plastic bottles, metal waste and cardboard
- B. Kitchen waste and leftovers
- C. Hazardous waste from hospitals

ANSWER: A

2 points

Who is responsible for collecting waste in Samdrup Jongkhar?

Using a tip: 1 point

- A. Samdrup Jongkhar Initiative
- B. Waste pickers
- C. Thromde

ANSWER: C

2 points

Who is the best group of people to sell PET bottles to?

ANSWER:

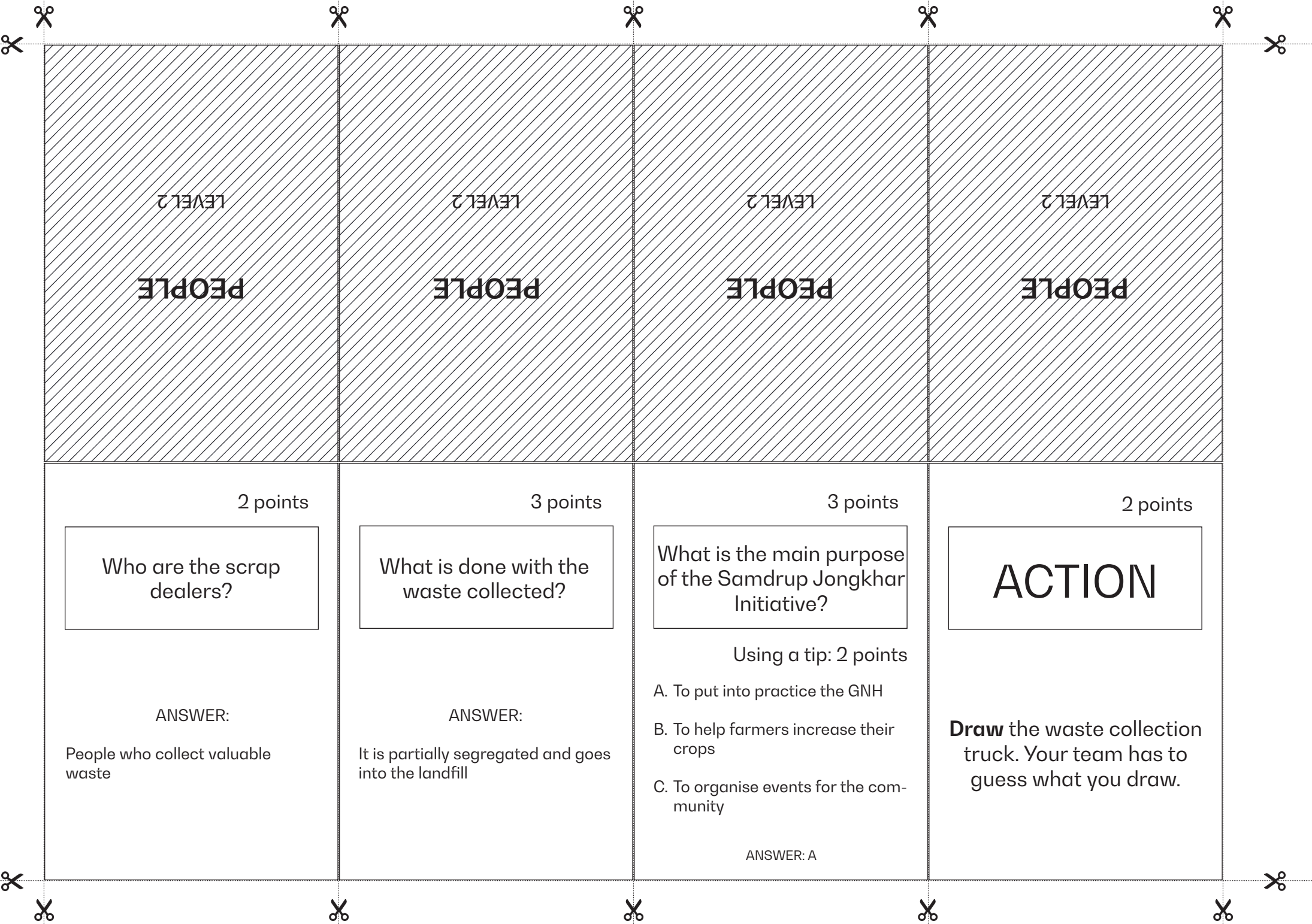
Scrap dealers

1 point

How is the waste collected in Dewathang and Samdrup Jongkhar?

