



Nuggets of NASA's Transform to Open Science (TOPS) Initiative



1. The Big Picture

2. Practice of Open Science

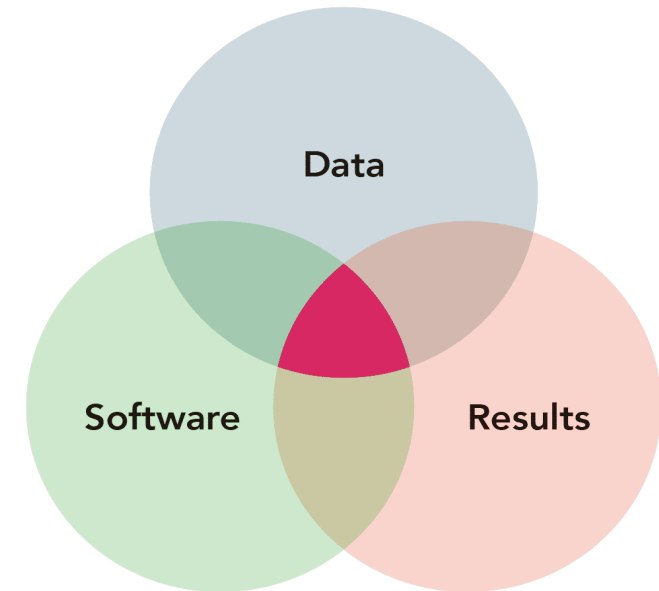
3. Benefits and Concerns

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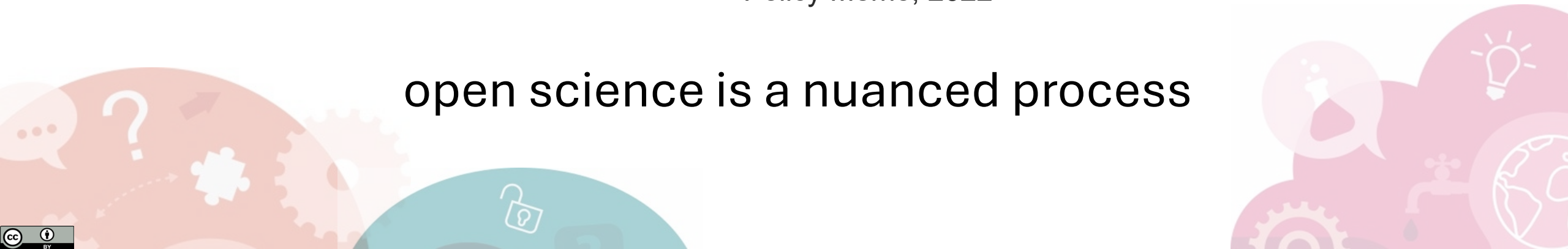
Open Science

is the principle and practice of making research products and processes available to all, while respecting diverse cultures, maintaining security and privacy, and fostering collaborations, reproducibility and equity.

- The White House Office of Science and Technology
Policy Memo, 2022



open science is a nuanced process



The White House announced 2023 A Year of Open Science

CDC ♦ DOA ♦ DOC ♦ DOE ♦ DOS ♦ DOT ♦ NASA ♦ NEH ♦ NIH ♦ NIST ♦ NOAA ♦ NSF ♦ SI ♦ USDA ♦ USGS



A multi-agency initiative across the US Federal Government to spark change and inspire open science adoption.

Joined by more than 85 universities and other organizations





The Big Picture: NASA's Open-Source Science Initiative

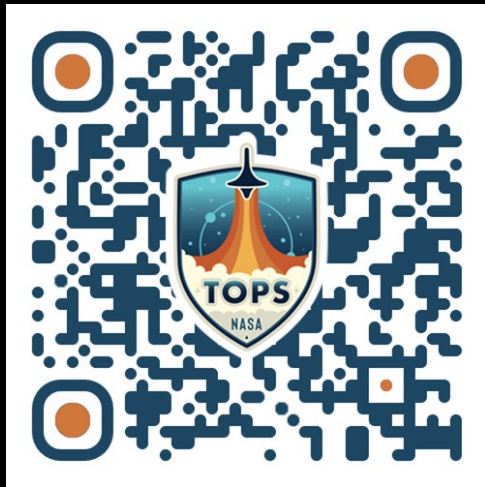


NASA's Transform to Open Science (TOPS)

A 5-year mission to accelerate adoption of open science

Goals:

- **Increase understanding** and adoption of open science principles and techniques
- **Broaden participation** by historically excluded communities
- **Accelerate scientific discovery**



