

eco

Designer

# Welcome to Eco Designer Game

This game is designed for you to learn about eco design principles in an engaging way through your own experience.

Enjoy the game!

# Why to learn about eco design?

Pollution and waste are largely the result of how we design things. We need to fully understand what kind of impact our product has on the environment in order to see possibilities to improve it and be able to optimize it.

Eco design helps us:

- design eco-friendly products
- reduce the environmental impact of an existing product

# Eco design process

- Consider all stages of the life cycle
- Understand the stakeholders
- Evaluate the environmental impact
- Make decisions based on the collected knowledge



# Why to play Eco Designer?

The aim of the game is to learn about eco design principles, tools and methods and to understand the complexity of product design and company decisions.

# THE GAME

# Narrative

Imagine that your company has the task to reduce the environmental impact of its product while being in a hard competition against other companies. Your task is to make your product as eco-friendly as possible while considering the changes in legislation, market variables and customer preferences.

You have to minimize your product's environmental impact, make decisions, optimize, compete with other companies and satisfy your board of directors by giving a plausible explanation about the events of the game.

# FORM GROUPS OF 2-6 PEOPLE!

Imagine you are companies competing to make the  
**best eco-friendly reusable diaper on earth!**

Find a fitting name for your company and sit together!



# THE GAME

- **Make** your product as eco-friendly as possible, while consider the changing environment.
- **Win** by
  - reducing the CO<sub>2</sub> of your product
  - presenting your company's story to the board of directors

# GAME OVERVIEW

<b>Preparation (10 minutes)</b>	<b>Game (80 minutes)</b>	<b>Pitch (10 minutes/group)</b>
<p>Introduction</p> <p>Game rules</p> <p>Product baseline for each group.</p>	<p>Game has 6 rounds which are years in your company's life.</p> <p>Each year your company earns resources and you can buy different actions. You get resources based on your results.</p>	<p>Present your storyline to the board of directors and answer their critical questions.</p>

# NOW EACH GROUP GETS THE GAME ELEMENTS

- (1) Life Cycle Overview (1/group)
- (2) Company Scoreboard 2 pages (1/group)
- (3) Pitch Storyline (1/group)
- (4) Quick Reference Card (1/group)
- 3 dice or a dice app (for example: app called Dice from Apple store)
- Download the EcoDesigner app. You find it here:  
<https://w4t.seriousgames.net/ecodesign/>.

Place the (5) Competition Overview and cards on the facilitators table.

# (1) Life Cycle Overview

Life cycle stages

Each stage has environmental impacts

The environmental impact is counted in CO<sub>2</sub> emissions. You have to fill out the boxes by rolling the dice.

Stage	Stage	Stage	Stage	Stage
Resource Acquisition	Manufacturing	Packaging and transport	Use	End of life
Environmental impacts	Environmental impacts	Environmental impacts	Environmental impacts	Environmental impacts
<b>Material 1: Nappy</b>	<b>Energy used</b> Medium 3	<b>Transport efficiency</b> Medium 3	<b>Durability</b> Medium 3	<b>Recyclability: Nappy</b> Medium 3
<b>Energy use</b> Medium 3	<b>Efficiency of resource use</b> Low 4	<b>Packaging material intensity</b> Medium 3	<b>Energy during use</b> High 4	<b>Recyclability: Wrap</b> Medium 3
<b>Toxicity</b> High 4	<b>Chemicals</b> High 4	<b>Energy use for packaging</b> Medium 3		<b>Recyclability: Liners</b> High 2
<b>Price</b> 2				<b>Waste collection system efficiency</b> Medium 3
<b>Material 2: Wrap</b>				
<b>Energy use</b> Medium 3				
<b>Toxicity</b> Medium 3				
<b>Price</b> 1				
<b>Material 3: Liners</b>				
<b>Energy use</b> Medium 3				
<b>Toxicity</b> Low 2				
<b>Price</b> 1				
CO <sub>2</sub>	CO <sub>2</sub>	CO <sub>2</sub>	CO <sub>2</sub>	CO <sub>2</sub>
	Product price		Product CO <sub>2</sub>	

Recyclability, Efficiency, Durability			
Low	Medium	High	Very High
4 Dice	3 Dice	2 Dice	1 Die

Energy use, Toxicity, Chemicals, Material intensity			
Very low	Low	Medium	High
1 Die	2 Dice	3 Dice	4 Dice

The sum of CO<sub>2</sub> in all stages will be your product's CO<sub>2</sub> emission.