ANSWER:

A truck collects them



<p>LEVEL 2</p> <p>PEOPLE</p>	<p>LEVEL 2</p> <p>PEOPLE</p>	<p>LEVEL 2</p> <p>PEOPLE</p>	<p>LEVEL 2</p> <p>PEOPLE</p>
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2 points

Who are the scrap dealers?

ANSWER:

People who collect valuable waste

3 points

What is done with the waste collected?

ANSWER:

It is partially segregated and goes into the landfill

3 points

What is the main purpose of the Samdrup Jongkhar Initiative?

Using a tip: 2 points

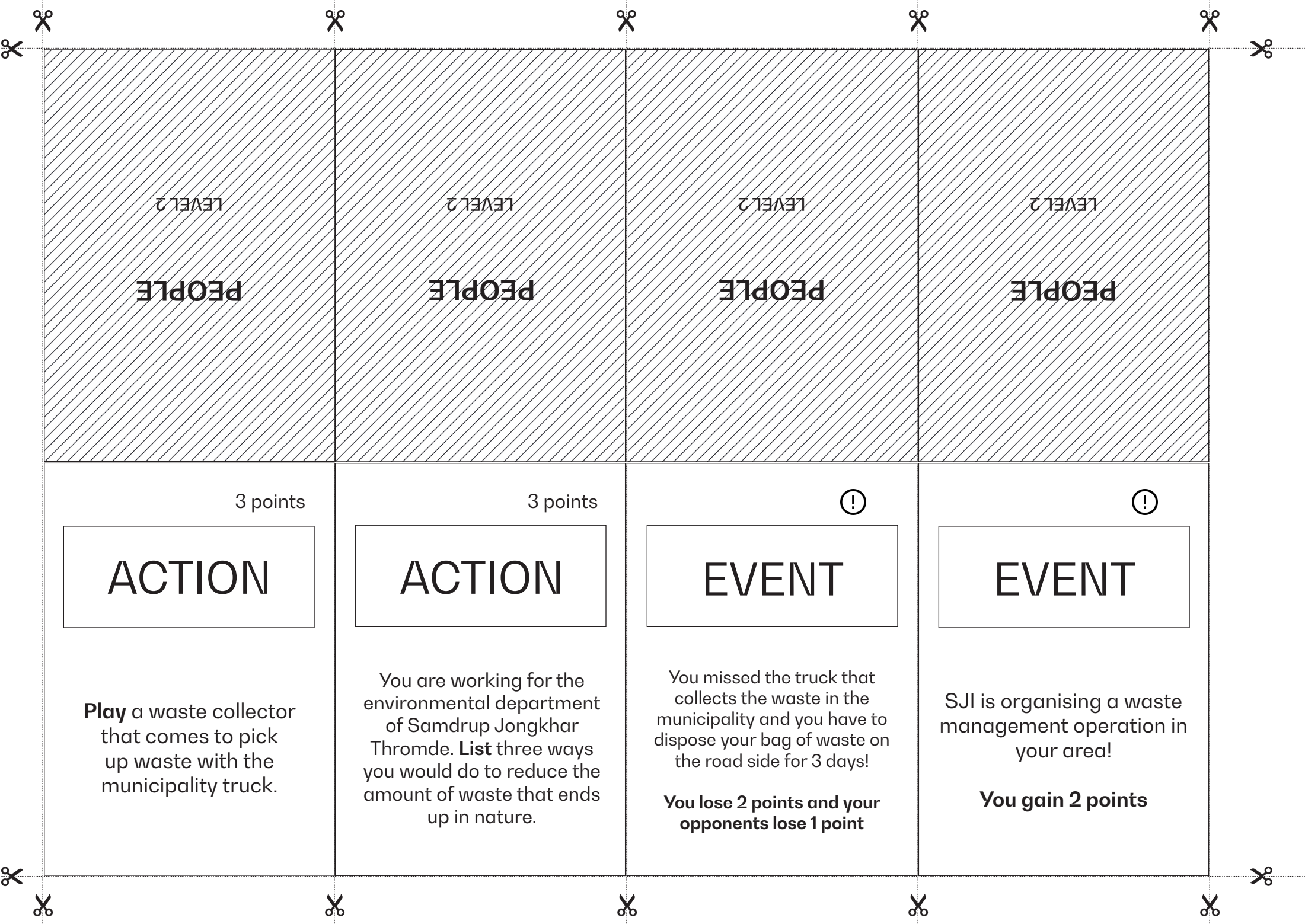
- A. To put into practice the GNH
- B. To help farmers increase their crops
- C. To organise events for the community

