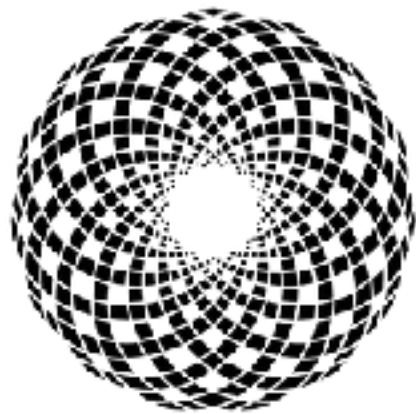# 'Making a meal' of transdisciplinary practice: *teams, terms and tips*

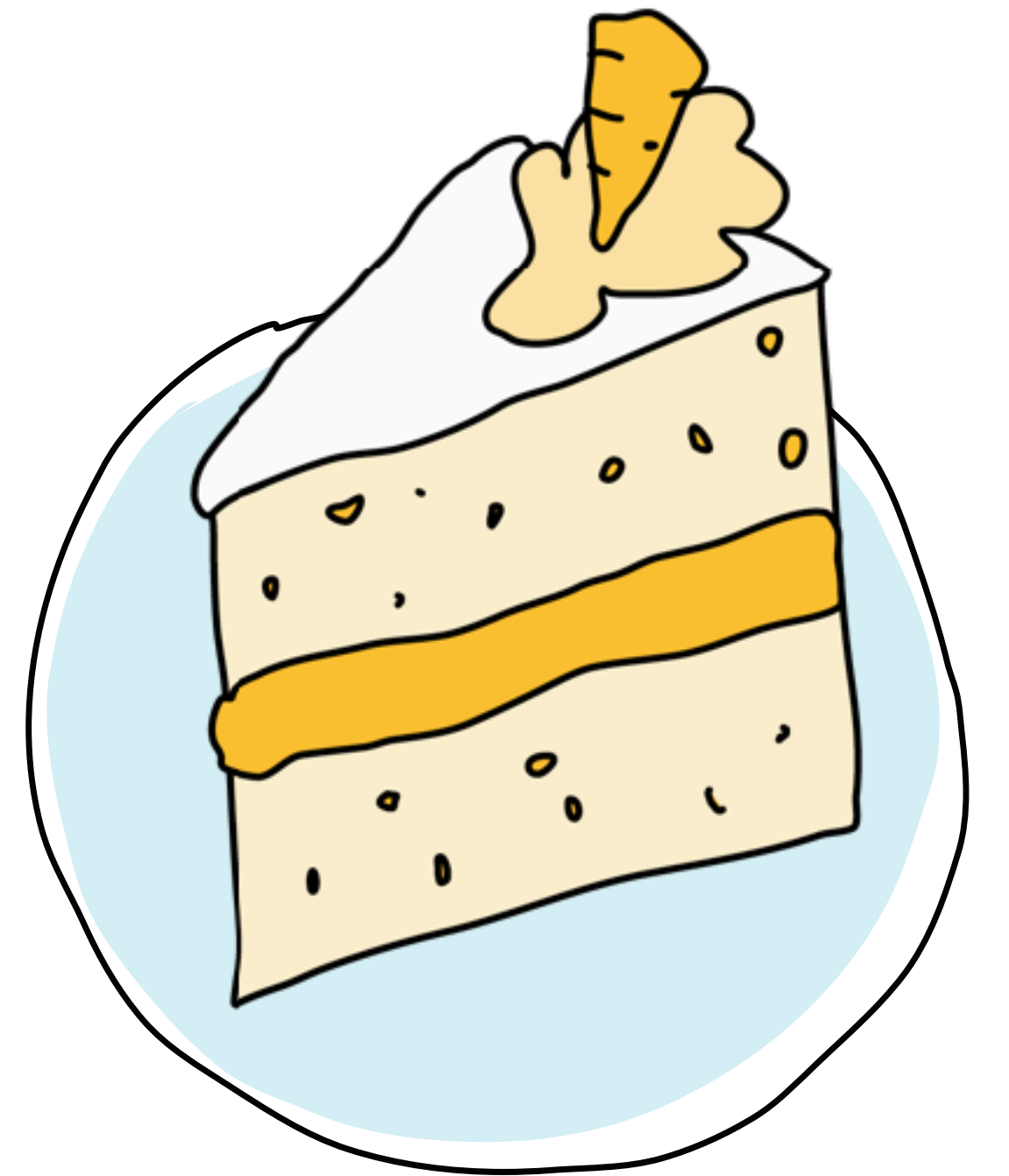## Jo Bailey

(she/they, I don't mind)

**Te Pūnaha Matatini**
Complexity is at our heart

# Also known as: fusion cooking with disciplines

# A mash-up of terms…

transdisciplinary

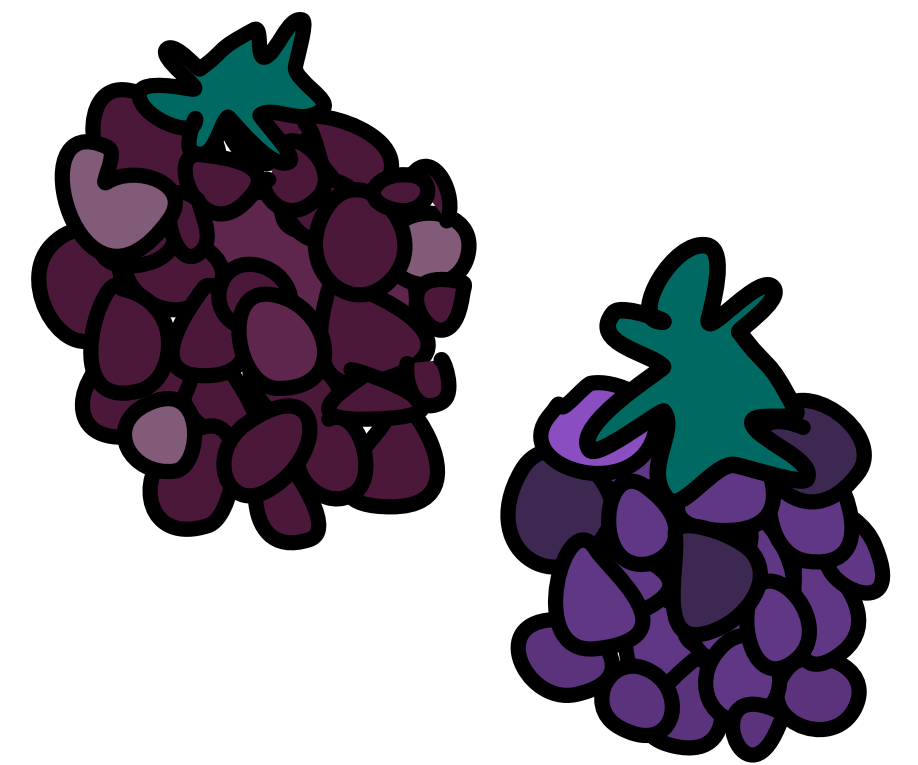intradisciplinary

interdisciplinary

crossdisciplinary

multidisciplinary

# Why would you work with other disciplines anyway?

# "The rationale for the interdisciplinary exercise"

Thoughts from Margaret Mead's *Blackberry Winter*, in Stember, M. (1991).
Advancing the social sciences through the interdisciplinary enterprise.
*The Social Science Journal, 28*(1), 1-14.

*an 'interdisciplinary' kitchen?*

- A '**new room**'
- Open to all disciplines
- Because the 'landscape' is epic
- And it takes multiple viewpoints to understand its complexity

"The practical argument for interdisciplinarity is that problems of the world are not organised according to academic disciplines…"

Stember, M. (1991). Advancing the social sciences through the interdisciplinary enterprise. *The Social Science Journal, 28*(1), 1-14.
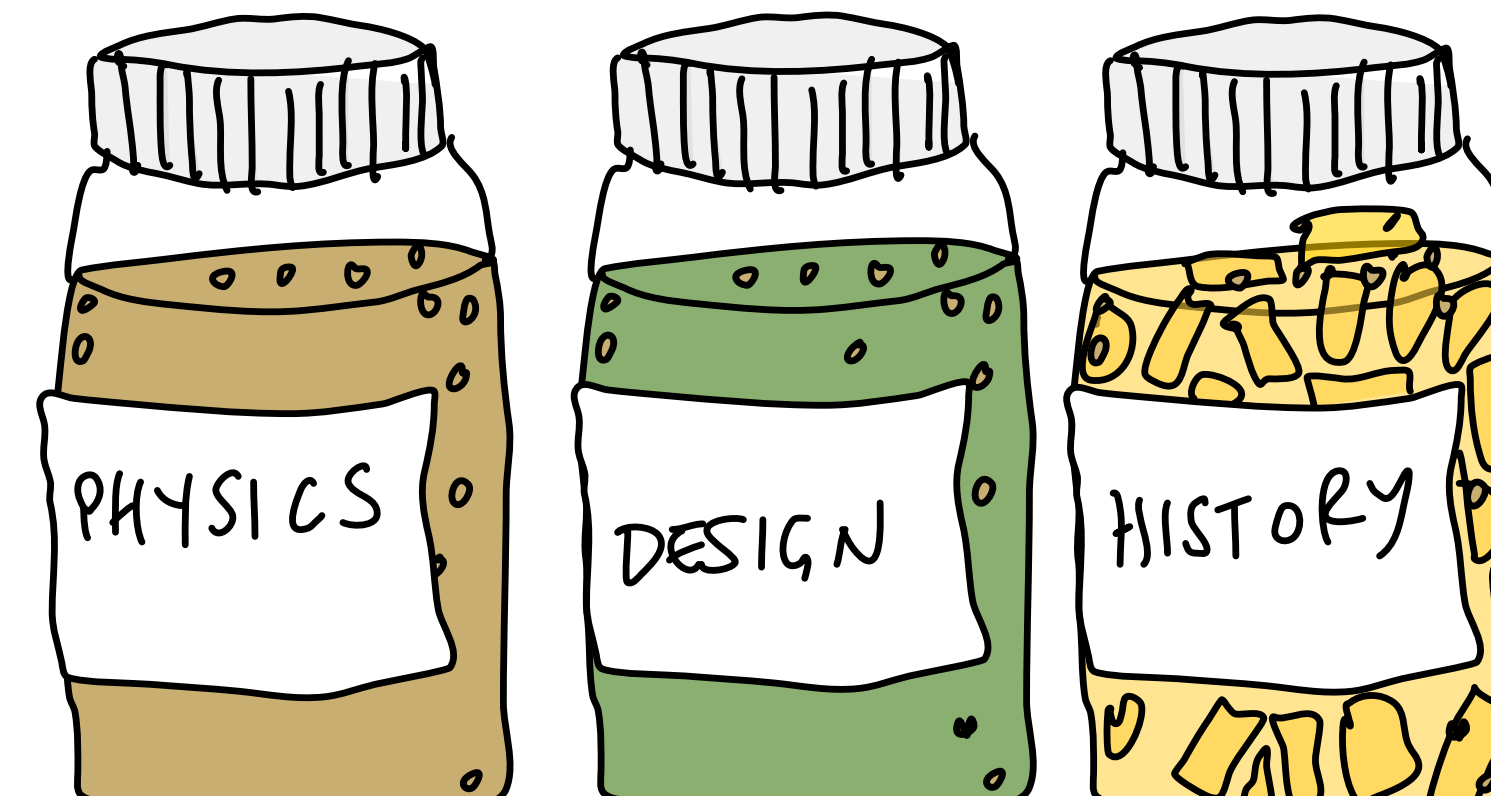
"Without knowledge from several disciplines, important problems in contemporary society cannot be solved"
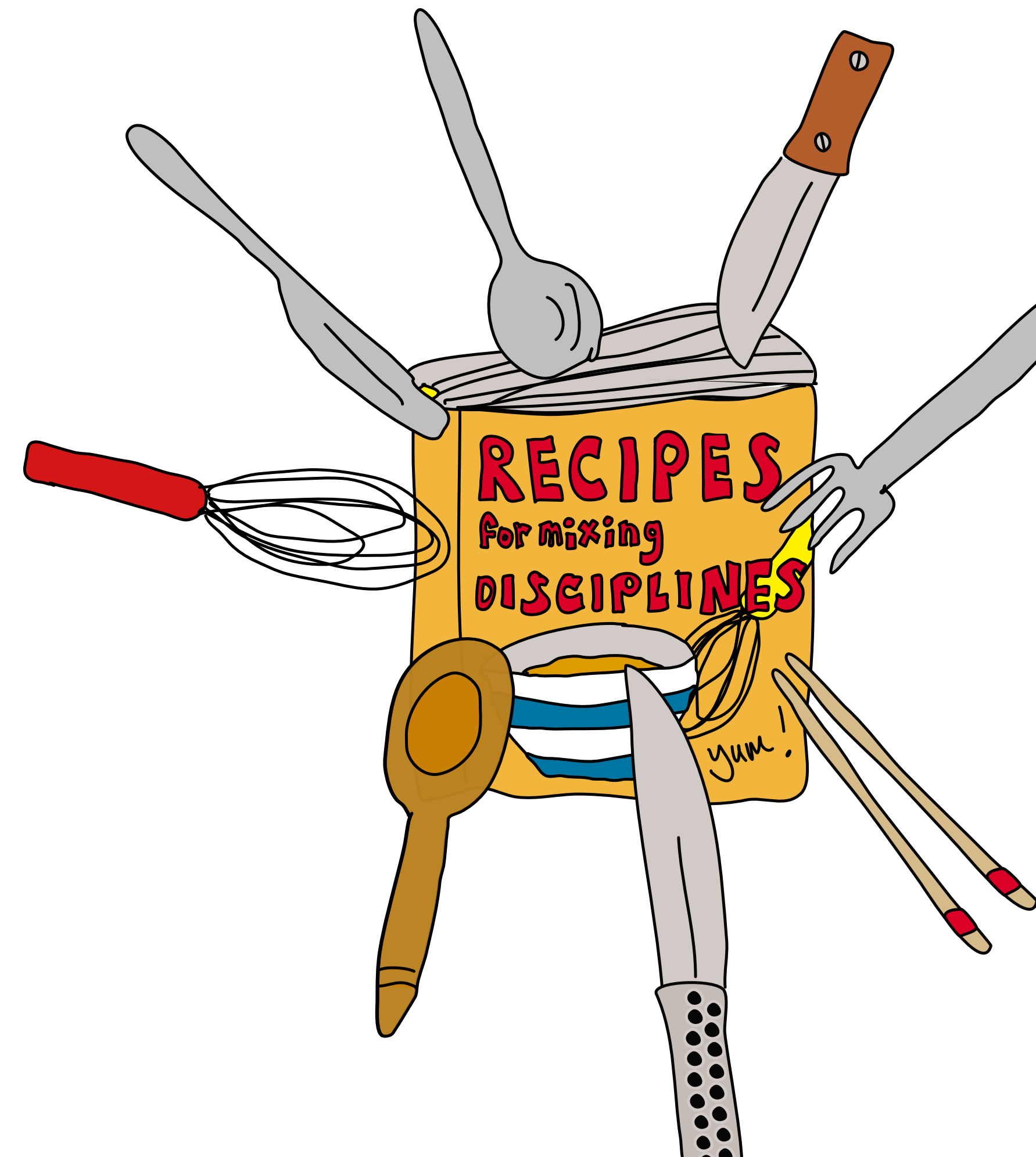
"It matters what matters we use to think other matters with; and it matters what stories we tell to tell other stories with"

Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene.* Duke University Press.