# Counting the CO<sub>2</sub> emission of your product

The table in the corner of your Life Cycle Overview shows how to count.




For example: If recyclability is low roll 4 dice.

Recyclability, Efficiency, Durability			
Low	Medium	High	Very High
4 Dice	3 Dice	2 Dice	1 Die

Energy use, Toxicity, Chemicals, Material intensity			
Very low	Low	Medium	High
1 Die	2 Dice	3 Dice	4 Dice

It is indicated on the your Life Cycle Overview next to the environmental impacts how many dice to roll in the beginning.

	<b>Energy used</b> Medium 3	<input type="text"/>
	<b>Effeciency of resource use</b> Low 4	<input type="text"/>
	<b>Chemicals</b> High 4	<input type="text"/>

Now you have time to count  
the CO<sub>2</sub> level of your product.

Example:

Material 1

Energy use: **Medium 3** - 3 x dice 4+ 3+1=8

Toxicity: **High 4** - 4 x dice: 1+5+2+4=12

**Material 1 CO<sub>2</sub>: 8+12=20**



## (2) Company Scoreboard


Your scoreboard is to keep track of your resources, eco-level and brand level. Use three small objects to indicate the company's scores.

Write the your company name and the Product CO<sub>2</sub> on it. Place one object on the Eco-level of your product based on your Product CO<sub>2</sub>.

(If it is above 260 don't place any object on the table. )

### Company scoreboard










**Company name** Supreme diapers       **Product price** \_\_\_\_\_       **Product CO<sub>2</sub>** 250

Resources										Development levels	
1	2	3	4	5	6	7	8	9	10	 <b>level 1</b> CO <sub>2</sub> < 260	<b>Brand level</b> 1
11	12	13	14	15	16	17	18	19	20	<b>Eco-level 2</b> CO <sub>2</sub> < 210	<b>Brand level</b> 2
21	22	23	24	25	26	27	28	29	30	<b>Eco-level 3</b> CO <sub>2</sub> < 170	<b>Brand level</b> 3
31	32	33	34	35	36	37	38	39	40	<b>Eco-level 4</b> CO <sub>2</sub> < 120	<b>Brand level</b> 4
41	42	43	44	45	46	47	48	49	50	<b>Eco-level 5</b> CO <sub>2</sub> < 80	<b>Brand level</b> 5
51	52	53	54	55	56	57	58	59	60		

# (3) Pitch Storyline

End of each year you have to fill out the storyline box of the actual year.

This will help you create your presentation at the end of the game.

3 Pitch storyline		
Year 1	Year 2	Year 3
<b>Changes</b> 1 _____ 2 _____ 3 _____ 4 _____	<b>Changes</b> 1 _____ 2 _____ 3 _____ 4 _____	<b>Changes</b> 1 _____ 2 _____ 3 _____ 4 _____
<b>Storyline</b> _____ _____ _____ _____ _____ _____ _____ _____	<b>Storyline</b> _____ _____ _____ _____ _____ _____ _____ _____	<b>Storyline</b> _____ _____ _____ _____ _____ _____ _____ _____
 Product CO <sub>2</sub> _____  Product price _____  Brand level _____	 Product CO <sub>2</sub> _____  Product price _____  Brand level _____	 Product CO <sub>2</sub> _____  Product price _____  Brand level _____

