

# THE BIORACE

## EDUCATIONAL BOARD GAME



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## BIO-QUESTIONS cards - Educational board game

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Created by: APRE, Agency for the Promotion of European Research

Technical contribution: AIJU, Technological Institute for children's products and leisure

Scientific validation by: BTG Biomass Technology Group B.V.

### ACKNOWLEDGEMENTS

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We extend our heartfelt thanks to all these participants and experts for their invaluable contributions and dedication.

This document details the formulas for various bio-based products that can be manufactured from 12 different types of biomasses found in 4 different environments.

## 12 TOTAL BIOMASSES

The biomasses are divided by environments because, if you play the PRO version of the game, you need to complete a formula for each environment to have the chance to end the game.

- 3 biomasses for the "**Countryside**" environment; Wine Production Waste, Hemp, Tomato Scraps
- 3 biomasses for the "**City**" Environment; Apple Scraps, Pruning Waste, Coffee Grounds (City)
- 3 biomasses for the "**Forest**" Environment; Bamboo, Wood Scraps, Mushrooms
- 3 biomasses for the "**Sea**" environment; Posidonia, Spirulina, and Fishery waste

## MAX 7 FORMULAS PER SINGLE BIOMASS

From each type of biomass (from waste or not), up to 7 different bio-based products (Bio-Products), representing a range of product categories/applications, can be manufactured.

## ALTERNATIVE BIOMASSES

The Card will also indicate alternative biomasses from which the same bio-based product can be manufactured (to give a broader overview).

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## Grape pomace Waste (Countryside)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><b><u>Watercolors</u></b></p> <p>Wine Production Waste + 4 Energy Units</p> <p>1 Sustainability Point</p>	Objects	Paints & Coatings
<p><b><u>Cooking Oil</u></b></p> <p>Wine Production Waste + 4 Energy Units</p> <p>1 Sustainability Point</p>	Oils	Foods & Drinks
<p><b><u>Food Supplements</u></b></p> <p>Wine Production Waste + 4 Energy Units</p> <p>1 Sustainability Point</p>	Supplements	Supplements & Additives
<p><b><u>Notebook</u></b></p> <p>Wine Production Waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	Paper	Paper products
<p><b><u>Eco-leather Jacket</u></b></p> <p>Wine Production Waste + 7 Energy Units</p>	Eco-leather	Clothing, Shoes & Accessories

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2 Sustainability Points		
<p><b>Biofuels</b></p> <p>Wine Production Waste + 10 Energy Units</p> <p>3 Sustainability Points</p>	Biofuels	Energy products
<p><b>Plant Fertilizer</b></p> <p>Wine Production Waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	Compost	Nutrients/fertilisers

## Hemp (Countryside)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><b>Supplement</b></p> <p>Hemp + 7 Energy Units</p> <p>2 Sustainability Points</p>	Supplements	Supplements & Additives

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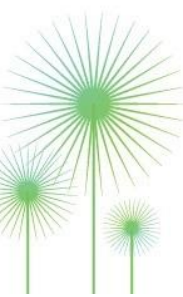


<p><b><u>Thermal Insulation</u></b></p> <p>Hemp + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Building Materials</p>	<p>Building Materials</p>
<p><b><u>Bio-based plastic Water Bottle</u></b></p> <p>Hemp + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Packaging materials</p>
<p><b><u>Scarf</u></b></p> <p>Hemp + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Fabrics</p>	<p>Clothing, Shoes &amp; Accessories</p>
<p><b><u>Pasta</u></b></p> <p>Hemp + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Food</p>	<p>Foods &amp; Drinks</p>
<p><b><u>Healing Oil</u></b></p> <p>Hemp + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Oils</p>	<p>Home, Beauty and Personal Care Products</p>