…each step requiring
"increasing integration
and modification of the
disciplinary contribution"
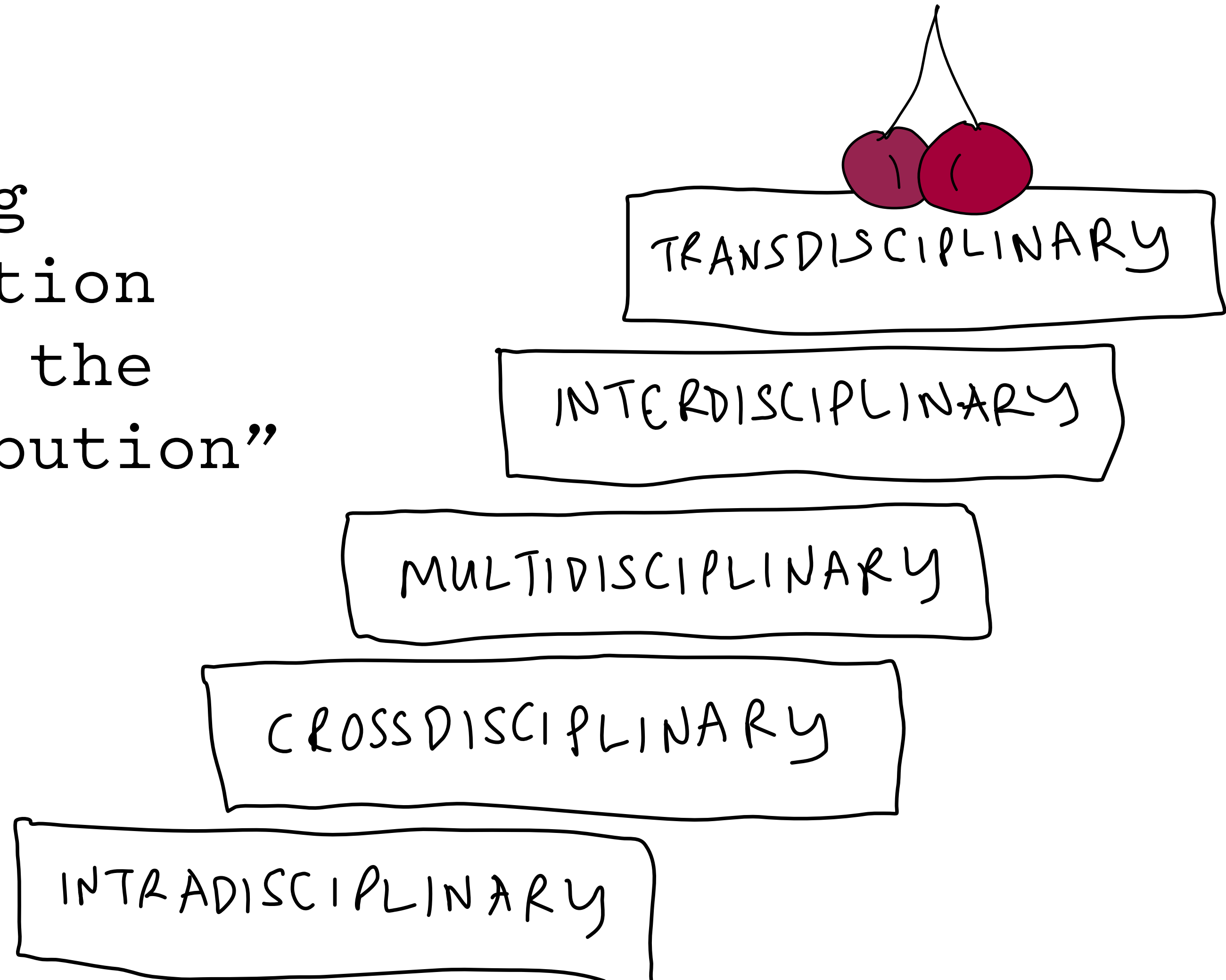
Stember, M. (1991). Advancing the social sciences
through the interdisciplinary enterprise. *The Social
Science Journal*, *28*(1), 1-14.

TRANSDISCIPLINARY

INTERDISCIPLINARY

MULTIDISCIPLINARY

CROSSDISCIPLINARY

INTRADISCIPLINARY

"Whilst the importance of the different terms and definitions is recognised 'interdisciplinary' is used in its broadest sense, encapsulating a range of activities from cross to multi to inter to trans"

Beaumont, N. (Ed.). (2020). *Demystifying interdisciplinary working (in Valuing Nature)* (Valuing Nature Paper VNP25V). Valuing Nature Network. valuing-nature.net/demystifying-interdisciplinary-working
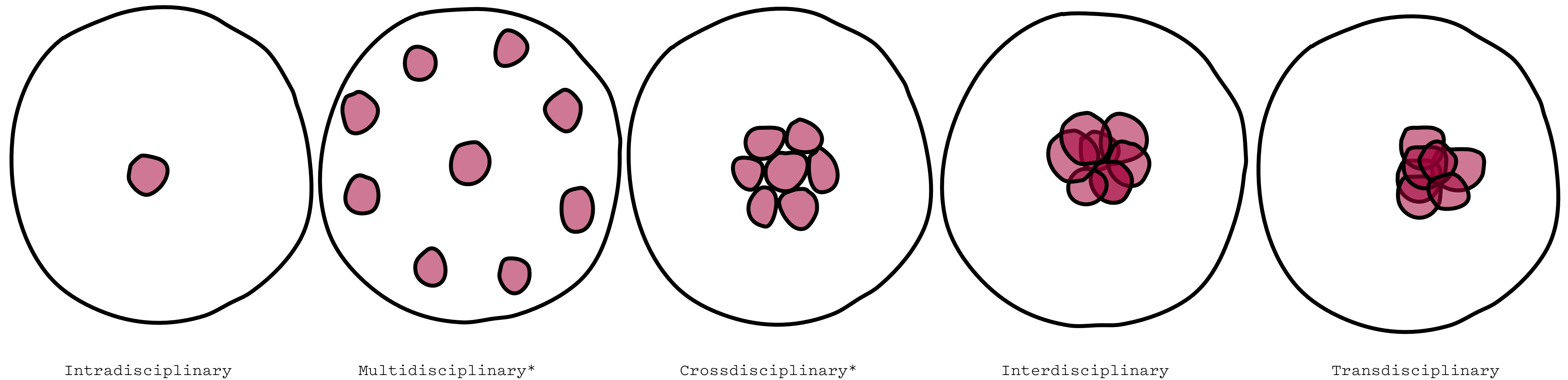
TRANSDISCIPLINARY

INTERDISCIPLINARY

MULTIDISCIPLINARY

CROSS-DISCIPLINARY

INTRADISCIPLINARY
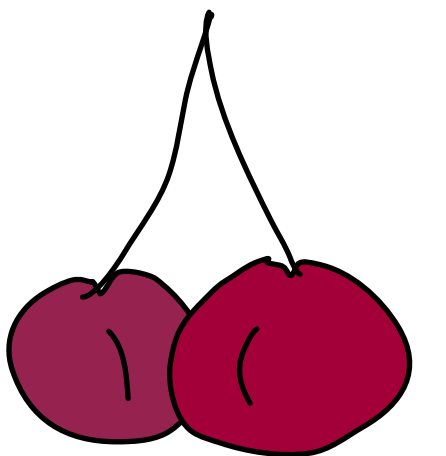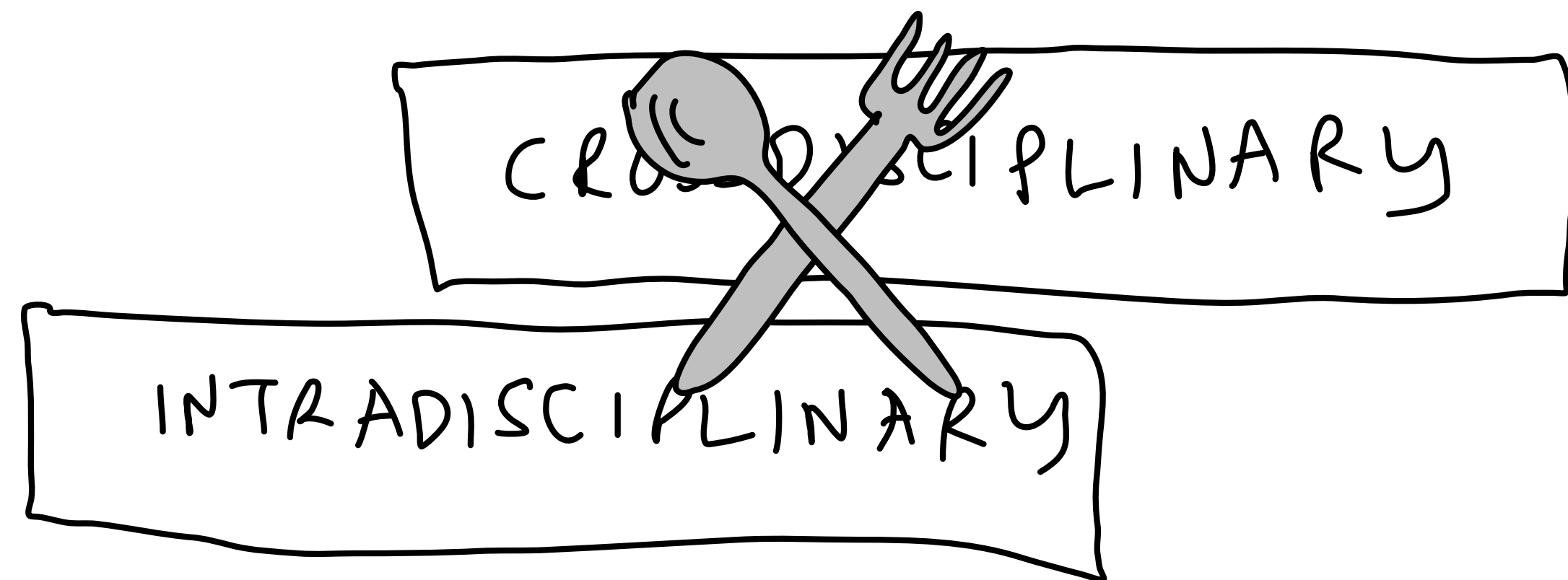
Not really about collaboration across disciplines
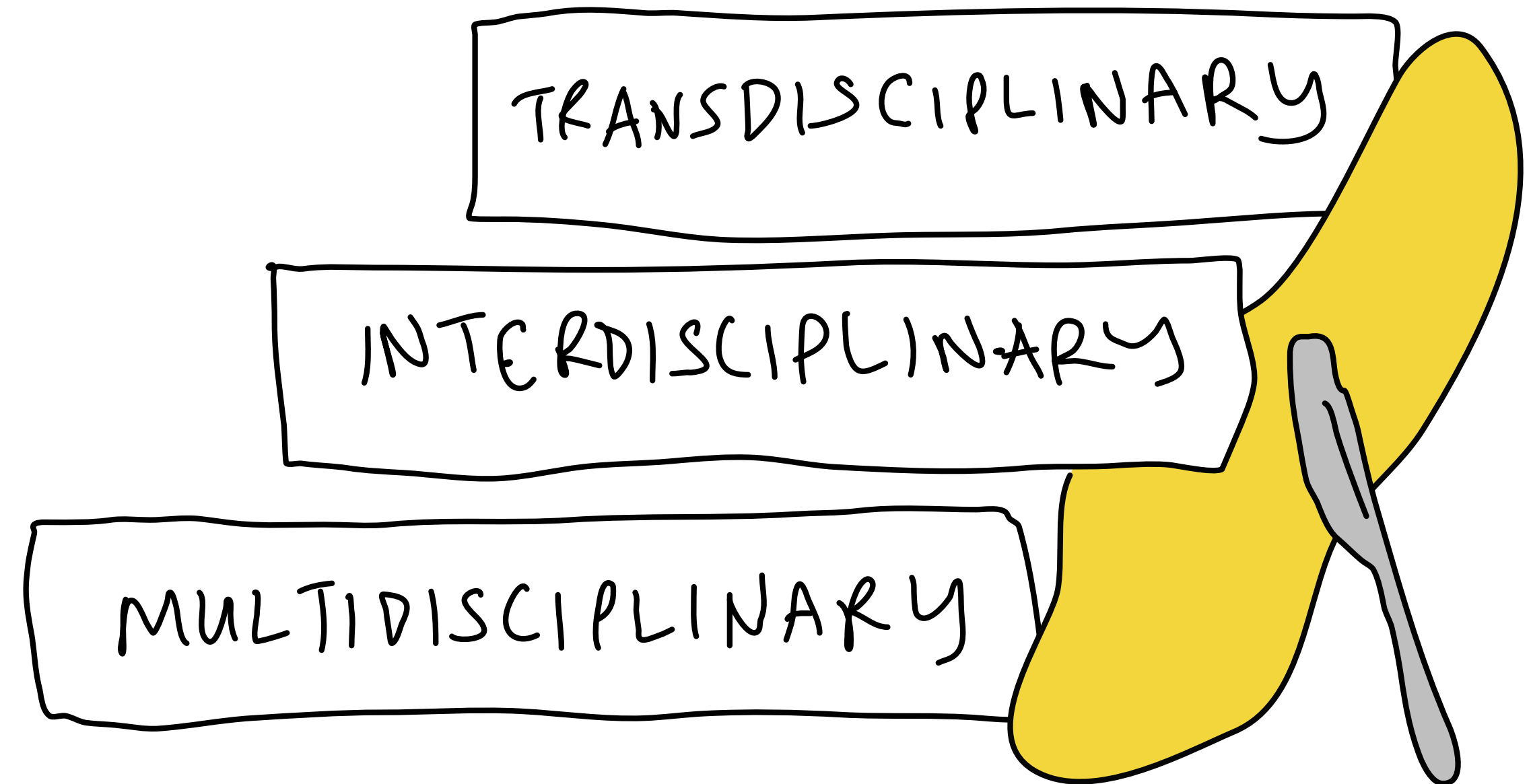
Sometimes 'interdisciplinary' spreads across all definitions

| | Multidisciplinary | Interdisciplinary | Transdisciplinary |
|---|---|---|---|
| Keyword | Additive | Interactive | Holistic |
| Maths | 2 + 2 = 4 | 2 + 2 = 5 | 2 + 2 = yellow |
| Food | A salad bowl (you can still see the individual ingredients) | A fondue or stew (melting pot) (ingredients are partially distinguishable) | A cake (the output is entirely different to the individual ingredients) |

**combine**     **blend+mash**     **bake**

Based on: Choi, B. C. K., & Pak, A. W. P. (2006). Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: 1. Definitions, objectives, and evidence of effectiveness. *Clinical & Investigative Medicine*, 29(6), 351-364.