ANSWER: A

2 points

ACTION

Draw the waste collection truck. Your team has to guess what you draw.



LEVEL 2

PEOPLE

LEVEL 2

PEOPLE

LEVEL 2

PEOPLE

LEVEL 2

PEOPLE

3 points

ACTION

Play a waste collector that comes to pick up waste with the municipality truck.

3 points

ACTION

You are working for the environmental department of Samdrup Jongkhar Thromde. **List** three ways you would do to reduce the amount of waste that ends up in nature.



EVENT

You missed the truck that collects the waste in the municipality and you have to dispose your bag of waste on the road side for 3 days!

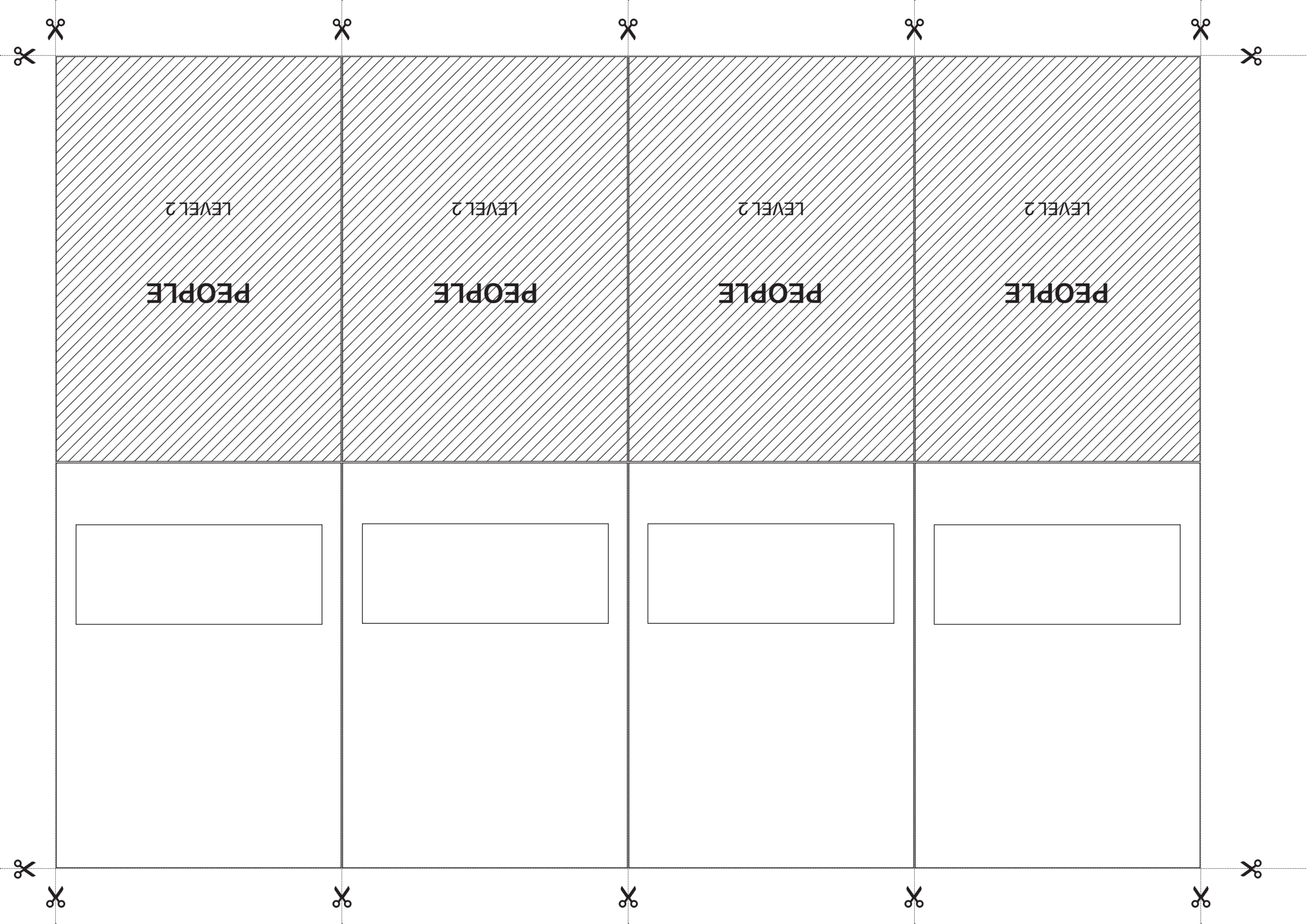
You lose 2 points and your opponents lose 1 point