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<p><b>Notebook</b></p> <p>Hemp + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Paper</p>	<p>Paper products</p>
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## Tomato Scraps (Countryside)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><b>Cosmetics</b></p> <p>Tomato Scraps + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Cosmetics</p>	<p>Home, Beauty and Personal Care Products</p>
<p><b>Pharmaceutical Compound</b></p> <p>Tomato Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Medicines</p>	<p>Medicines &amp; Pharmaceuticals</p>
<p><b>Bio Varnish</b></p> <p>Tomato Scraps + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Paints &amp; Coatings</p>

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<p><b><u>Protective Lacquers for coating the inside of Metal Food Containers</u></b></p> <p>Tomato Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Paints &amp; Coatings</p>
<p><b><u>Watercolors</u></b></p> <p>Tomato Scraps + 4 Energy Units</p> <p>1 Sustainability Points</p>	<p>Objects</p>	<p>Paints &amp; Coatings</p>
<p><b><u>Bio-based plastic Bags</u></b></p> <p>Tomato Scraps + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Packaging materials</p>
<p><b><u>Food Additives</u></b></p> <p>Tomato Scraps + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Objects</p>	<p>Supplements &amp; Additives</p>

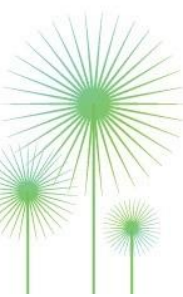
## Apple Scraps (City)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
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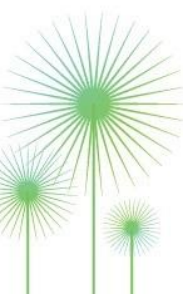


<p><b><u>Drawing Sheets</u></b></p> <p>Apple Scraps + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Paper</p>	<p>Paper products</p>
<p><b><u>Bio-based plastic Vase</u></b></p> <p>Apple Scraps + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Room decoration</p>
<p><b><u>Eco-leather Handbag</u></b></p> <p>Apple Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Clothing, Shoes &amp; Accessories</p>
<p><b><u>Food Packaging</u></b></p> <p>Apple Scraps + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Paper</p>	<p>Packaging materials</p>
<p><b><u>Toilet Paper</u></b></p> <p>Apple Scraps + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Paper</p>	<p>Paper products</p>

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<p><b><u>Supplement</u></b></p> <p>Apple Scraps + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Supplements</p>	<p>Supplements &amp; Additives</p>
<p><b><u>Eco-leather Sneakers</u></b></p> <p>Apple Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Clothing, Shoes &amp; Accessories</p>

## Pruning Waste (City)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><b><u>Biofuel</u></b></p> <p>Pruning Waste + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Biofuels</p>	<p>Energy products</p>

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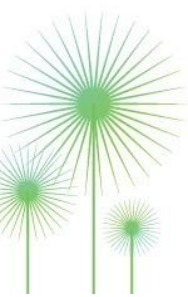


<p><b><u>Plant Fertilizer</u></b></p> <p>Pruning Waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Compost</p>	<p>Nutrients/fertilisers</p>
<p><b><u>Thermal Insulation</u></b></p> <p>Pruning Waste + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Building Materials</p>	<p>Building Materials</p>
<p><b><u>Confetti</u></b></p> <p>Pruning Waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Paper</p>	<p>Paper products</p>
<p><b><u>Socks</u></b></p> <p>Pruning Waste + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Fabrics</p>	<p>Clothing, Shoes &amp; Accessories</p>
<p><b><u>Gift Wrapping Paper</u></b></p> <p>Pruning Waste + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Paper</p>	<p>Paper products</p>

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<p><b><u>Panels</u></b></p> <p>Pruning Waste + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Building Materials</p>	<p>Building Materials</p>
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## Coffee Grounds (City)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><b><u>Notebook</u></b></p> <p>Coffee Grounds + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Paper</p>	<p>Paper products</p>
<p><b><u>Fertilizer for Mushrooms</u></b></p> <p>Coffee Grounds + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Compost</p>	<p>Nutrients/fertilisers</p>
<p><b><u>Technical Sports T-shirt</u></b></p> <p>Coffee Grounds + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Fabrics</p>	<p>Clothing, Shoes &amp; Accessories</p>
<p><b><u>Coffee Cup</u></b></p> <p>Coffee Grounds + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Kitchen products</p>