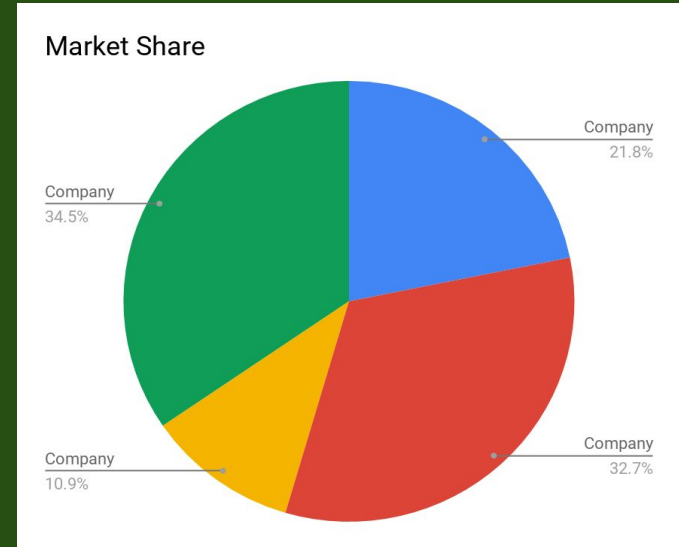


# Market Share

Each year you get resources based on your market share.

Your market share is based on your:

- **Eco-level:** Based on the CO<sub>2</sub> emission of your product.
- **Brand level:** How well you communicate, (communication activities are on cards)
- **Resources left:** The amount of resources left at the end of each year.



# 1. YEAR

You will be guided through each phase of the year  
and can ask questions.

# 1. Resources and development levels

Every company starts with


- 15 resources
- brand level 1.
- Price 4

Each year start by paying your product price. Product price: prices of all materials used. Price can be changed buying new materials.



## 2 Company scoreboard

**Company name** Supreme diapers      € **Product price** 4      **CO<sub>2</sub>** **Product CO<sub>2</sub>** 250

### Resources

1	2	3	4	5	6	7	8	9	10
11	12	13	14		16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

### Development levels

 <b>Level 1</b> CO <sub>2</sub> < 260	 <b>Brand level 1</b>
<b>Eco-level 2</b> CO <sub>2</sub> < 210	<b>Brand level 2</b>
<b>Eco-level 3</b> CO <sub>2</sub> < 170	<b>Brand level 3</b>
<b>Eco-level 4</b> CO <sub>2</sub> < 120	<b>Brand level 4</b>
<b>Eco-level 5</b> CO <sub>2</sub> < 80	<b>Brand level 5</b>

Pay for your product and  
indicate it on the Company Scoreboard.

**Resources**

1	2	3	4	5	6	7	8	9	10
 11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

## 2. Actions

You can decide to use your resources in three different ways:

1. Buy research and development
2. Buy new materials
3. Buy cards

**Choose an environmental impact that needs to be improved  
on your Life Cycle Overview**

**You can choose any item in the manufacturing, transportation and  
packaging, use stages.**

# Research and Development

Buy R&D can reduce the CO<sub>2</sub> emission of your product. You can choose a R&D level based on your needs. The more expensive R&D you buy the higher is your chance to reduce your CO<sub>2</sub> emission.

Level	Price	Count
R&D 1	1	4 dice
R&D 2	3	3 dice
R&D 3	5	2 dice
R&D 4	7	1 dice

# IMPROVE YOUR PRODUCT WITH R&D

1. Choose one environmental impact on your Life Cycle Overview's manufacturing, transport and packaging or use stage.
2. Choose a research level and pay for it. The table is on your (4) Quick reference card.
3. Roll as many dice as the research level indicates.
4. The rolled amount is the new CO<sub>2</sub> emission of the chosen item. If you didn't manage to improve it, then it stays the same.

R&D	Price	Dice
R&D 1	1	4 dice
R&D 2	3	3 dice
R&D 3	5	2 dice
R&D 4	7	1 die

Example: Improve energy use in manufacturing stage. Its 16 now.

Buy research level 2 and pay 3 resources.

Throw 3 dice  $3+3+3=9$

New CO<sub>2</sub> emission of the energy use is 9.

If you throw  $6+5+6=17$  then it stays 16.