Intradisciplinary    Multidisciplinary*    Crossdisciplinary*    Interdisciplinary    Transdisciplinary

Based on: Jensenius, A. (2012, March 12).
Disciplinarities: Intra, cross, multi, inter, trans.
*Alexander Refsum Jensenius.*
arj.no/2012/03/12/disciplinarities-2/

*note these names are
reversed compared to
other sources

| | Terms in Pak and Choi (2006) | | | | |
|---|---|---|---|---|---|
| | **Intradisciplinary** | **Crossdisciplinary** | **Multidisciplinary** | **Interdisciplinary** | **Transdisciplinary** |
| **Keyword** | Singular | Proximal | Additive | Interactive | Holistic |
| **Mathematical example** | 1 | 1+1 | 2+2=4 | 2+2=5 | 2+2=yellow |
| **Food example** | A single carrot on a plate | Several different vegetables on a plate, separate from each other | A salad bowl (you can still see the individual ingredients) | A fondue or stew (melting pot) (ingredients are partially distinguishable) | A cake (the output is entirely different to the individual ingredients) |
| **Descriptions** | Intradisciplinary is research approached from a single disciplinary tradition. | Crossdisciplinary is viewing one discipline from the perspective of another. For example, a physics professor describing the physics of music, and the music department running a course on the history of the music genre. | Multidisciplinarity is studying a research topic in not just one discipline but in several simultaneously. From this perspective, any topic will ultimately be enriched by incorporating the perspectives of several disciplines. | Interdisciplinary is the transfer of methods from one discipline to another. Like multidisciplinarity, interdisciplinarity overflows the disciplines, but its goal still remains within the framework of disciplinary research. | Transdisciplinarity is that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge. |

Table 4: Explanatory keywords, mathematical examples and food examples with explanatory descriptions. Building on Choi and Pak (2006) Nicolescu (2008, 2010, 2014) and Stember (1991).

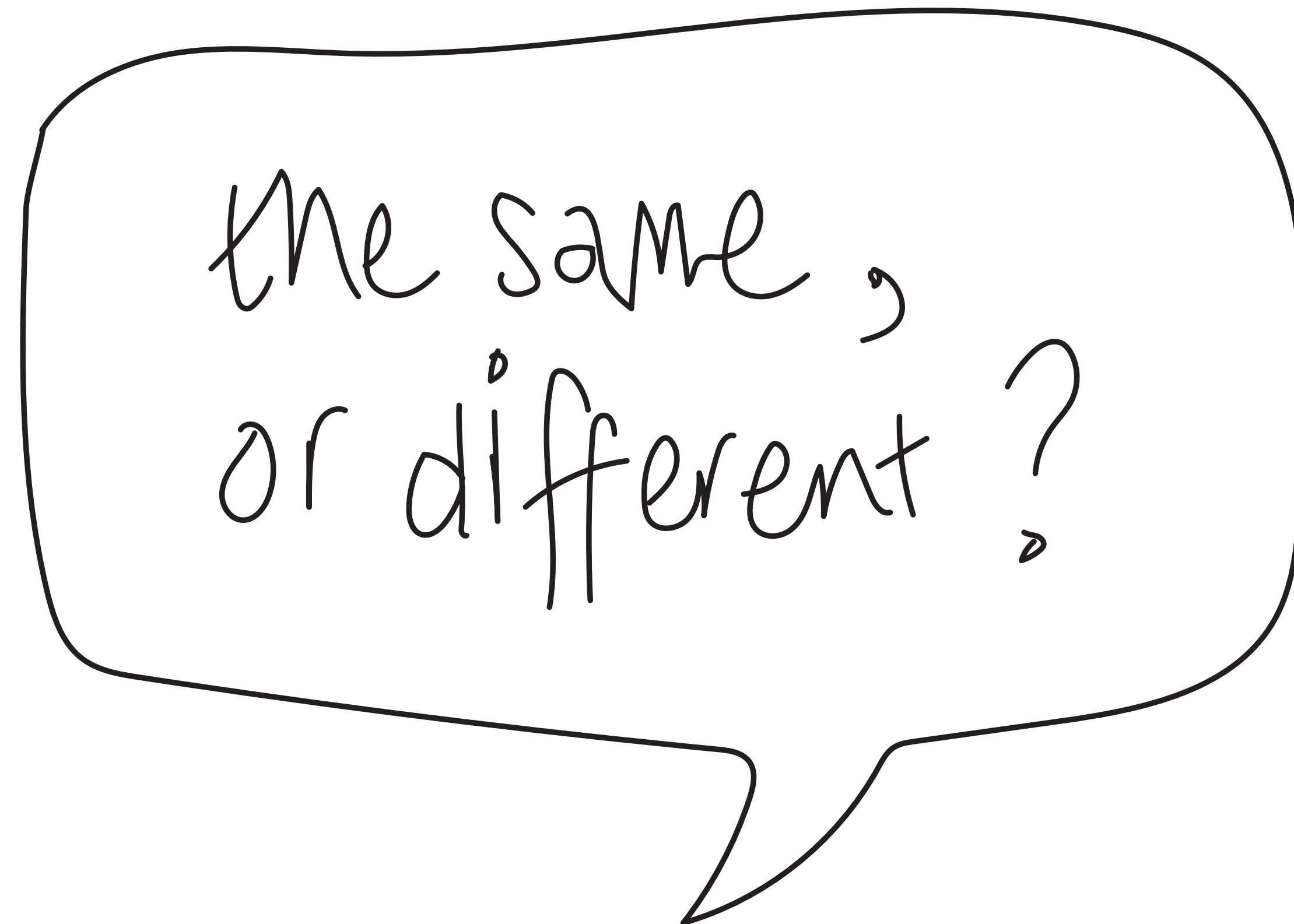# Variable usage is common

transdisciplinary

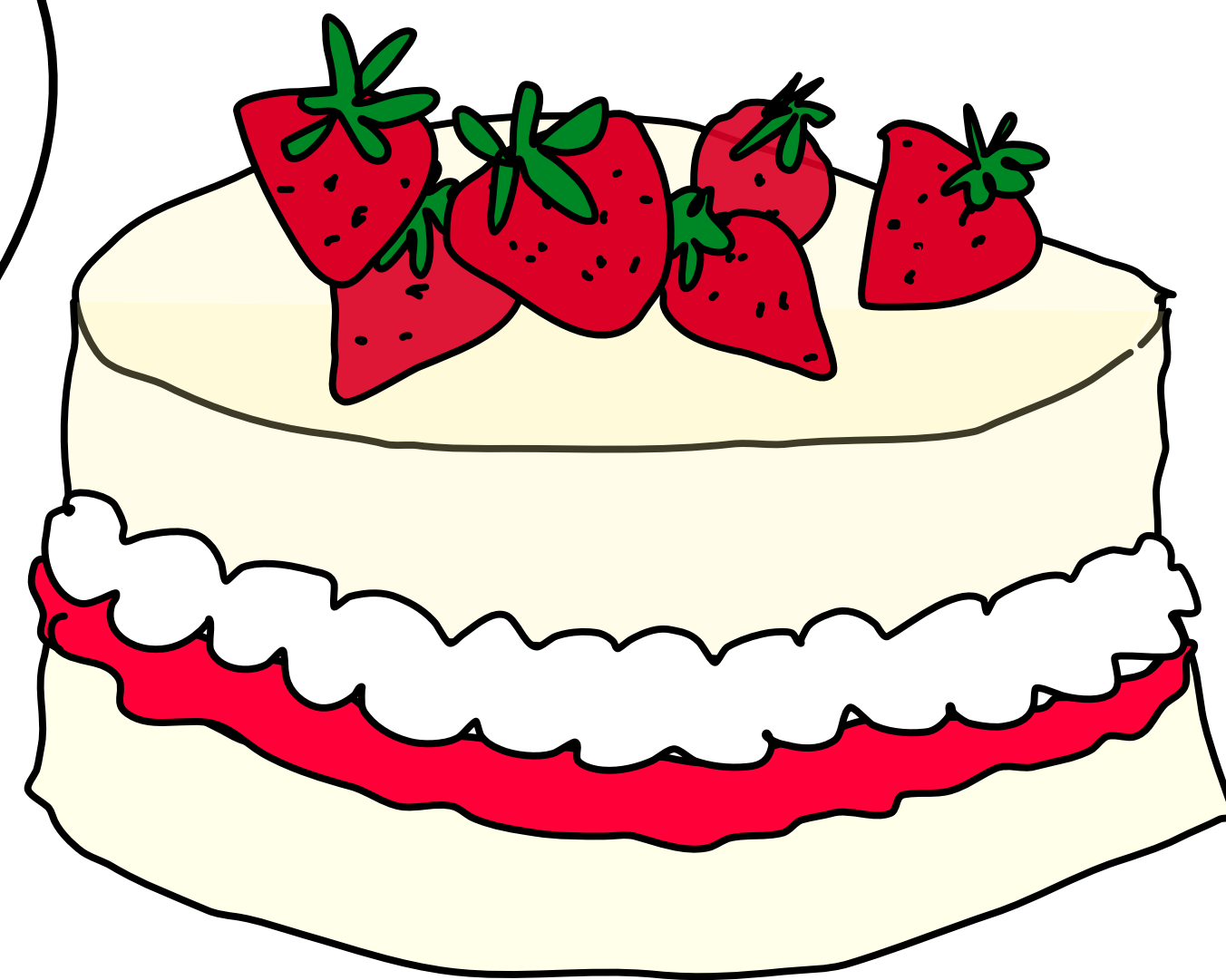intradisciplinary

interdisciplinary

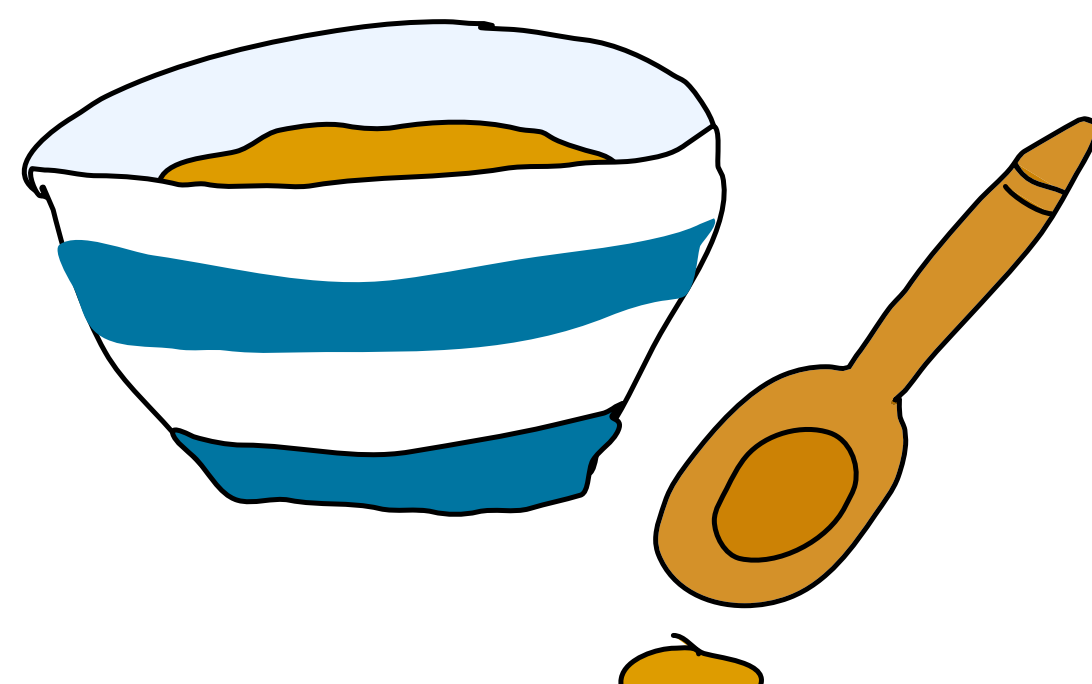crossdisciplinary

multidisciplinary

# Variable usage is common

eat your
meal in order:
salad, stew and
then CAKE!