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<p><b><u>Biofuel</u></b></p> <p>Coffee Grounds + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Biofuels</p>	<p>Energy products</p>
<p><b><u>Pen</u></b></p> <p>Coffee Grounds + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Office supplies</p>
<p><b><u>Air Freshener</u></b></p> <p>Coffee Grounds + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Objects</p>	<p>Home, Beauty and Personal Care Products</p>

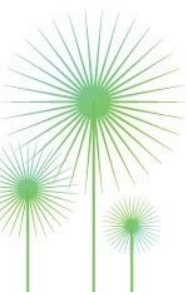
## Bamboo (Forest)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
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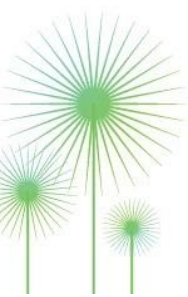


<p><b><u>Gloves</u></b></p> <p>Bamboo + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Fabrics</p>	<p>Clothing, Shoes &amp; Accessories</p>
<p><b><u>Supplement</u></b></p> <p>Bamboo + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Supplements</p>	<p>Supplements &amp; Additives</p>
<p><b><u>Deodorant</u></b></p> <p>Bamboo + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Cosmetics</p>	<p>Home, Beauty and Personal Care Products</p>
<p><b><u>Flooring</u></b></p> <p>Bamboo + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Building Materials</p>	<p>Building Materials</p>
<p><b><u>3D Puzzle</u></b></p> <p>Bamboo + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Toys &amp; Games</p>

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<p><b><u>Guitar</u></b></p> <p>Bamboo + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Sports &amp; Music</p>
<p><b><u>Toothbrush</u></b></p> <p>Bamboo + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Objects</p>	<p>Home, Beauty and Personal Care Products</p>

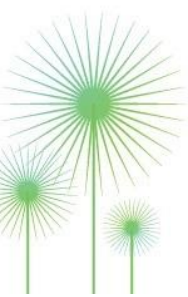
## Wood Scraps (Forest)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
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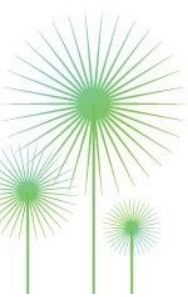


<p><b><u>Pants</u></b></p> <p>Wood Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Fabrics</p>	<p>Clothing, Shoes &amp; Accessories</p>
<p><b><u>Crutches</u></b></p> <p>Wood Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Liquid Wood</p>	<p>t.b.d.</p>
<p><b><u>Thermal Insulation</u></b></p> <p>Wood Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Building Materials</p>	<p>Building Materials</p>
<p><b><u>Cat Litter</u></b></p> <p>Wood Scraps + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Animal Food &amp; Care</p>
<p><b><u>Biofuels</u></b></p> <p>Wood Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Biofuels</p>	<p>Energy products</p>

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<p><b><u>Pharmaceutical Compound</u></b></p> <p>Wood Scraps + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Medicines</p>	<p>Medicines &amp; Pharmaceuticals</p>
<p><b><u>Freight Transport Support (Pallet)</u></b></p> <p>Wood Scraps + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Objects</p>	<p>Transport &amp; Shipping</p>

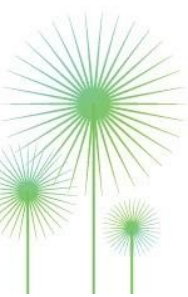
## Mushrooms (Forest)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
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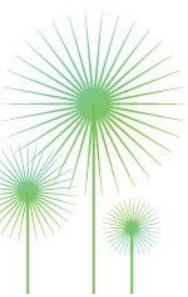