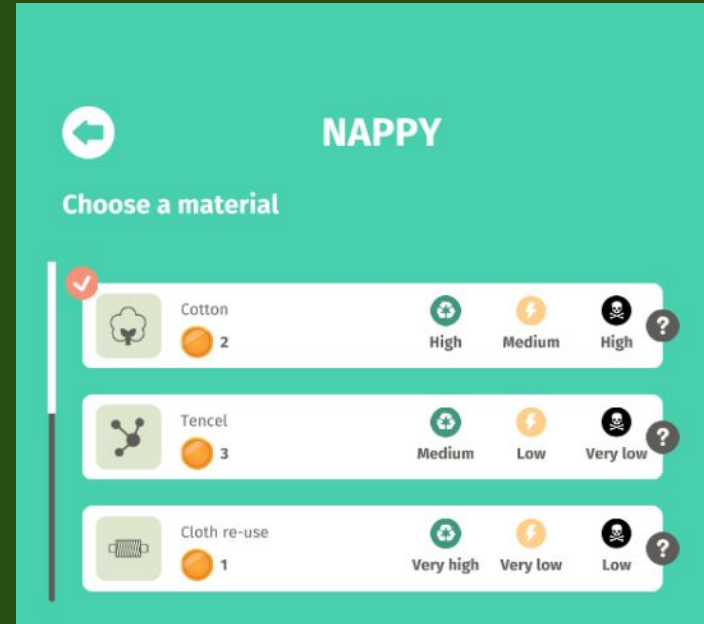


**REGISTER CHANGES**  
**in resources and CO<sub>2</sub> emission.**

# New material

New material changes resource acquisition (energy use and toxicity) and recyclability in the end of life stage.

1. Open the app and explore at the material properties (Recyclability, Energy use, Toxicity and Price)



## Now we all change the wrap's material

2. Click on the wrap and see the possible materials. Wool is the only alternative here.
3. Compare it to the original material.

Ethylene vinyl acetate (Medium, Medium, Medium) price 1

Wool (Medium, Medium, Low) price 1

In case the price of the material is different, your product's price changes.  
Here it is the same.

#### 4. Pay for the new material

The new material costs one resource per level of changes. Low to Very Low is one level change, from Medium to Very Low is two level change.

Changing Ethylene vinyl acetate (Medium, Medium, Medium) to Wool (Medium, Medium, Low) means 1 level change. It costs 1 resource.

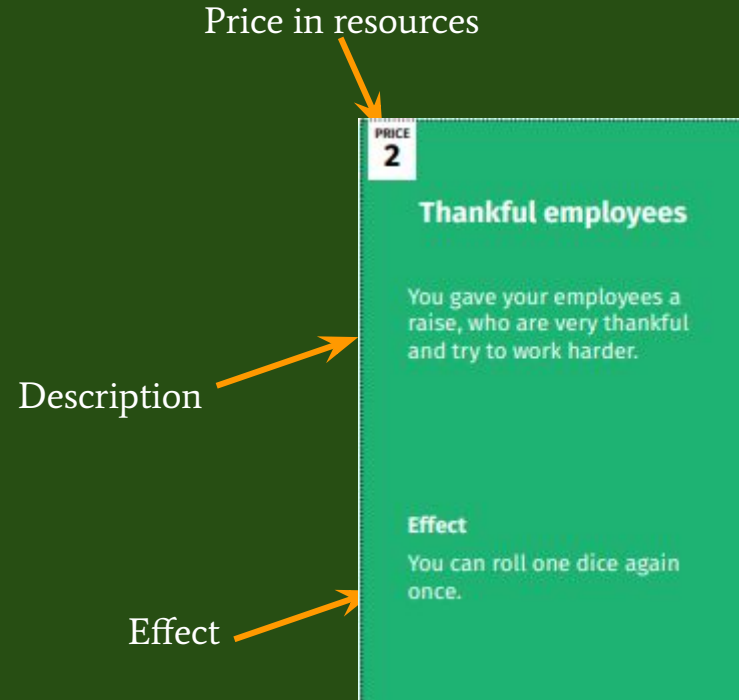
#### 5. Define the new CO<sub>2</sub> emission

Roll the dice, the same way like in the beginning. The table on the Life Cycle Overview helps to know how many dice to roll.