Multidisciplinary

Interdisciplinary

Transdisciplinary

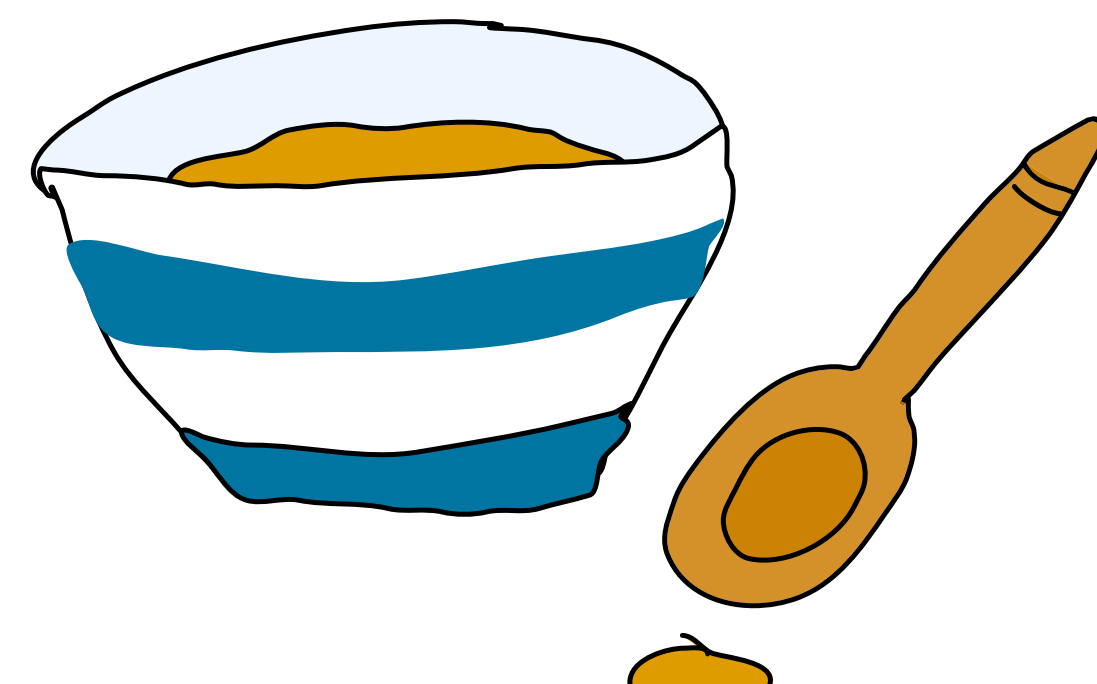# Make It Tasty

Multidisciplinary

Interdisciplinary

Transdisciplinary
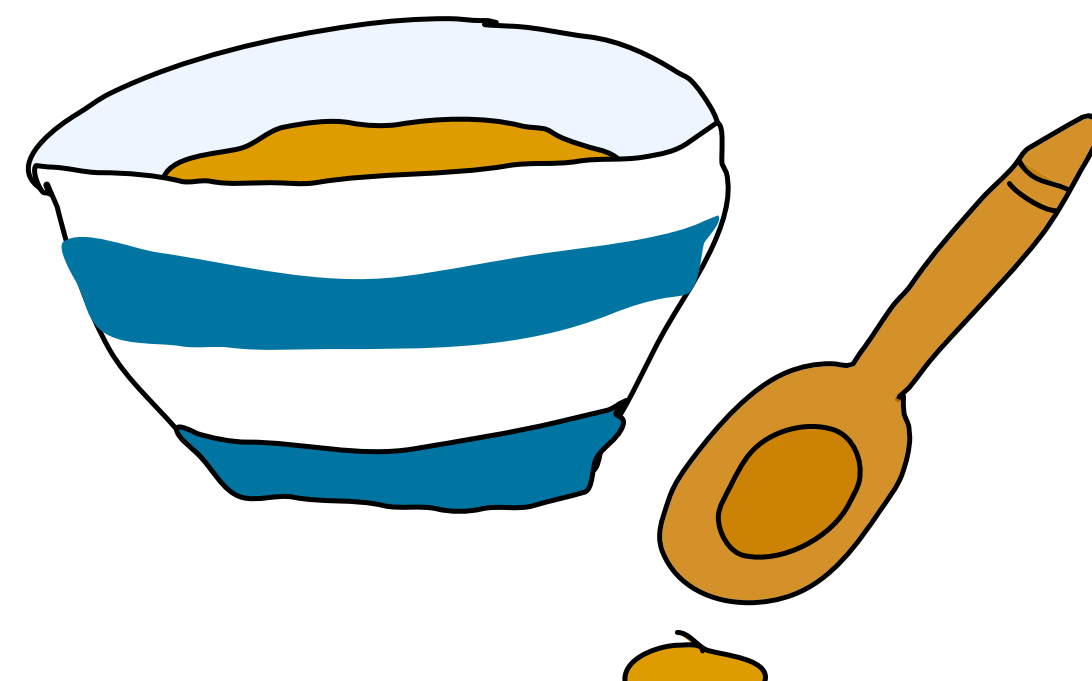
# Make It Tasty

Intradisciplinary

Cross disciplinary

Multidisciplinary

Interdisciplinary

Transdisciplinary
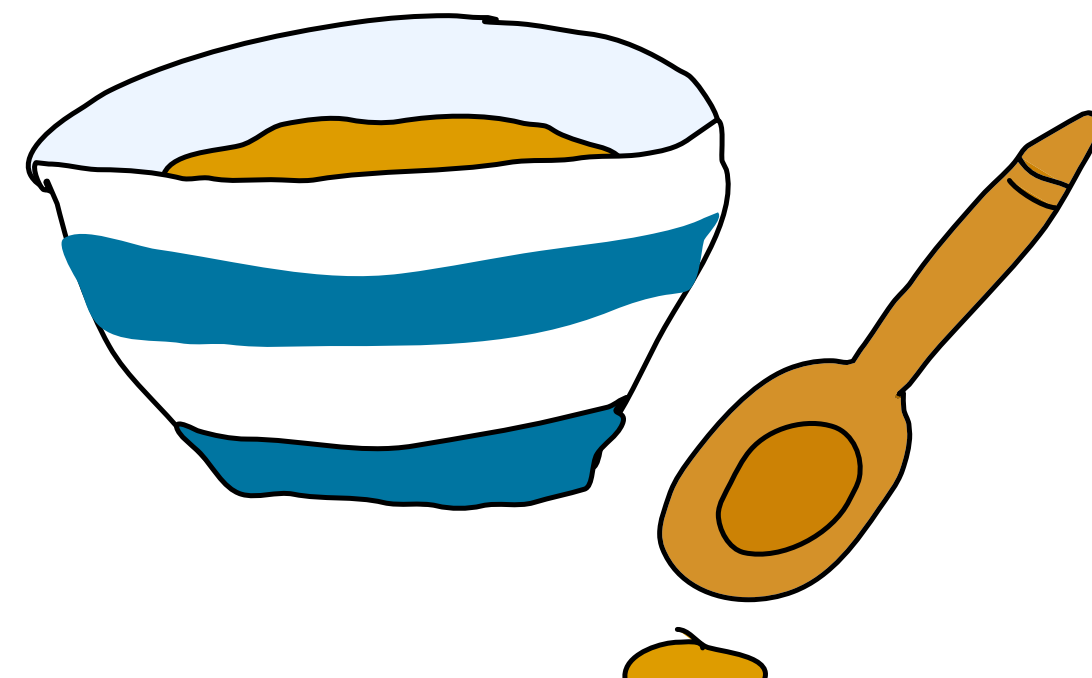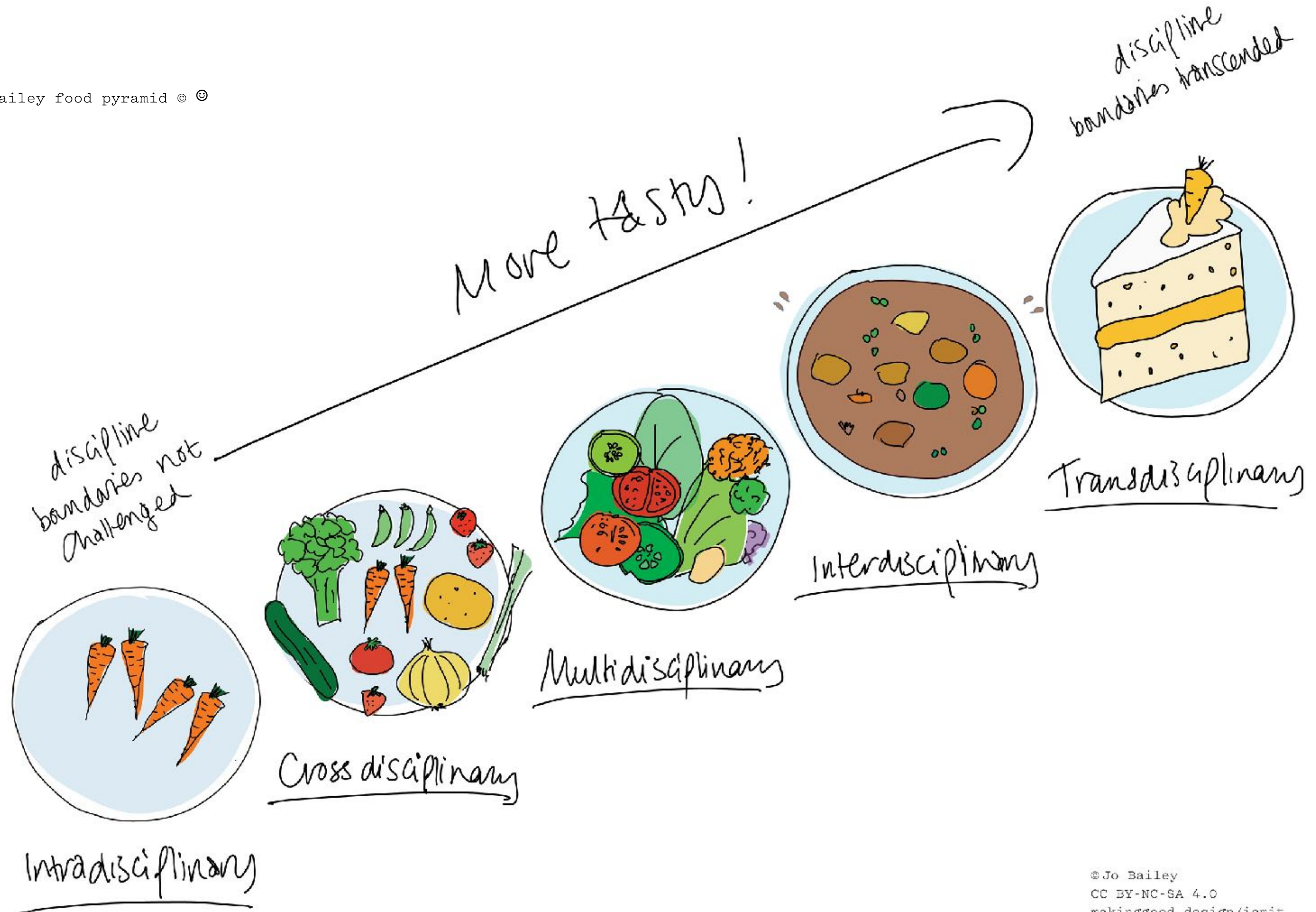
# I Can Make It Tasty

Intradisciplinary

Cross disciplinary

Multidisciplinary

Interdisciplinary

Transdisciplinary

The Bailey food pyramid © 😊

discipline boundaries transcended

More tasty!

discipline boundaries not challenged

Transdisciplinary

Interdisciplinary

Multidisciplinary

Cross disciplinary

Intradisciplinary

# Making a meal of disciplinarity combinations…

I Can Make It Tasty
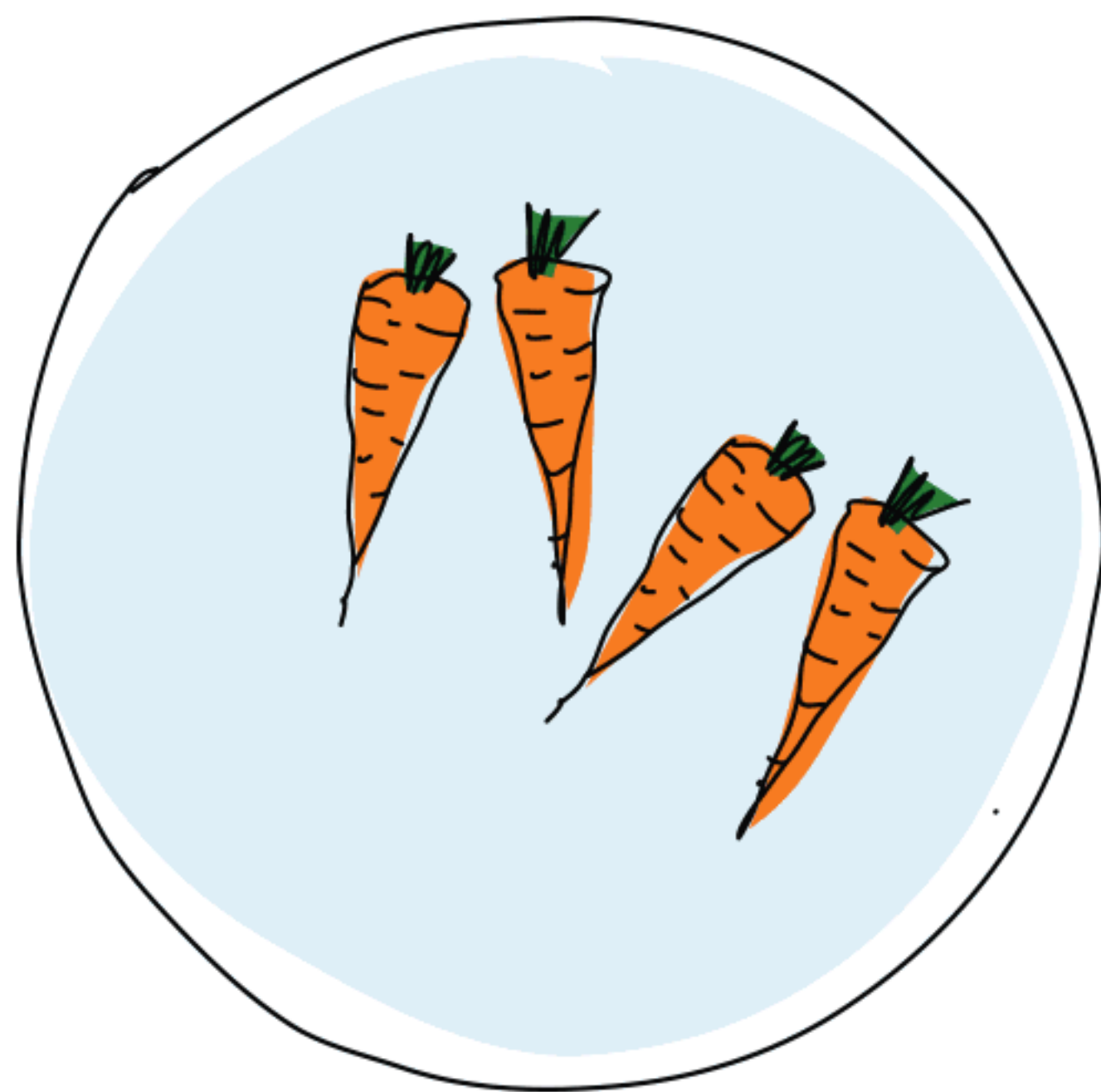
Intradisciplinary



I Can Make It Tasty

Intradisciplinary working is within one discipline. Like a single ingredient, clearly distinguishable…

