

## RECOMMENDED SUPPLIERS (NL)

Finding the things you need can be a chore, here’s our list of recommended suppliers in the Netherlands:

- Eurofysica – lab supplies for schools
- Labshop – lab supplies, chemical compounds, cellulose
- De Hekserij – chemical compounds, e.g. calcium chloride
- Unique Products – sodium alginate (via Friedas.nl)
- Brouwland – light malt extract, activated carbon (bulk)
- De Molenwinkel – rye grain and wheat bran (bulk)
- Meervilt – mordants and natural dyes
- Belspo.be – microorganisms (institutional customers only)
- Mycelia.be – mushroom strains, consultancy & training
- Homegreen.nl – mushroom strains (also sporeless varieties)
- Carolina.de – slime mold sclerotium & educational materials
- Grown.bio – colonized substrates for DIY mycelium products
- Rotterzwam – DIY oyster mushroom growkit to do at home\*
- Yaya Kombucha – kombucha starter kits\*
- Startercultures.eu – cultures for food fermentation\*

*\* Do not mix non-food and food applications and organisms. Keep utensils separate, don’t grow edibles in a biolab where other experiments also take place.*

## DISCLAIMER

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Publisher:	Amsterdam University of Applied Sciences
Partner:	Textilelab Amsterdam
Typeface:	Calibri
Images:	All images by authors and AUAS students unless stated otherwise.

Funded by NRO Comenius Teaching Fellowship for educational innovation, awarded to Loes Bogers in 2020.

Many thanks to all our students for their wonderful participation, crazy ideas and honest feedback.

This printed toolkit is a limited edition. The booklet and cards are printed with soy-based ink on a RISO printer, on recycled and FSC-certified paper. The purse is made from 100% Oekotex certified undyed wool felt, sewn together with 100% silk yarn, and a hand-spun string made from Dutch wool. The wool can be mordanted and dyed with most natural dyes, such as madder, weld, cochineal or other.

A digital version of the toolkit is available for download at: [https://github.com/loesjebo/biomaterials\\_toolkit](https://github.com/loesjebo/biomaterials_toolkit)

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## BIOMATERIALS TEACHING TOOLKIT

A TEACHING RESOURCE FOR CRITICAL MATERIALS RESEARCH

*Materials can help to expose the cracks of our ailing systems; because they have the power to solidify new norms; because they can make more preferable futures tangible.*

– Liz Corbin, materials researcher & designer

What you have in your hands is a teaching toolkit for critical materials research in higher design and arts education. It comes out of a 2-year project at the Amsterdam University of Applied Sciences, where we – a group of design educators and/or researchers – developed ways to invite third year bachelor students to explore making practices that center ecosystems rather than human systems. With this toolkit, we share our tried and tested activities, which take bio-based design materials and their unique properties as a point of departure, and offer hands-on activities to critically engage in sustainable material research.

This toolkit will provide you ways to see materials anew, by learning more about them, exploring alternatives, or altogether de-familiarizing ourselves from what we think materials can and should do.

### A critical, transdisciplinary approach to (material) making

The activities described in these cards invite learners to draw together insights from material science, industrial manufacturing, microbiology, material culture, design and arts as well as ancient crafts practices. Creating “new” natural materials here refers less to inventing novelty materials or being a contemporary nano-alchemist or genetic engineer. It refers to a new way of looking at materials that share a common characteristic: they are created from feedstocks that were once alive and regenerative. And more radically: some are bio-manufactured by leveraging living systems without killing those living systems at all, instead enveloping them into making processes without depleting or destroying them. This toolkit helps you explore natural materials and growth processes in a hands-way, while asking questions that help unsettle what everyday human-made objects look and feel like, and the creative strategies, manufacturing processes and social and ecological systems involved in creating them.

How to use this toolkit

From cooking bioplastics in your kitchen, to hands-on collaborations with fungi: these activities will help you get acquainted and collaborate with natural substances and living organisms to inspire regenerative and sustainable design and arts projects. The prompts provided in this toolkit can be combined at will to create longer programs in higher education, based on audience, level, resources, and time available.

The set is not exhaustive and certainly leaves room for many more and different activities. But it aspires to give educators (as well as students, even researchers) practical starting points to imagine material futures without petrol-based plastics and toxic materials.

Themes and categories

The cards are structured around four themes that each contribute to understanding and making sustainable materials and sustainable modes of production. Depending on your aim and audience you can combine cards from the categories:

- *Materialogy*
- *Bio-based Materials*
- *DIY Microbiology*
- *Critical Making*

Each category contains a mix of reflective, practical, creative, and more conceptual activities. We recommend teachers explore each activity with peers first to get an understanding of the workflow, needs, and potential risks to be aware of.

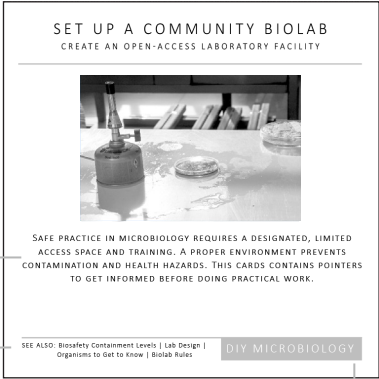
SELECT AND EXPLORE

INTRODUCTION

The short description allows you to quickly assess whether the activity or method on the cards suits your needs.

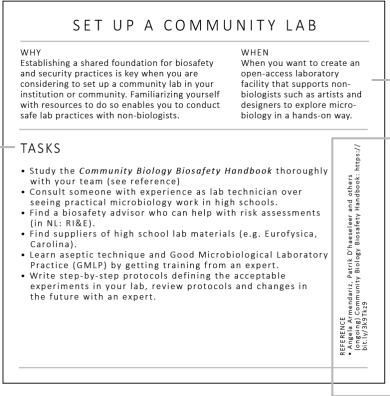
SEE ALSO

Cards that are related to this card: information that is needed before executing this card, additional information or cards that are about a related topic.



CATEGORY

Depending on what learners already know and depending on what topic you want to center your activities, the toolkit is divided in four categories. Cards can be about Materialogy, DIY Microbiology, Bio-based Materials, or Critical Making.



RECOMMENDATIONS

Why/when/ingredients/tools/next. These sections provide context and additional information to understand and execute the tasks described on the cards.

REFERENCE

The source of the described activity. The information about the activities described on the cards is (most of times) freely available on the internet.

TASKS

The steps that need to be taken in order to execute the activity or method.

BIOBASED MATERIALS

This category contains recipes and protocols to create various kinds of bio-based materials. Ranging from cooking bioplastics and growing fungal biocomposites to ancient techniques such as fish leather tanning and natural dyes.

MATERIOLOGY

These activities explore the intersection between material science and material experience. How can we know materials? How can we share this knowledge and experiences? In addition, cards about industrial processing and conversion techniques help to explore the possibilities of a give material more extensively.

CRITICAL MAKING

This section provides activities – sometimes accompanied with readings – that help to rethink existing norms and values around matter, materials and human-made objects. The cards suggest exploring the history and changing use of core concepts across different fields, and provides practical *defamiliarization* exercises that help us see things anew.

DIY MICROBIOLOGY

The cards with this tag explain basic techniques, protocols and etiquette for working in a micro-biological lab setting safely. It also provides resources to get informed about lab safety, lab design and suitable organisms for use in schools and community labs.  
*Note: do not start any microbiological experiments without getting guidance and information.*