**REGISTER CHANGES**  
**in resources and CO<sub>2</sub> emission.**

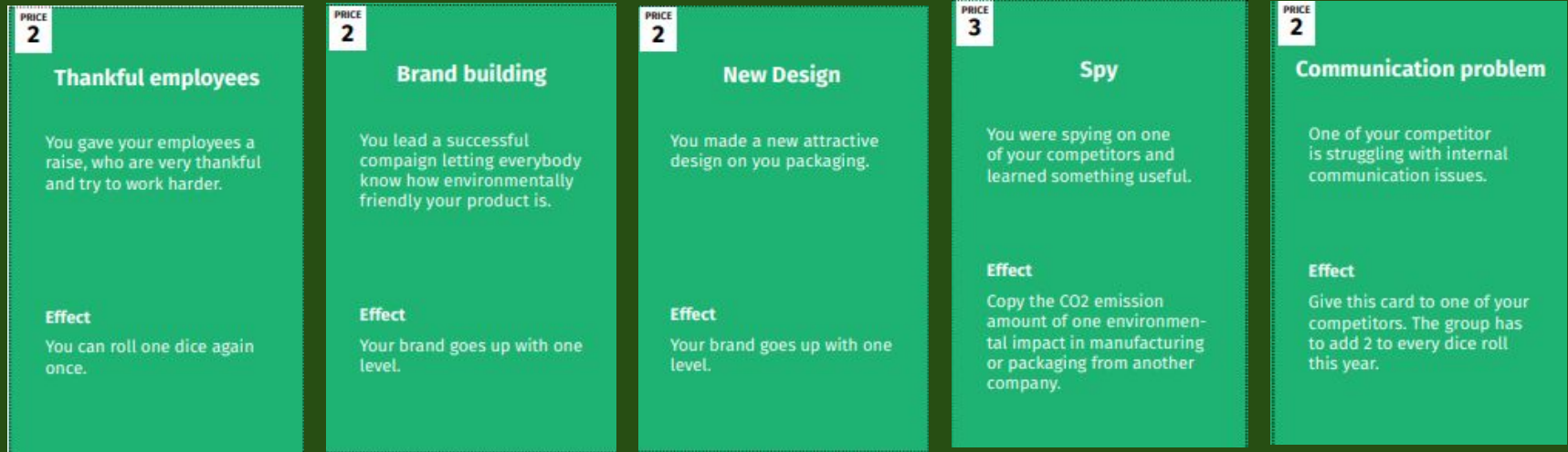
# Cards

- Send one representative from your group to the facilitator's table any time during the years. This person can see and buy the cards for your group.
- Enact the card by showing it to the involved parties (for example: one or more other companies) and the facilitator. Used cards should be given back to the facilitator.



# Cards on the facilitators table

Now the facilitator places the following cards on the table.



When a card is bought the facilitator puts a random card to its place. There are always 5 cards to choose from at the table.

**You can buy cards from the next round on.**



# 3. Storyline

You have to make a story describing in detail what has happened to your company, how and why.

Use the changes of the year as a skeleton and use your former knowledge and creativity to form a possible scenario about why and how things have happened.

Later your task will be to present your storyline in an engaging way to your board members.

Year 1

**Changes**

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

**Storyline**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**CO<sub>2</sub>** Product CO<sub>2</sub> \_\_\_\_\_

**€** Product price \_\_\_\_\_

**★** Brand level \_\_\_\_\_

# Write storyline on your (2) Pitch Storyline

Be creative! Use your former knowledge!

1. List all the changes:

For examples: wrap material changed from x to y.

2. Write the storyline:

Questions that can help you:

- Why did you focus on certain areas?
- How did you manage to solve problems or change the environmental impact?
- How did resource change affect your company?

# Storyline examples

Change: *durability increased 6 points by R&D*

Storyline: *We invested in research because we realized that the durability of our product doesn't satisfy our customers. We not just reduced the environmental impact by making our product highly durable, but we got very good feedback from our customers.*

Change: *Try to R&D, but didn't manage*

Storyline: *Unfortunately, so far the research investments didn't create visible change yet, because our lead researcher left the company suddenly. We need find a way to replace him and try to research and implement changes next year.*

## 4. Year event

Every year happens something unexpected, which can influence your business. These events will appear on the slides before the actual year ends.