*Cross disciplinary*

I Can Make It Tasty
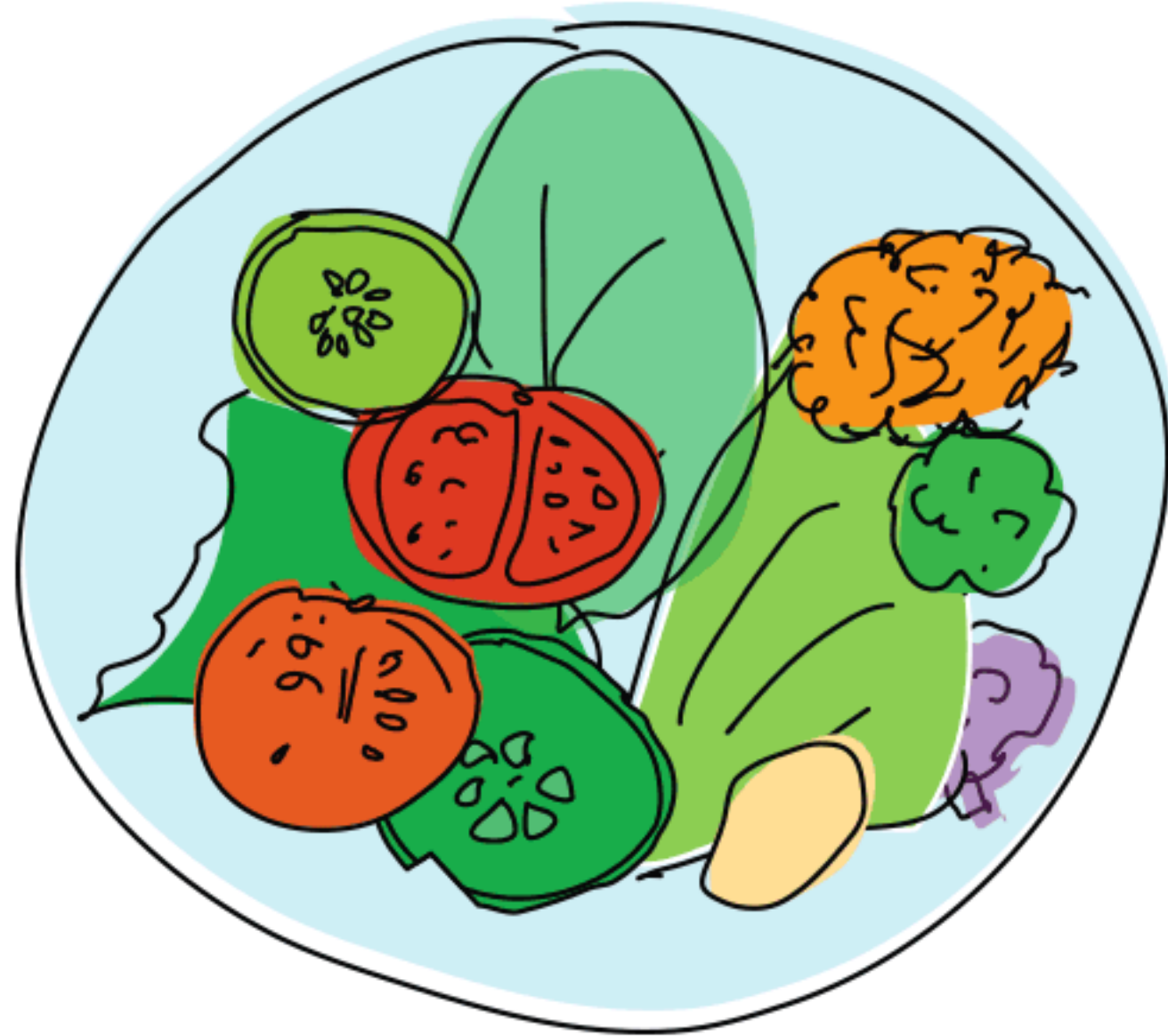
Crossdisciplinary working views one discipline from the frame of reference of another. It's like different ingredients on a plate, but without chopping them up and mixing them...
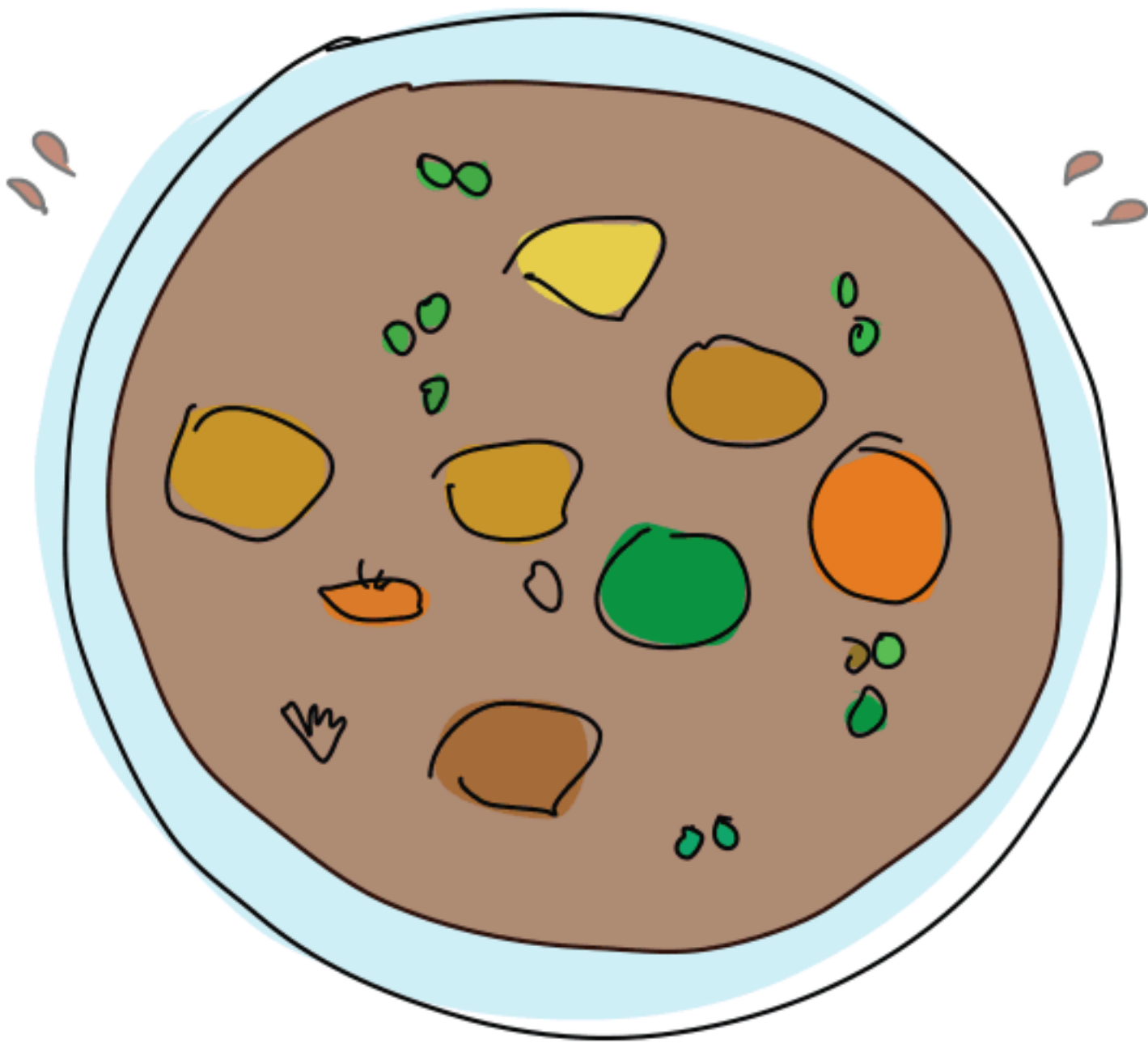
# Multidisciplinary

Multidisciplinary working brings disciplines together so they can learn from each other, drawing on the mix of disciplinary knowledge. It's like a salad: the original ingredients are intact, but the flavours begin to blend…

I Can Make It Tasty

Interdisciplinary

I Can Make It Tasty

Interdisciplinary working starts to take a new form, integrating knowledge and methods from different disciplines and synthesising into a new whole. It's like a stew: the original ingredients are still partly distinguishable, but the overall is a blended pot of mixed flavours…

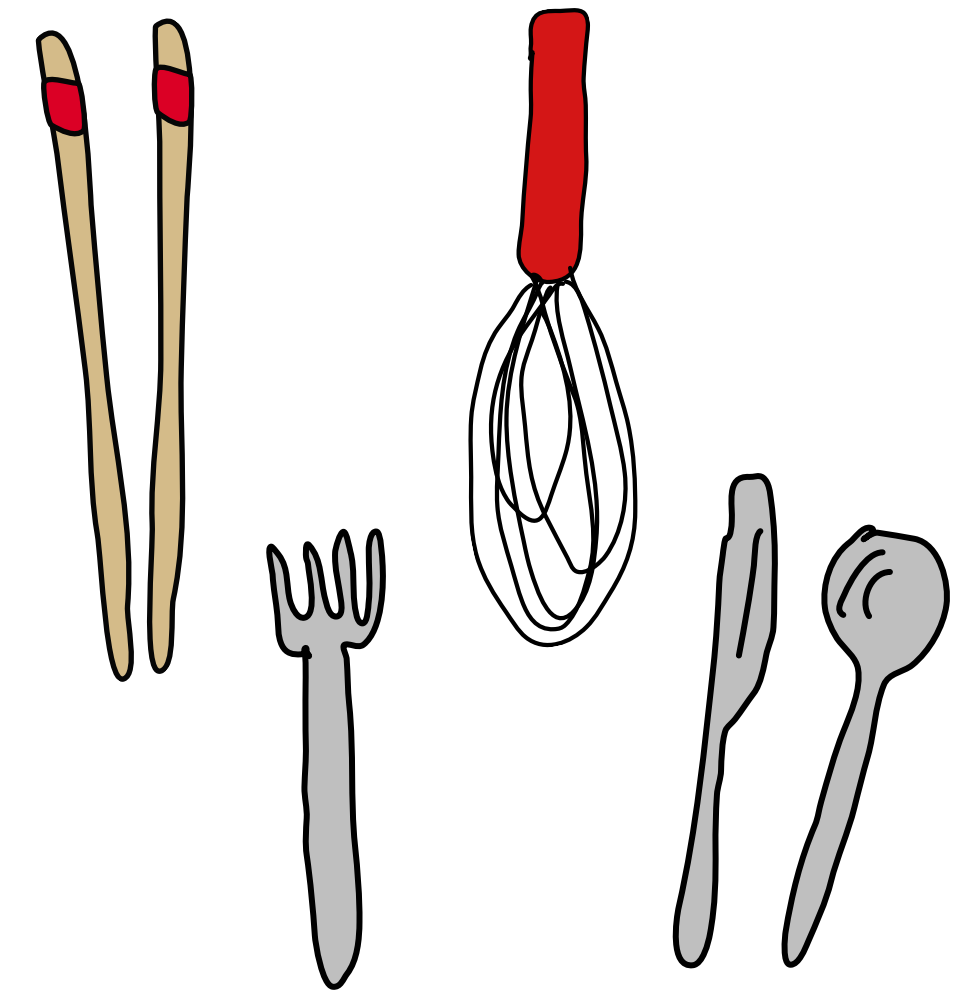Transdisiplinary working produces a new, novel form or way of working beyond the original disciplinary boundaries. It's like a cake: you can no longer see the form of the ingredients as they have taken on a different shape and flavour.
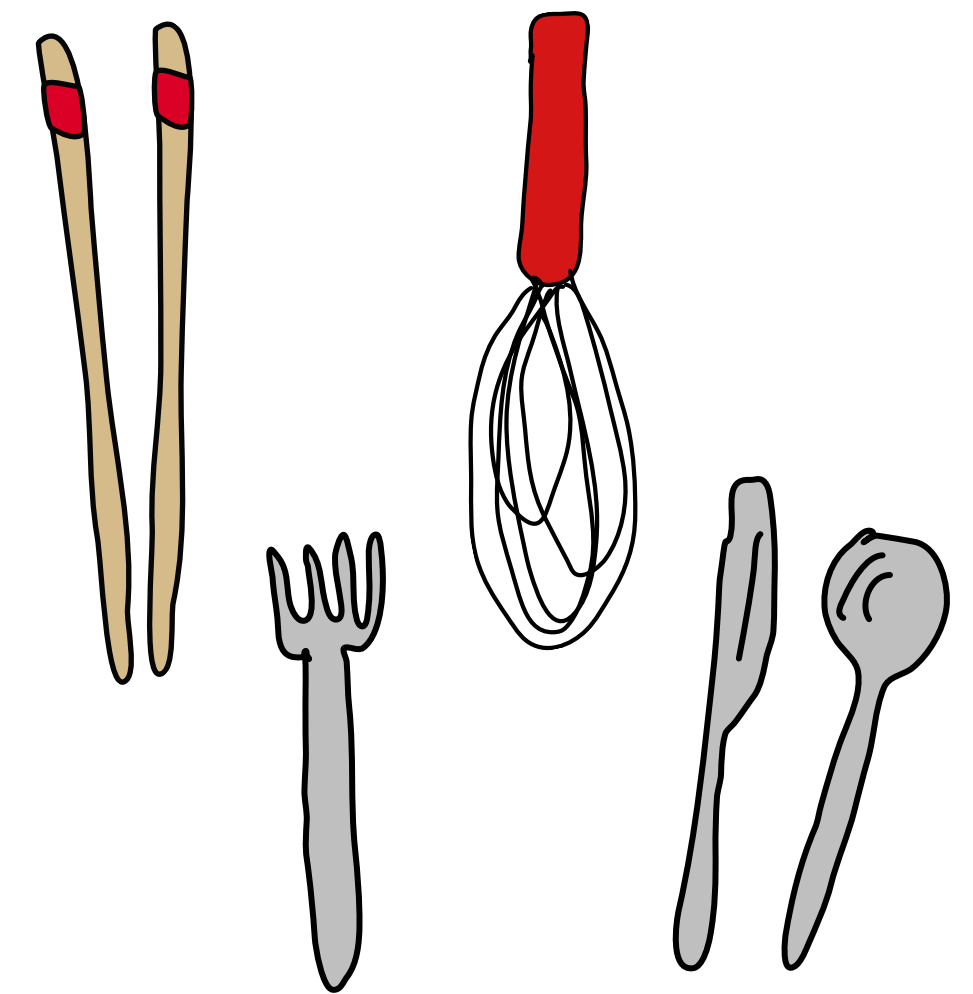
I Can Make It Tasty

# Mode 2
# transdisciplinarity

"the inclusion of stakeholders in participatory problem-solving approaches that are applied to tangible, real-world problems"
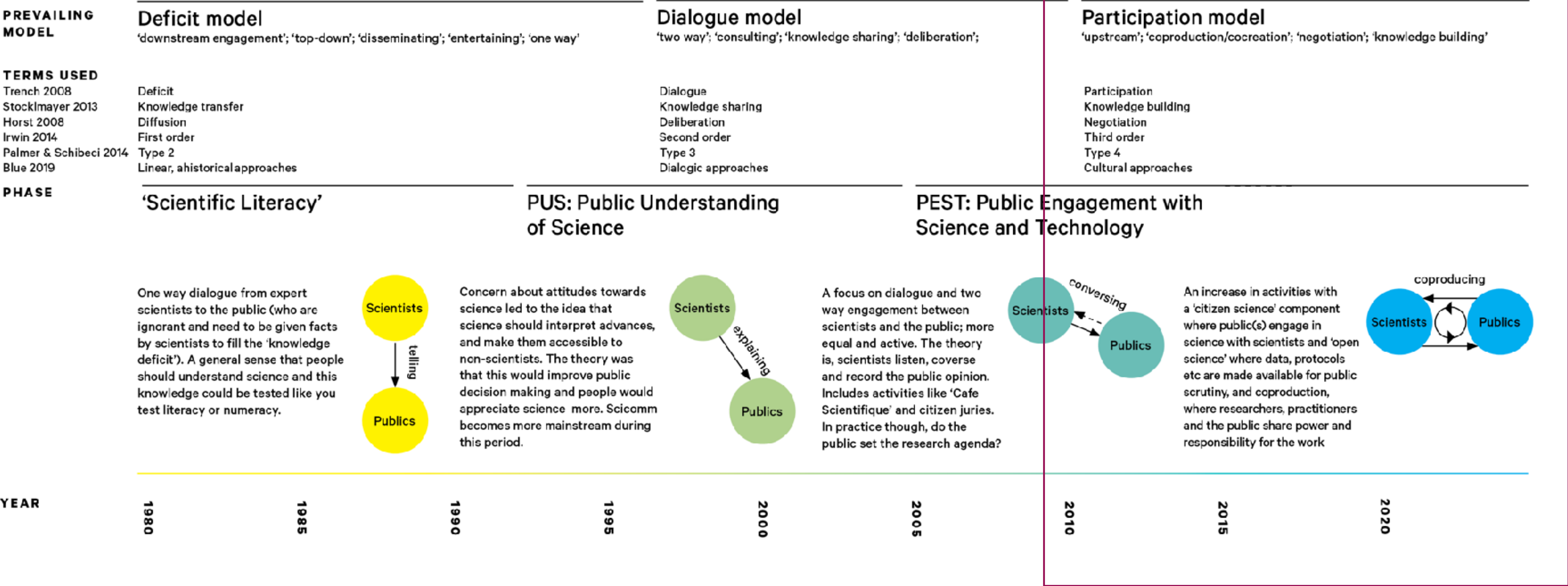
Rigolot, C. (2020). Transdisciplinarity as a discipline and a way of being: Complementarities and creative tensions. *Humanities and Social Sciences Communications*, 7(1), 1-5. doi.org/10.1057/s41599-020-00598-5