EVENT

SJI is organising a waste management operation in your area!

You gain 2 points



LEVEL 2

PEOPLE

LEVEL 2

PEOPLE

LEVEL 2

PEOPLE

LEVEL 2

PEOPLE

LEVEL 2

**WASTE
MANAGEMENT**

2 points

Who is responsible for
your waste?

ANSWER:

YOU

LEVEL 2

**WASTE
MANAGEMENT**

2 points

What are the four “Rs” of
waste management?

ANSWER:

Refuse, Reduce, Reuse, Recycle

LEVEL 2

**WASTE
MANAGEMENT**

2 points

Which one is less harmful
for the environment: a
plastic plate or a banana
leaf? Why?

ANSWER:

A banana leaf, because it will
decompose. A plastic plate will
take over a hundred of years to
decompose, which means that it
will stay in the environment and
animals might accidentally eat it.

LEVEL 2

**WASTE
MANAGEMENT**

1 point

What is compost used
for?

ANSWER:

Transforming biodegradable
waste into fertilisers (plant food)

LEVEL 2

**WASTE
MANAGEMENT**

LEVEL 2

**WASTE
MANAGEMENT**

LEVEL 2

**WASTE
MANAGEMENT**

LEVEL 2

**WASTE
MANAGEMENT**

3 points

Why is segregation important?

ANSWER:

Any of these: Because less waste will end up in the landfill and nature; Because it makes the treatment of waste easier; Because it helps to recycle materials.

2 points

You see bags of waste on the side of the road. What do you do?

ANSWER:

You leave them where they are.

EXTRA INFO:

It is not safe to pick up waste from the side of the road by yourself because there could be something dangerous in the bags.

2 points

What is most important when it comes to waste?

ANSWER:

Refusing waste.

2 points

Your brother/sister does not know how to segregate waste. What do you do?

ANSWER:

I explain to him/her how to segregate waste and why it is important and/ or: I help him/her to segregate waste.