# YEAR EVENT 1

This year it became very important for the customers that reusable diapers can be used many times. Every company's brand value increases whose product's durability is lower than 10.

# 5. Register changes

Update your Company scoreboard and the Competition Overview on the facilitators table end of each year.

2 Company scoreboard

Company name \_\_\_\_\_

€ Product price \_\_\_\_\_ CO<sub>2</sub> Product CO<sub>2</sub> \_\_\_\_\_

**Resources**

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

**Development levels**

Eco-level 1 CO <sub>2</sub> < 260	Brand level 1
Eco-level 2 CO <sub>2</sub> < 210	Brand level 2
Eco-level 3 CO <sub>2</sub> < 170	Brand level 3
Eco-level 4 CO <sub>2</sub> < 120	Brand level 4
Eco-level 5 CO <sub>2</sub> < 80	Brand level 5

5 Competition overview

Company \_\_\_\_\_

€ Product price \_\_\_\_\_  
CO<sub>2</sub> Energy use \_\_\_\_\_

Development levels

Eco-level 1 CO <sub>2</sub> < 260	Brand level 1
Eco-level 2 CO <sub>2</sub> < 210	Brand level 2
Eco-level 3 CO <sub>2</sub> < 170	Brand level 3
Eco-level 4 CO <sub>2</sub> < 120	Brand level 4
Eco-level 5 CO <sub>2</sub> < 80	Brand level 5

Company \_\_\_\_\_

€ Product price \_\_\_\_\_  
CO<sub>2</sub> Energy use \_\_\_\_\_

Development levels

Eco-level 1 CO <sub>2</sub> < 260	Brand level 1
Eco-level 2 CO <sub>2</sub> < 210	Brand level 2
Eco-level 3 CO <sub>2</sub> < 170	Brand level 3
Eco-level 4 CO <sub>2</sub> < 120	Brand level 4
Eco-level 5 CO <sub>2</sub> < 80	Brand level 5

Company \_\_\_\_\_

€ Product price \_\_\_\_\_  
CO<sub>2</sub> Energy use \_\_\_\_\_

Development levels

Eco-level 1 CO <sub>2</sub> < 260	Brand level 1
Eco-level 2 CO <sub>2</sub> < 210	Brand level 2
Eco-level 3 CO <sub>2</sub> < 170	Brand level 3
Eco-level 4 CO <sub>2</sub> < 120	Brand level 4
Eco-level 5 CO <sub>2</sub> < 80	Brand level 5

Company \_\_\_\_\_

€ Product price \_\_\_\_\_  
CO<sub>2</sub> Energy use \_\_\_\_\_

Development levels

Eco-level 1 CO <sub>2</sub> < 260	Brand level 1
Eco-level 2 CO <sub>2</sub> < 210	Brand level 2
Eco-level 3 CO <sub>2</sub> < 170	Brand level 3
Eco-level 4 CO <sub>2</sub> < 120	Brand level 4
Eco-level 5 CO <sub>2</sub> < 80	Brand level 5

## 6. Market share

Market share:  $(\text{Brand level} + \text{Eco level}) \times 2 + \text{Resources left} = \text{Earned resources}$

Example:  $(\text{Brand level } 1 + \text{Eco level } 1 + 2 \text{ resources left}) \times 2 = 8$

Add resources from your market share to your resources on the Company Scoreboard and start the year.

## 2. YEAR

You all have 15 minutes for the 2nd Year.

Use the quick reference card to help you.



## 2. YEAR

1. Pay your product
2. Buy research, development, new material or cards
3. Write the storyline

Use the quick reference card and register the changes in resources, CO<sub>2</sub> and brand levels.

## YEAR EVENT 2

The legislation changed which requires that everybody lowers their CO<sub>2</sub> levels by improving transport efficiency to maximum 12 by the end of year 3.

In case your company doesn't meet the requirements, you get a fine. You have to pay 2 resources every year until you fulfill the requirement.

**End of year 2.**

**Register changes and count market share**

**Update your company scoreboard and the competition overview at the facilitator.**

**Add the earned resources to your resources.**

# 3. YEAR

**You have 15 minutes.**

Use the quick reference card to help you.