# Science communication
## Models and phases over time*

*timescale does not mean no scicomm took place before 1980! This is a very Eurocentric view of the scicomm landscape

**PREVAILING MODEL**

| Deficit model | Dialogue model | Participation model |
|---|---|---|
| 'downstream engagement'; 'top-down'; 'disseminating'; 'entertaining'; 'one way' | 'two way'; 'consulting'; 'knowledge sharing'; 'deliberation'; | 'upstream'; 'coproduction/cocreation'; 'negotiation'; 'knowledge building' |

**TERMS USED**

| | | | |
|---|---|---|---|
| Trench 2008 | Deficit | Dialogue | Participation |
| Stocklmayer 2013 | Knowledge transfer | Knowledge sharing | Knowledge building |
| Horst 2008 | Diffusion | Deliberation | Negotiation |
| Irwin 2014 | First order | Second order | Third order |
| Palmer & Schibeci 2014 | Type 2 | Type 3 | Type 4 |
| Blue 2019 | Linear, ahistorical approaches | Dialogic approaches | Cultural approaches |

**PHASE**

| 'Scientific Literacy' | PUS: Public Understanding of Science | PEST: Public Engagement with Science and Technology | |
|---|---|---|---|
| One way dialogue from expert scientists to the public (who are ignorant and need to be given facts by scientists to fill the 'knowledge deficit'). A general sense that people should understand science and this knowledge could be tested like you test literacy or numeracy. | Concern about attitudes towards science led to the idea that science should interpret advances, and make them accessible to non-scientists. The theory was that this would improve public decision making and people would appreciate science more. Scicomm becomes more mainstream during this period. | A focus on dialogue and two way engagement between scientists and the public; more equal and active. The theory is, scientists listen, converse and record the public opinion. Includes activities like 'Cafe Scientifique' and citizen juries. In practice though, do the public set the research agenda? | An increase in activities with a 'citizen science' component where public(s) engage in science with scientists and 'open science' where data, protocols etc are made available for public scrutiny, and coproduction, where researchers, practitioners and the public share power and responsibility for the work |

Scientists — telling → Publics

Scientists — explaining → Publics

Scientists — conversing ⇄ Publics

Scientists — coproducing ⇄ Publics

**YEAR** 1980 1985 1990 1995 2000 2005 2010 2015 2020

Science communication models and phases over time, adapted from Bowater and Yeoman (2013) and Bucchi and Trench (2014). (See also: Blue, 2019; Horst, 2008; Irwin, 2014b; Palmer & Schibeci, 2014; Stocklmayer, 2013).

"Knowledge seeps through institutions and structures like water through the pores of a membrane. Knowledge seeps in both directions, from science to society as well as from society to science"

Nowotny, H. (2006). *The Potential of Transdisciplinarity.*
helga-nowotny.eu/texts.php
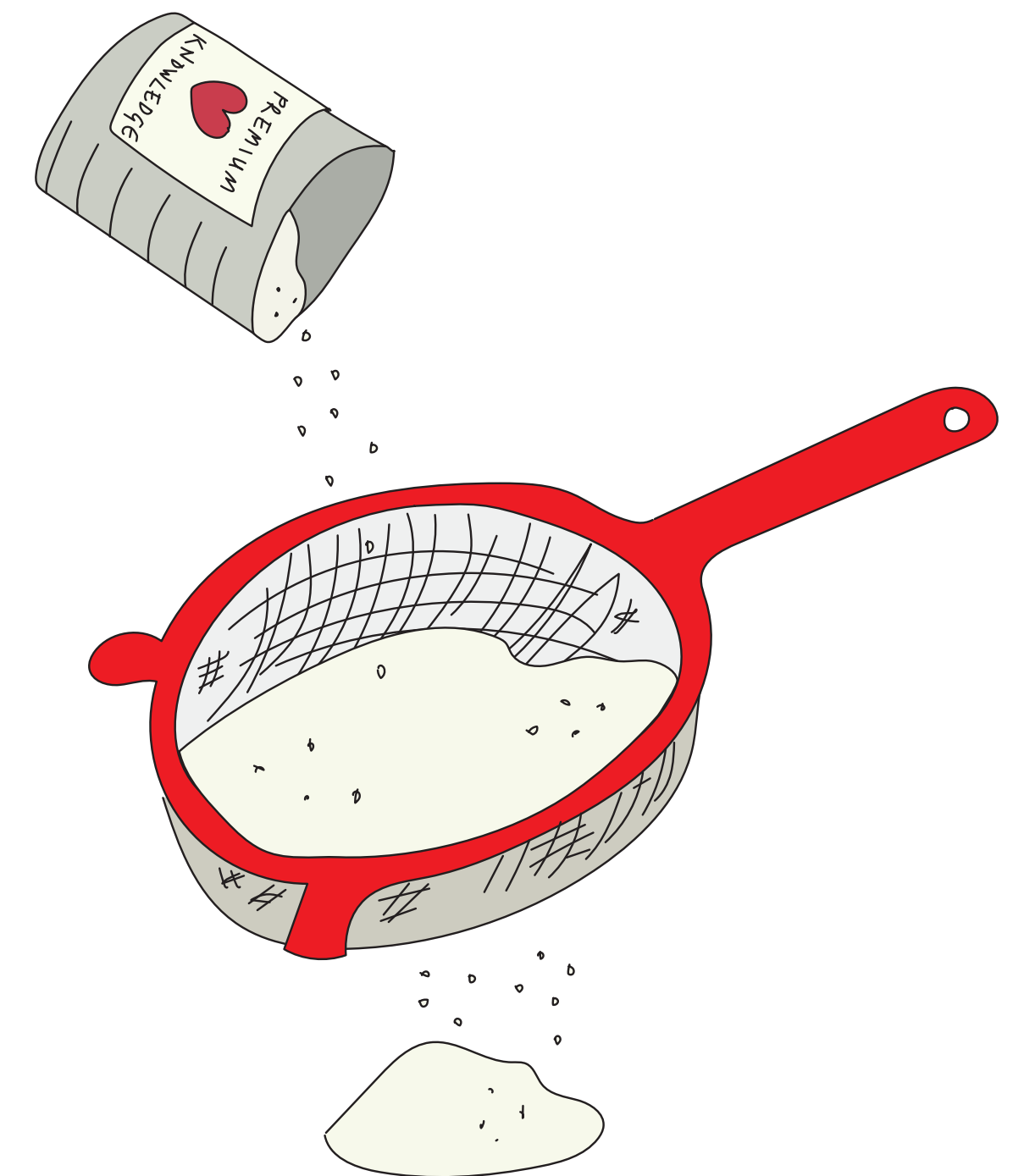
# What might help us move towards transdisciplinary practice?



disciplinary PICKLE
TOP QUALITY BLEND

# Respect

- Try not to 'rank' disciplines
- Make sure you're not relegating some knowledge-creation practices to roles 'in service' to science
- Be consciously reflexive; challenge assumptions
- Acknowledge all contributions; find a shared goal

Beaumont, N. (Ed.). (2020). *Demystifying interdisciplinary working (in Valuing Nature)* (Valuing Nature Paper No. VNP25V). Valuing Nature Network. valuing-nature.net/demystifying-interdisciplinary-working

# Time and resources

- Take time to learn and understand everyone's normal disciplinary approaches, methods and vocabulary upfront
- More time at the overall project level, as well as for extended discussion at the everyday level, to build interdisciplinary capacity
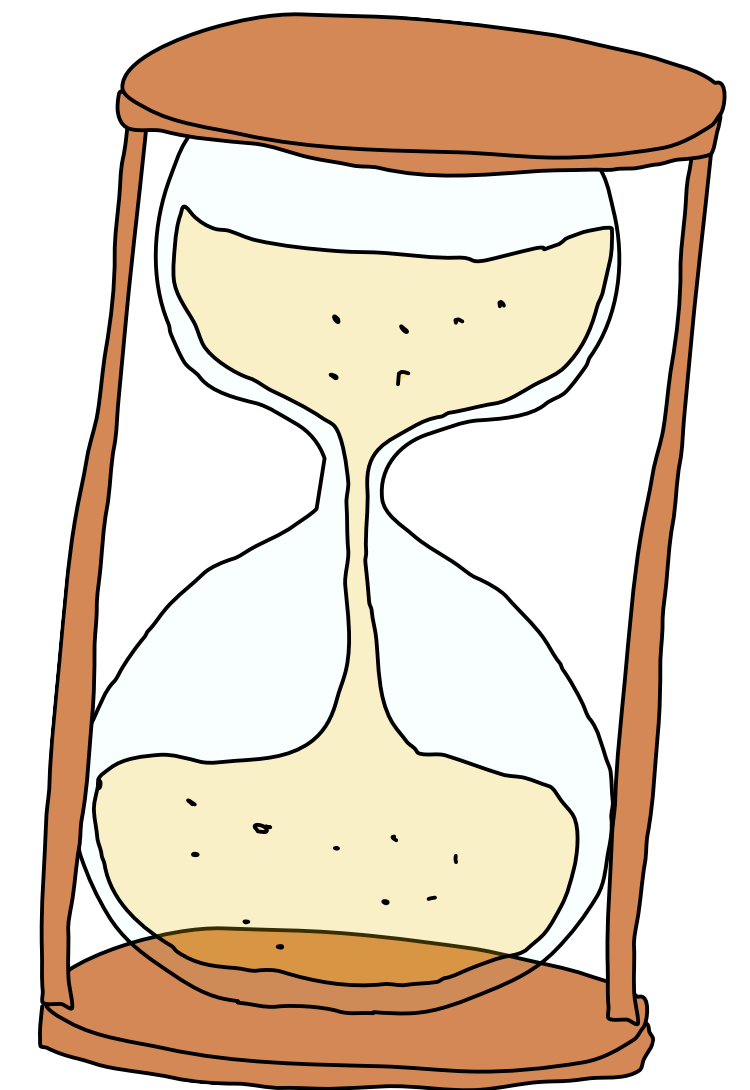
# Communication

- Check the meaning of key terms across disciplines
- Keep a shared project dictionary
- Build shared understanding through shared experiences

Bracken, L. J., & Oughton, E. A. (2006). 'What do you mean?' The importance of language in developing interdisciplinary research. *Transactions of the Institute of British Geographers, 31*(3), 371-382. doi.org/10.1111/j.1475-5661.2006.00218.x
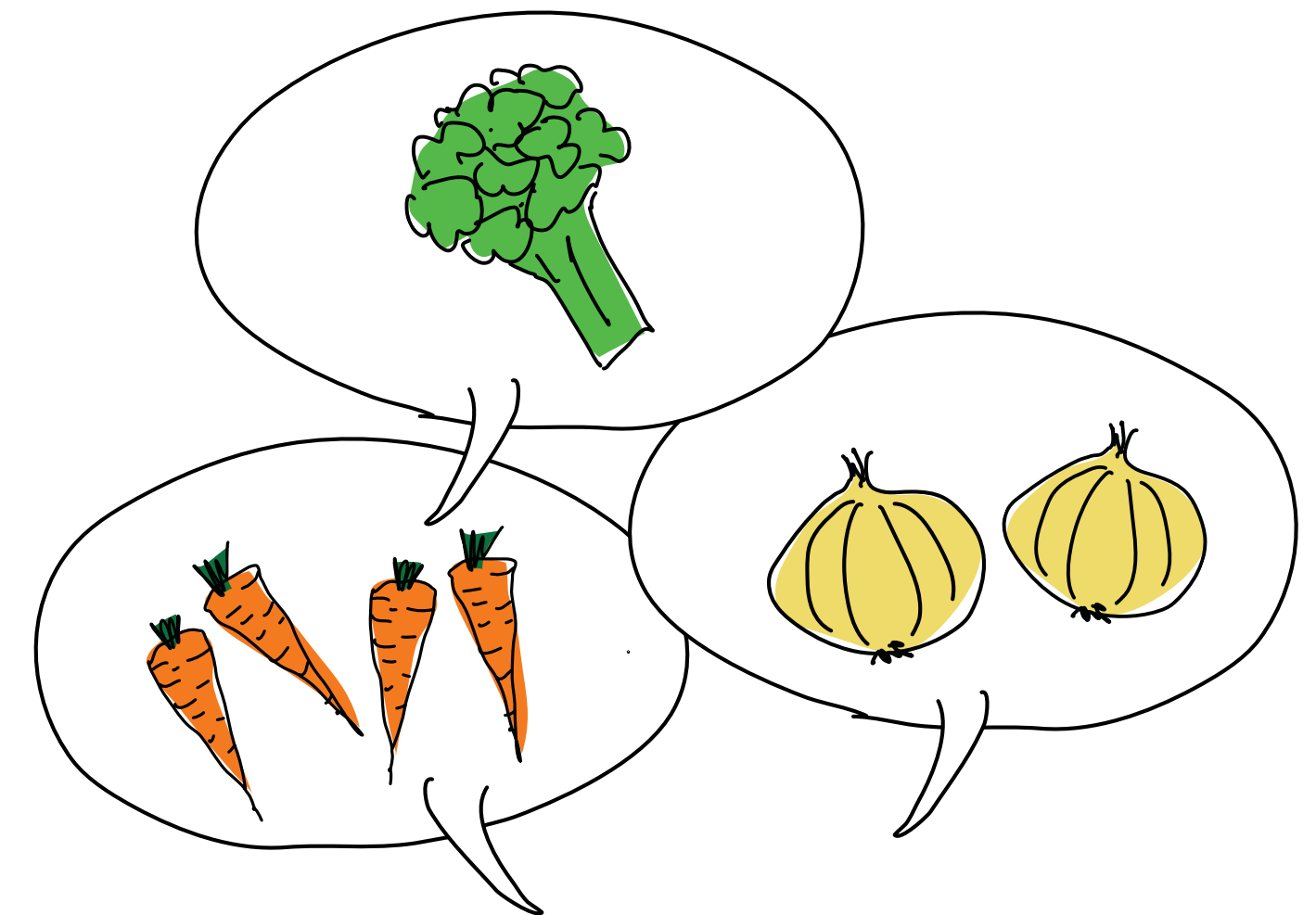
# Shared values