LEVEL 2

WASTE MANAGEMENT

LEVEL 2

WASTE MANAGEMENT

LEVEL 2

WASTE MANAGEMENT

LEVEL 2

WASTE MANAGEMENT

2 points

ACTION

Draw a compost. Your other team members have to guess

2 points

ACTION

Draw a type of biodegradable waste. Your other team members have to guess

2 points

ACTION

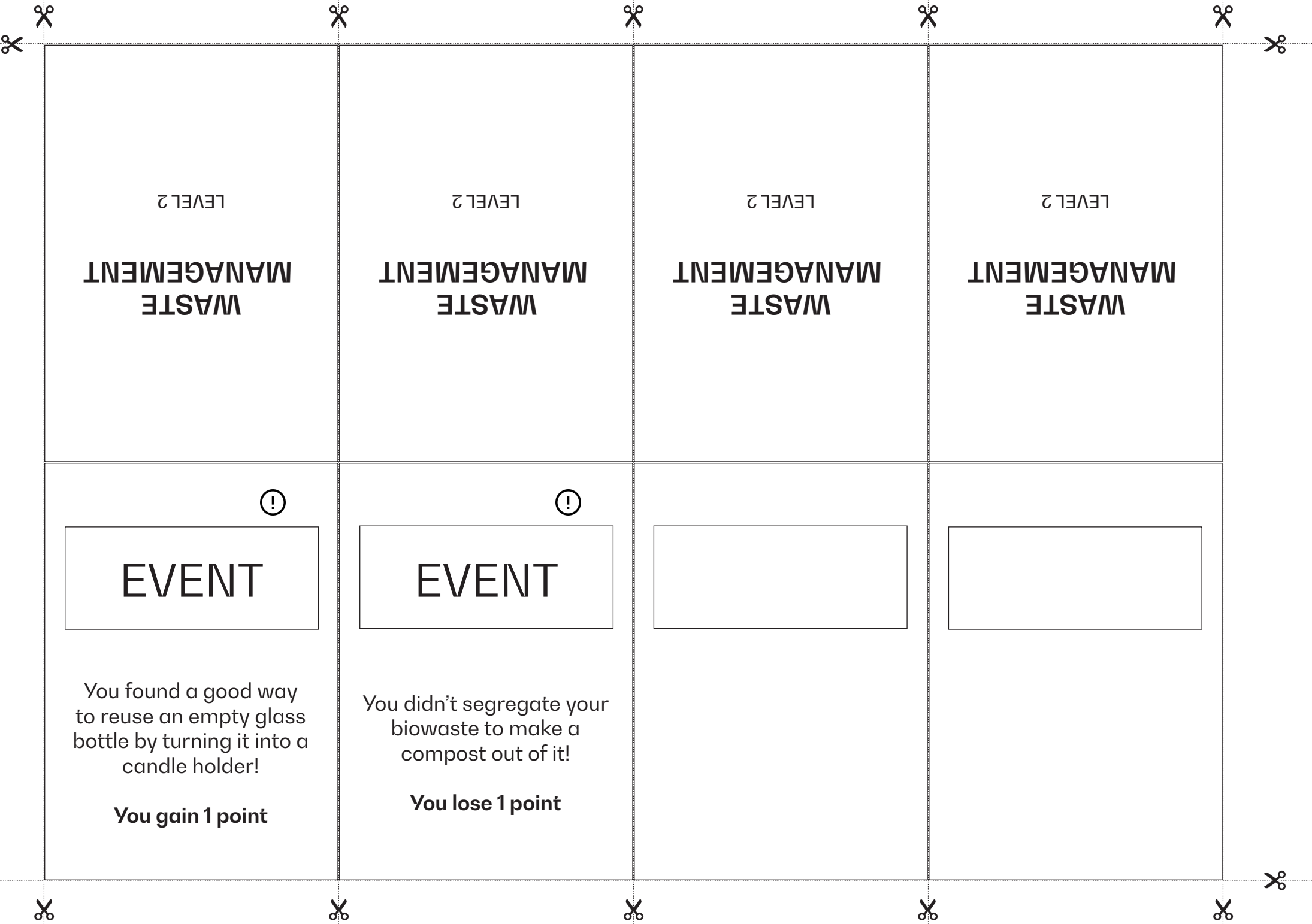
Play how you segregate waste. Your team has to guess.



EVENT

You decided to take an apple instead of chips for your today's snack, you are reducing your waste!

You can play again



LEVEL 2

WASTE
MANAGEMENT



EVENT

You found a good way
to reuse an empty glass
bottle by turning it into a
candle holder!

You gain 1 point

LEVEL 2

WASTE
MANAGEMENT



EVENT

You didn't segregate your
biowaste to make a
compost out of it!