## YEAR EVENT 3

Environmental impact is on the agenda this year. By the end of year 4 you should to lower your CO<sub>2</sub> emission by 10.

If you manage, your brand value increases by one level and get 5 resources support from the government for research and development.

**End of year 3.**

**If your transport efficiency is not lower than 13, you get a fine of 2 resources.**

**Register changes and count market share**

**Update your company scoreboard and the competition overview at the facilitator.**

**Add the earned resources to your resources.**

# 4. YEAR

**You have 15 minutes.**

Use the quick reference card to help you.

## YEAR EVENT 4

The price of polypropylene went up to 3.

If you still have the original liner material, your product got more expensive.



**End of year 4.**

**If you lowered your CO<sub>2</sub> emission by 10 points this year, your brand value increases by one level and get 5 resources.**

**Register changes and count market share**

**Update your company scoreboard and the competition overview at the facilitator.**

**Add the earned resources to your resources.**

# 5. YEAR

**You have 15 minutes.**

Use the quick reference card to help you.

## YEAR EVENT 5

Our economy is not doing well this year. The importance of resources has increased.

Count the market share this year by  
 $\text{Eco level} + \text{brand level} + (\text{resources left} \times 2) =$

**End of year 5.**

**Register changes and count market share**

**Update your company scoreboard and the competition overview at the facilitator.**

**Only this year market share: Eco level+brand level+(resources leftx2)=**

**Add the earned resources to your resources.**

# 6. YEAR

**You have 15 minutes.**

Use the quick reference card to help you.

## YEAR EVENT 6

The municipality invested in more efficient waste collection system, which lowers the CO<sub>2</sub> emission of the waste collection to 6 for everybody.

**End of year 6.**

**Register changes and count market share**

**Update your company scoreboard and the competition overview at the facilitator.**

**Add the earned resources to your resources.**

**BREAK**



# Presentation

You have to present your storyline to your board of directors.

You have 10 minutes to prepare.

Every company gets a **(6) Pitch evaluation card**, which shows the how the presentation will be evaluated by other groups.

**Each group presents their storyline in 5 minutes**

After each presentation the board of directors asks critical questions to be sure that the company's management know what they are doing.

Each group can ask questions as the board of directors.

# Evaluation after the presentations

Every group fills out a (6)  
Pitch evaluation card  
ranking the other  
companies.

When you are finished,  
give the them to the  
facilitator.

**6 Pitch evaluation card**

Rank the companies based on the different category below. Write the first three on the lines next to their ranks. Fill out the table below by adding the points for all companies.

**Potential:** Show how much did you reduce the environmental impact of the product and how?

1st \_\_\_\_\_ = 3 points      2nd \_\_\_\_\_ = 2 points      3rd \_\_\_\_\_ = 1 point

**Possibility:** Try to make your story as close to reality as possible

1st \_\_\_\_\_ = 3 points      2nd \_\_\_\_\_ = 2 points      3rd \_\_\_\_\_ = 1 point

**Process:** Describe why you made certain decisions based on solid arguments, showing how different factors are connected

1st \_\_\_\_\_ = 3 points      2nd \_\_\_\_\_ = 2 points      3rd \_\_\_\_\_ = 1 point

**Performance:** Make the presentation clear, interesting and engaging. Be creative!

1st \_\_\_\_\_ = 3 points      2nd \_\_\_\_\_ = 2 points      3rd \_\_\_\_\_ = 1 point

**Point table**

Company name \_\_\_\_\_ Points \_\_\_\_\_

Company name \_\_\_\_\_ Points \_\_\_\_\_

Company name \_\_\_\_\_ Points \_\_\_\_\_

Company name \_\_\_\_\_ Points \_\_\_\_\_

Company name \_\_\_\_\_ Points \_\_\_\_\_

# Winner is the company with most points

Points received from the other groups

+

Brand level

+

Eco level

+

Resources left

The facilitator counts the points for each group and announces the winner.

# Reflect together on what you have learned

Reflective questions:

- What did you learn about ecodesign?
- What are the challenges in making a product eco-friendly?
- What did you learn from the process?
- What would you do differently if you could start from the beginning?
- etc.