- No one person is their discipline! Build understanding of disciplinary perspectives *and* personal perspectives
- Shared experiences outside the normal workspace can help build new frames of reference
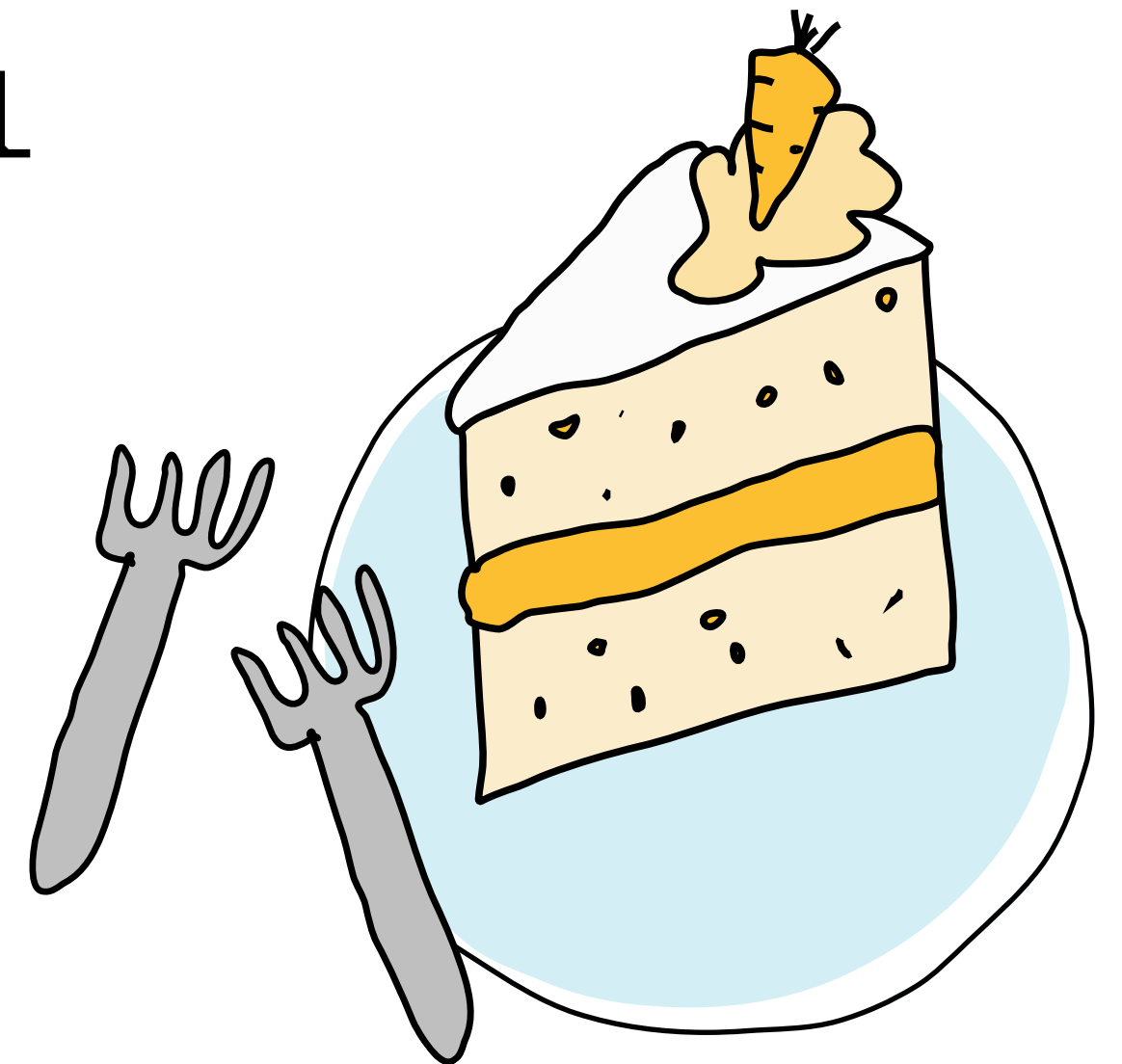
# Prepare and adapt

- This is new; previous experiences might not apply
- Think carefully about how you intend to collaborate
- Agree a strategy for inclusive outputs
- Expect the unexpected!
- When you feel like you're feet can't touch the bottom and you're collectively floating, embrace it!
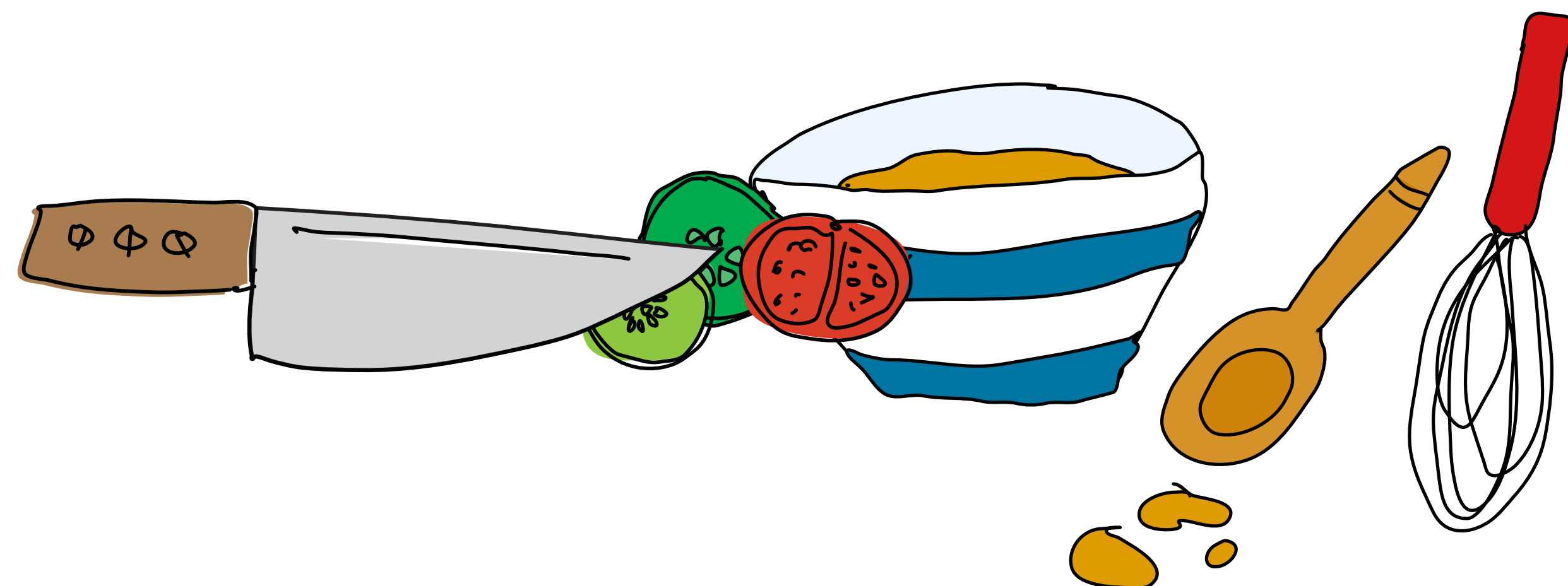
# Disciplines are what makes interdisciplinary work possible

RECIPES for mixing DISCIPLINES

yum!

artefact designed by a designer with design skills!

# I Can Make It Tasty
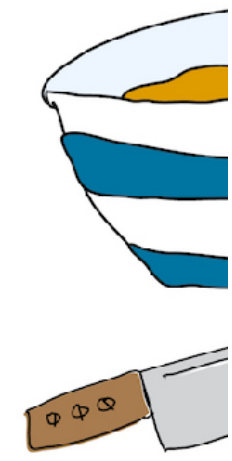
**Intra- / Cross- / Multi- / Inter- / Trans-Fusion cooking with disciplines!**

Complex problems require us to look outside disciplinary boundaries in order to shape new modes of knowledge production. These developing models of collective and collaborative working have gained a range of words to describe them. Though these continue to evolve and different bodies of literature may employ them with subtle variations, there is a general coalescence around some terms that articulate these different levels of 'fusion' as a continuum of increasing integration. Cooking – making raw ingredients increasingly 'tasty' – can be a useful way of understanding the different degrees of blending and mixing, and the mnemonic **I Can Make It Tasty** describes this progression: **Intra**disciplinary / **Cross**disciplinary / **Multi**disciplinary / **Inter**disciplinary / **Trans**disciplinary:

*eat your meal in order: salad, stew and then CAKE!*

*More Tasty!*

*discipline boundaries not challenged*

*discipline boundaries transcended*
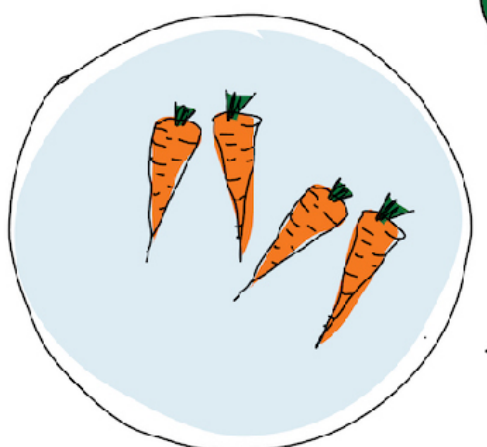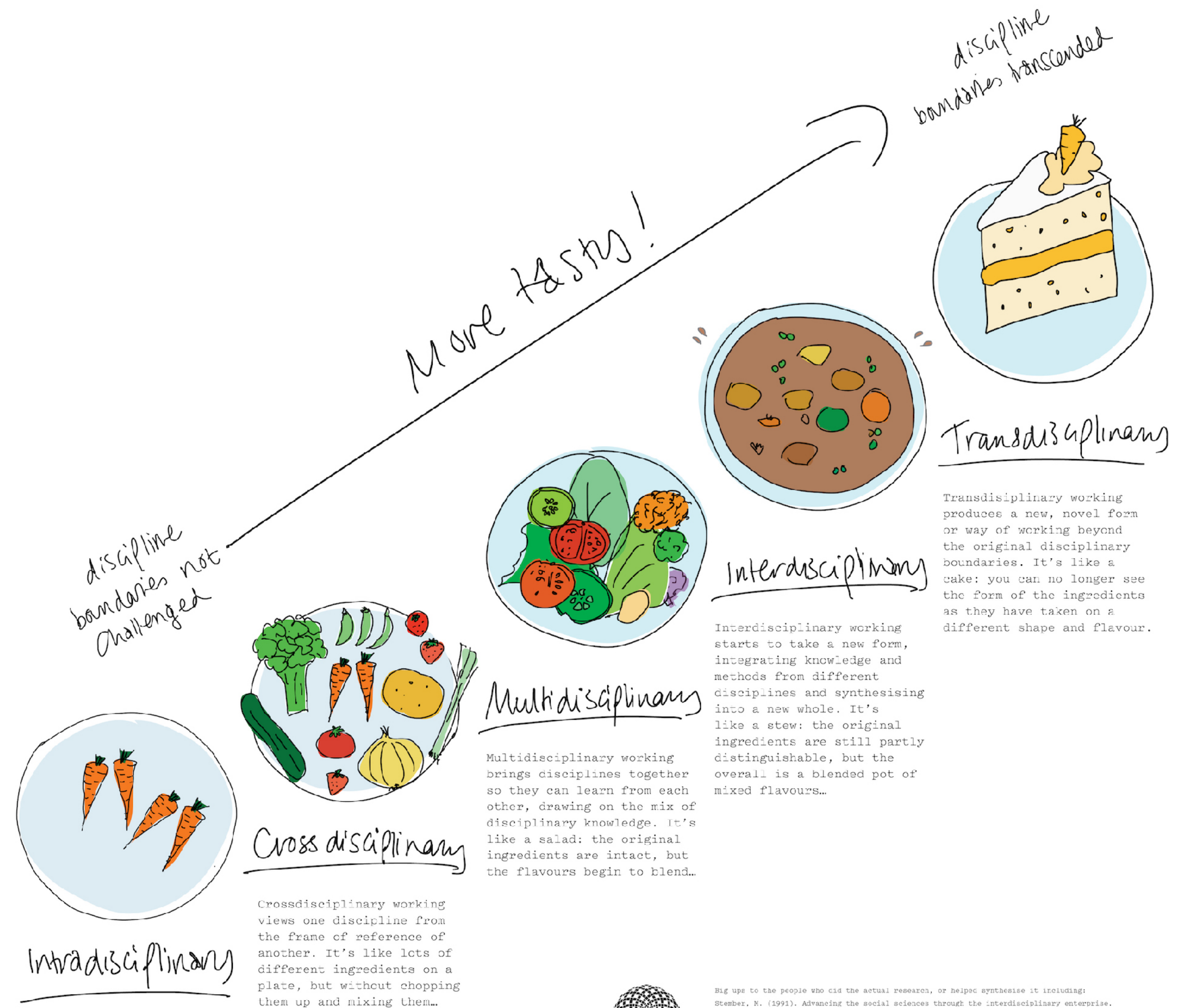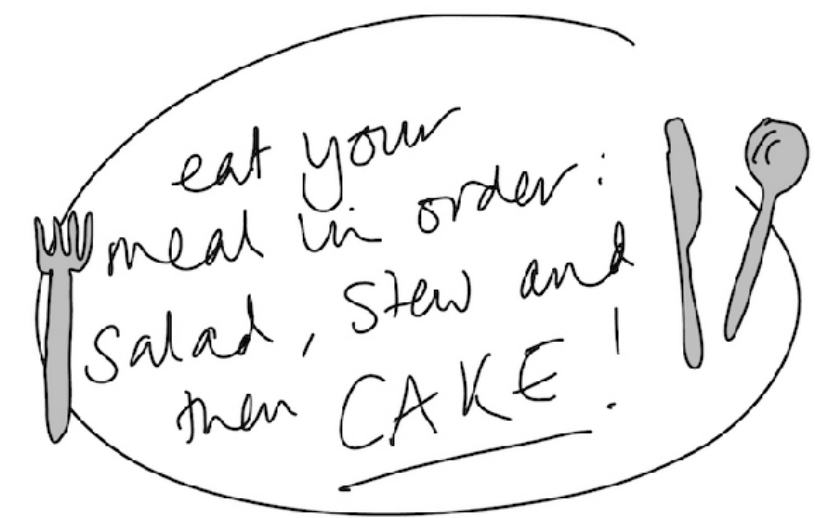
## Intradisciplinary

Intradisciplinary working is within one discipline. Like a single ingredient, clearly distinguishable…

## Crossdisciplinary

Crossdisciplinary working views one discipline from the frame of reference of another. It's like lots of different ingredients on a plate, but without chopping them up and mixing them…
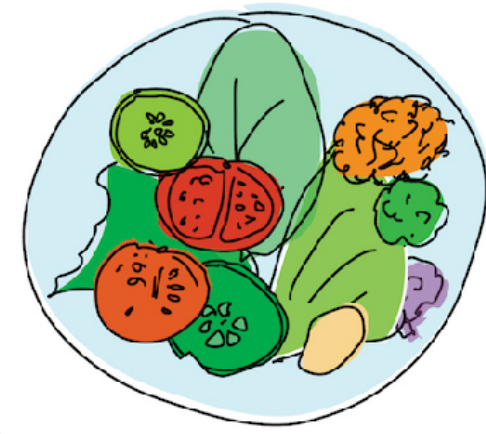
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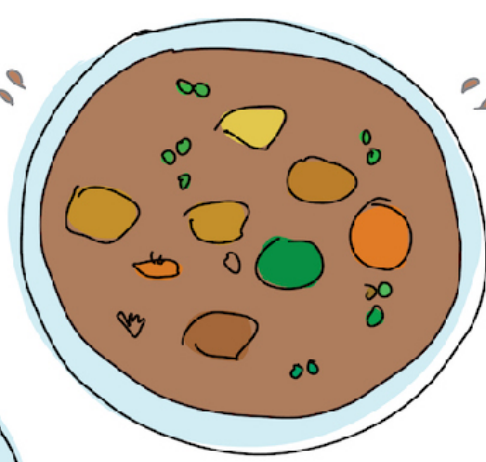
## Interdisciplinary