You lose 1 point

LEVEL 2

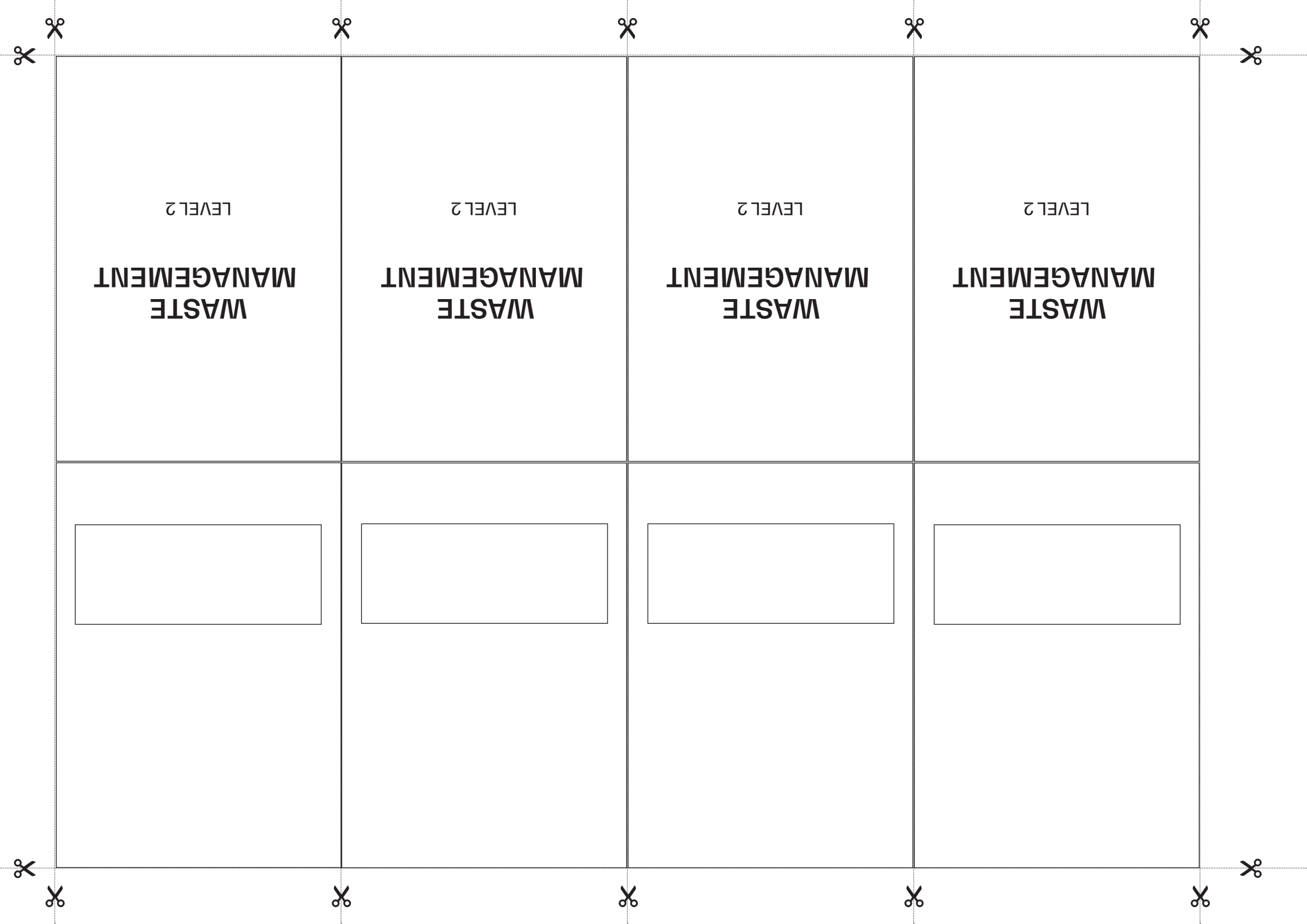
WASTE
MANAGEMENT

EVENT

LEVEL 2

WASTE
MANAGEMENT

EVENT



LEVEL 2

**WASTE
MANAGEMENT**

LEVEL 2

**WASTE
MANAGEMENT**

LEVEL 2

**WASTE
MANAGEMENT**

LEVEL 2

**WASTE
MANAGEMENT**