<p><b><u>Packaging Material</u></b></p> <p>Mushrooms + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Packaging materials</p>
<p><b><u>Bricks</u></b></p> <p>Mushrooms + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Building Materials</p>	<p>Building Materials</p>
<p><b><u>Eco-leather Belt</u></b></p> <p>Mushrooms + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Eco-leather</p>	<p>Clothing, Shoes &amp; Accessories</p>
<p><b><u>Plant Fertilizer</u></b></p> <p>Mushrooms + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Compost</p>	<p>Nutrients/fertilisers</p>
<p><b><u>Supplements</u></b></p> <p>Mushrooms + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Supplements</p>	<p>Supplements &amp; Additives</p>
<p><b><u>Biofuels</u></b></p> <p>Mushrooms + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Biofuels</p>	<p>Energy products</p>

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<p><b>Biodegradable-Interred Vases</b></p> <p>Mushrooms + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Room decoration</p>
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## Posidonia (Sea)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><b>Cosmetics</b></p> <p>Posidonia + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Cosmetics</p>	<p>Home, Beauty and Personal Care Products</p>
<p><b>Pharmaceutical Compound</b></p> <p>Posidonia + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Pharmaceuticals</p>	<p>Medicines &amp; Pharmaceuticals</p>
<p><b>Grocery Bag</b></p> <p>Posidonia + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Objects</p>	<p>Packaging materials</p>

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<p><b>Plant Fertilizer</b></p> <p>Posidonia + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Compost</p>	<p>Nutrients/fertilisers</p>
<p><b>Biofuels</b></p> <p>Posidonia + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Biofuels</p>	<p>Energy products</p>
<p><b>Insulating Material</b></p> <p>Posidonia + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Building Materials</p>	<p>Building Materials</p>
<p><b>Carpet</b></p> <p>Posidonia + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Objects</p>	<p>Room decoration</p>

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## Spirulina (Sea)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><b><u>Face cream</u></b></p> <p>Spirulina + 7 Energy Units</p> <p>2 Sustainability Points</p>	Cosmetics	Home, Beauty and Personal Care Products
<p><b><u>Supplement</u></b></p> <p>Spirulina + 4 Energy Units</p> <p>1 Sustainability Point</p>	Supplements	Supplements & Additives
<p><b><u>Cellphone cover</u></b></p> <p>Spirulina + 10 Energy Units</p> <p>3 Sustainability Points</p>	Objects	t.b.d.
<p><b><u>Pasta</u></b></p> <p>Spirulina + 4 Energy Units</p> <p>1 Sustainability Point</p>	Food	Foods & Drinks

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<p><b><u>Biofuels</u></b></p> <p>Spirulina + 10 Energy Units</p> <p>3 Sustainability Points</p>	<p>Biofuels</p>	<p>Energy products</p>
<p><b><u>Animal feed</u></b></p> <p>Spirulina + 4 Energy Units</p> <p>1 Sustainability Point</p>	<p>Food</p>	<p>Animal Food &amp; Care</p>
<p><b><u>Lamp stand</u></b></p> <p>Spirulina + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Room decoration</p>

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## Fishery waste (Sea)

PRODUCT	CATEGORY	SPECIFIC CATEGORY
<p><u>Sunscreen</u></p> <p>Fishery waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	Cosmetics	Home, Beauty and Personal Care Products
<p><u>Supplement</u></p> <p>Fishery waste + 4 Energy Units</p> <p>1 Sustainability Point</p>	Supplements	Supplements & Additives
<p><u>Wallet</u></p> <p>Fishery waste+ 10 Energy Units</p> <p>3 Sustainability Points</p>	Eco-leather	t.b.d.

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<p><b><u>Plant fertilizer</u></b></p> <p>Fishery waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Compost</p>	<p>Nutrients/fertilisers</p>
<p><b><u>Bricks</u></b></p> <p>Fishery waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Building Material</p>	<p>Building Materials</p>
<p><b><u>Bioreef-artificial reefs</u></b></p> <p>Fishery waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Building Material</p>	<p>Building Materials</p>
<p><b><u>Packaging material</u></b></p> <p>Fishery waste + 7 Energy Units</p> <p>2 Sustainability Points</p>	<p>Objects</p>	<p>Packaging materials</p>

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