Interdisciplinary working starts to take a new form, integrating knowledge and methods from different disciplines and synthesising into a new whole. It's like a stew: the original ingredients are still partly distinguishable, but the overall is a blended pot of mixed flavours…

## Transdisciplinary

Transdisciplinary working produces a new, novel form or way of working beyond the original disciplinary boundaries. It's like a cake: you can no longer see the form of the ingredients as they have taken on a different shape and flavour.
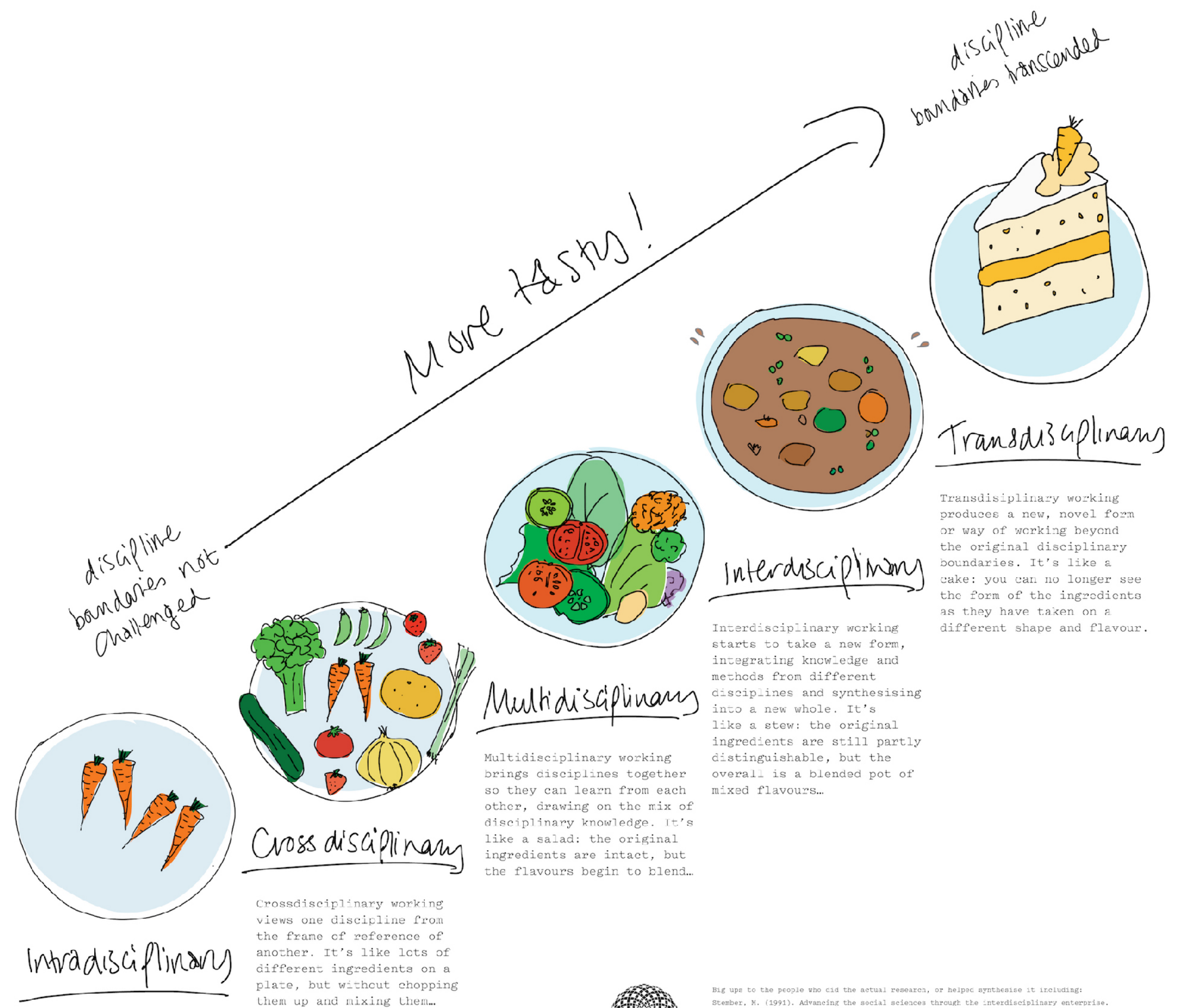
I found your poster … on disciplinary recipes when trying to find some way to really explain transdisciplinary research. I love it! … I think it explains things perfectly. And while I am always striving to bake the cake - it is really a tough thing to achieve, as you are clearly aware.

**A Royal Society Fellow**

# I Can Make It Tasty

Intra-/Cross-/Multi-/Inter-/Trans-
Fusion cooking with disciplines!

# Visuals at:

makinggood. design/ICMIT
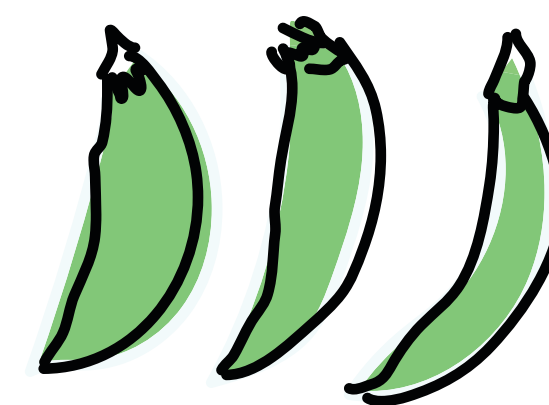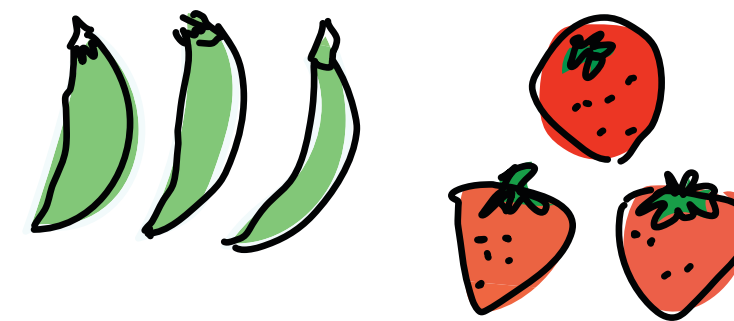
# References

## Resources and Zotero library link available at makinggood.design/icmit

Arnold, M. (2013). Transdisciplinary Research (Transdisciplinarity). In E. G. Carayannis (Ed.), *Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship* (pp. 1819-1828). Springer. doi.org/10.1007/978-1-4614-3858-8_337

Beaumont, N. (Ed.). (2020). *Demystifying interdisciplinary working (in Valuing Nature)* (Valuing Nature Paper No. VNP25V). Valuing Nature Network. valuing-nature.net/demystifying-interdisciplinary-working

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Buanes, A., & Jentoft, S. (2009). Building bridges: Institutional perspectives on interdisciplinarity. Futures, 41(7), 446-454. doi.org/10.1016/j.futures.2009.01.010

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Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.

Jensenius, A. (2012, March 12). Disciplinarities: Intra, cross, multi, inter, trans. *Alexander Refsum Jensenius*. arj.no/2012/03/12/disciplinarities-2/

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Mobjörk, M. (2010). Consulting versus participatory transdisciplinarity: A refined classification of transdisciplinary research. Futures, 42(8), 866-873. doi.org/10.1016/j.futures.2010.03.003

Kannary Nikolov(a), J., et al (n.d.). Towards a taxonomy of the challenges within typologies of collaborations between Art-Design-Engineering-Science-Humanities: A practical guide. Retrieved from researchgate.net/publication/233853232_SEAD_Network_for_Sciences_Engineering_Arts_and_Design

Nicolescu, B. (2008). Transdisciplinarity: Theory and Practice. Hampton Press.

Nowotny, H. (2006). The Potential of Transdisciplinarity. helga-nowotny.eu/texts.php

Rigolot, C. (2020). Transdisciplinarity as a discipline and a way of being: Complementarities and creative tensions. *Humanities and Social Sciences Communications*, 7(1), 1-5. doi.org/10.1057/s41599-020-00598-5
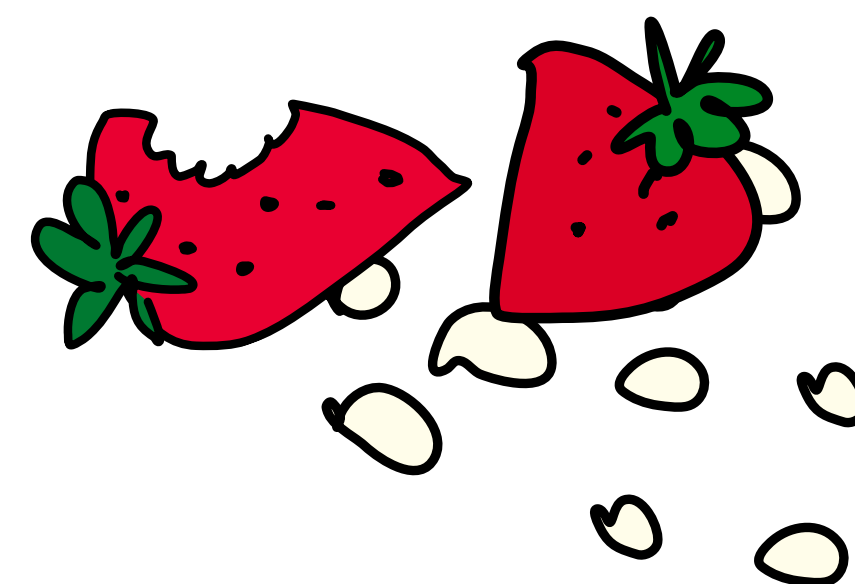
Stember, M. (1991). Advancing the social sciences through the interdisciplinary enterprise. *The Social Science Journal*, 28(1), 1-14. doi.org/10.1016/0362-3319(91)90040-B

Tress, B., Tress, G., Valk, A. J. J. van der, & Fry, G. (2003). *Interdisciplinary and Transdisciplinary Landscape Studies: Potential and Limitations*. WUR, Alterra. research.wur.nl/en/publications/interdisciplinary-and-transdisciplinary-landscape-studies-potenti
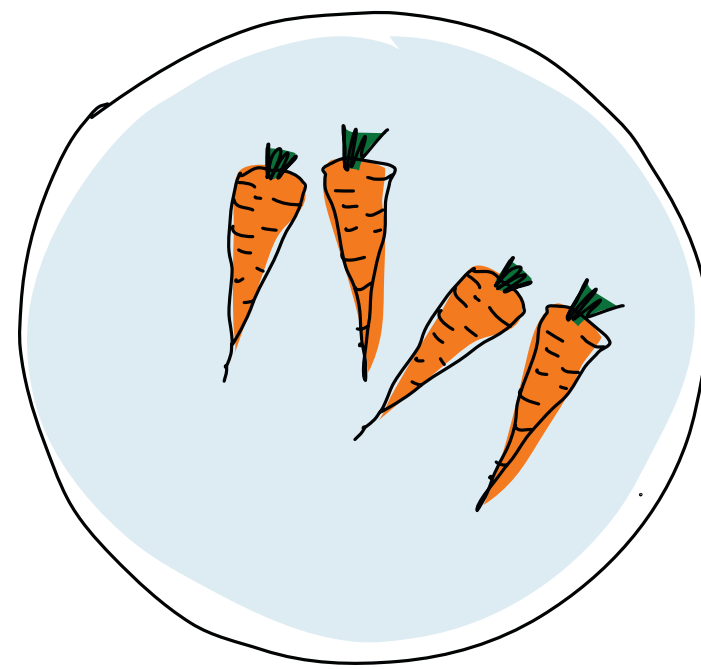
# Ngā mihi *Thank you*

Resources and Zotero
library link available at
makinggood.design/icmit

**Jo Bailey**
j.bailey@massey.ac.nz
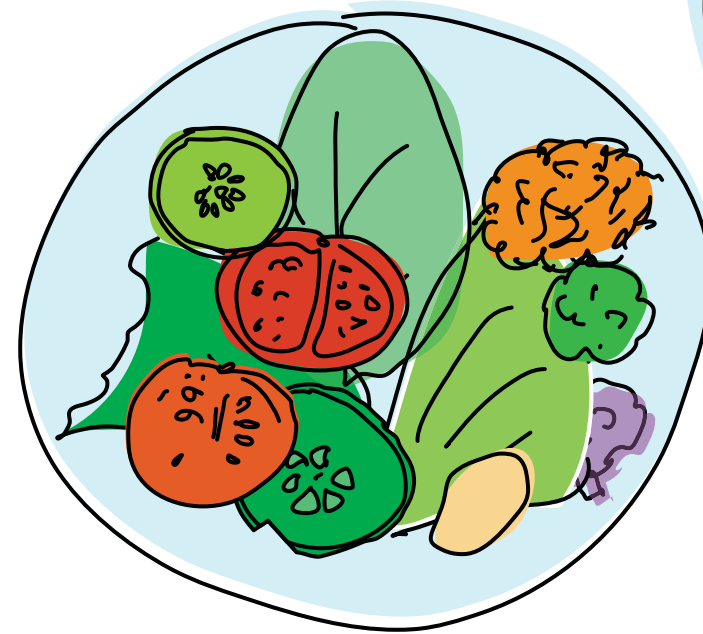makinggood.design
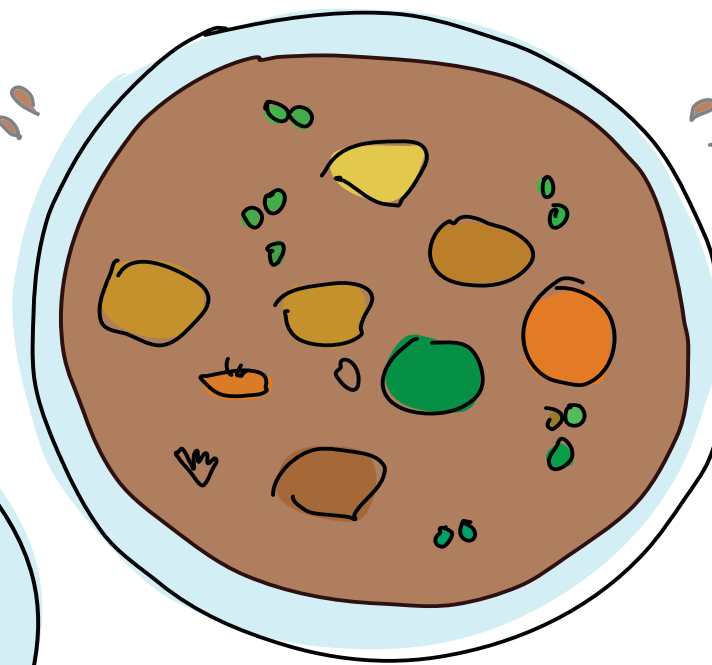
# I Can Make It Tasty

discipline boundaries transcended

More Tasty!

discipline boundaries not challenged

Intradisciplinary

Cross disciplinary

Multidisciplinary

Interdisciplinary

Transdisciplinary