Open Science 101

A community-developed introduction to **core open science skills**

<https://nasa.github.io/Transform-to-Open-Science/>

The FAIR Principle

F A I R



Findable

identifier (DOI)
metadata
keywords



Accessible

retrievable by DOI
open protocol
public access



Interoperable

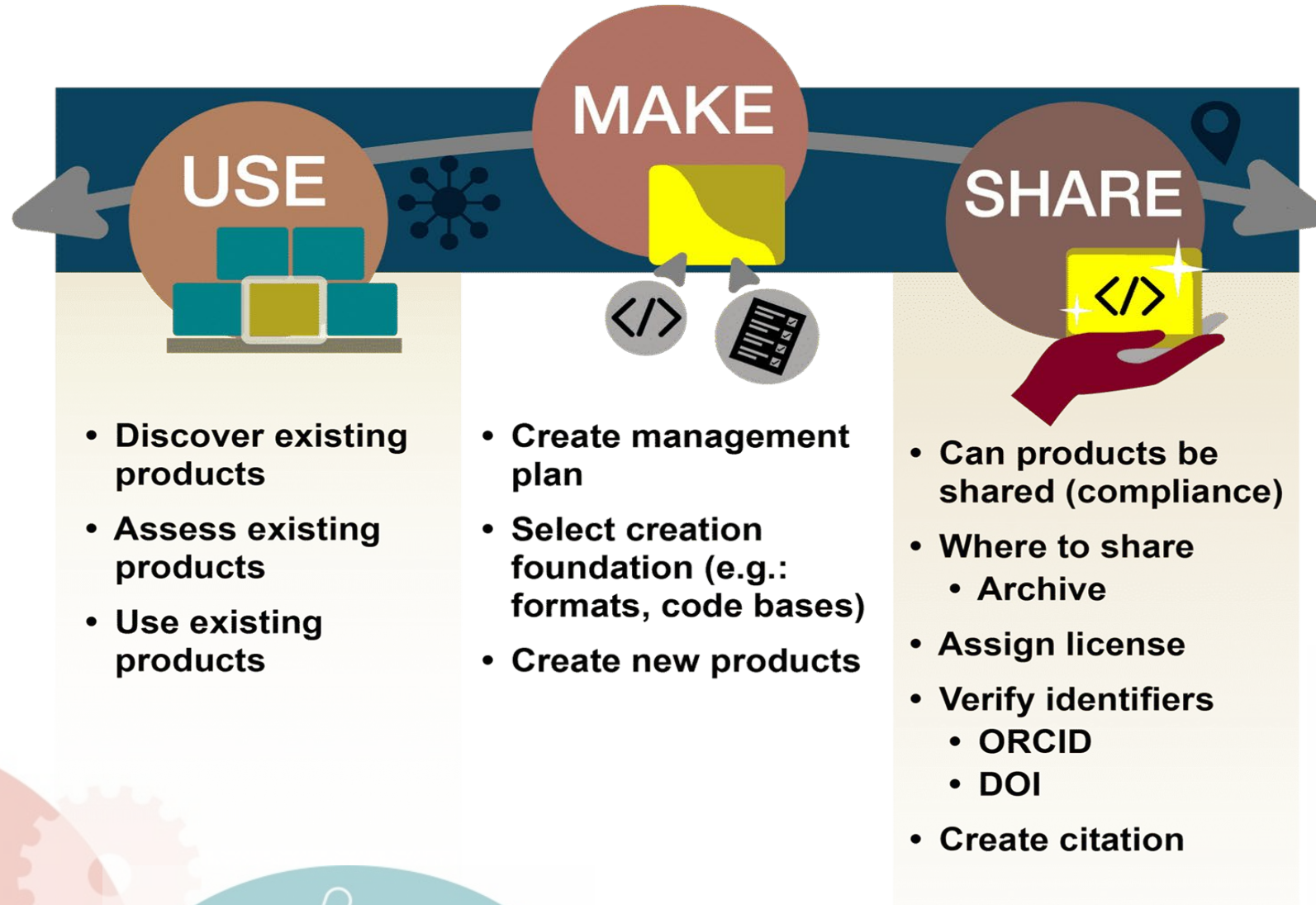
data format
metadata
FAIR



Reusable

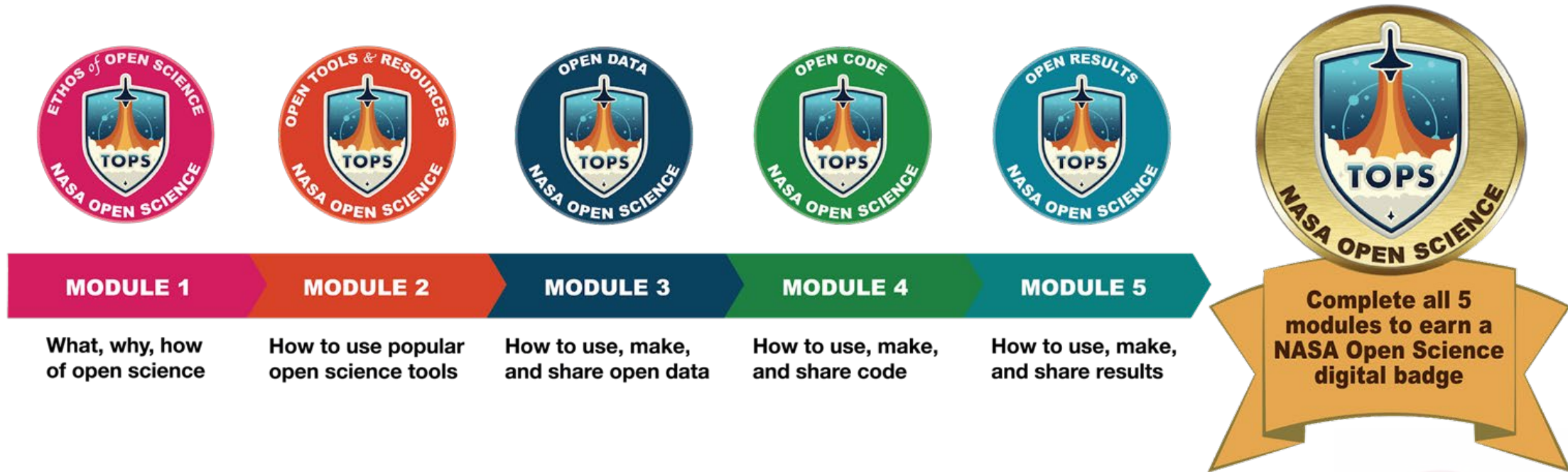
attributes
license
community standard

Use, Make, Share Framework



Open Science 101:

Five Modules Organized as a Scientific Workflow



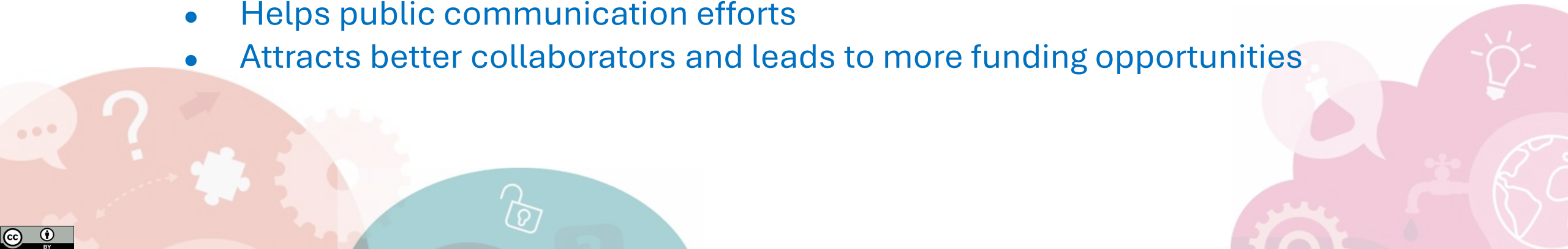


Benefits to Science & Society

- Leads to more discoveries
- Scholarly communications
- Can accelerate the pace of science
- Efficient science
- Attracts a diverse set of participants

Benefits to us

- Never lose access (e.g., journal subscription when moving institutions)
- Well documented research products demonstrate quality of work
- Helps public communication efforts
- Attracts better collaborators and leads to more funding opportunities



Concerns Around Adopting Open Science Practices

MISTAKES

SCOOPING

CREDIT

MAINTENANCE

- It can be intimidating to share your research materials publicly, because someone might find a mistake, but it will allow us to quickly find and fix mistakes.
- Peer review is a core pillar of the scientific method, and is a mechanism for others to help improve the quality of the research.





Concerns Around Adopting Open Science Practices

MISTAKES

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- Yes, this can happen (but to be honest, it rarely does).
- **Depositing your work early and making it citable** are ways to establish your work and **can prevent scooping**.
- This serves as evidence for when you started working on it and makes it easier for others to cite you.





Concerns Around Adopting Open Science Practices

MISTAKES

SCOOPING

CREDIT

MAINTENANCE

- Science ethics dictates that you should be cited if your work is used.
- Part of open science is valuing all steps of the scientific workflow, and encouraging researchers to cite code, data, or other non-published articles.
- **Make it easy for others to cite you** by adding a digital object identifier (DOI) to your research product.



Concerns Around Adopting Open Science Practices

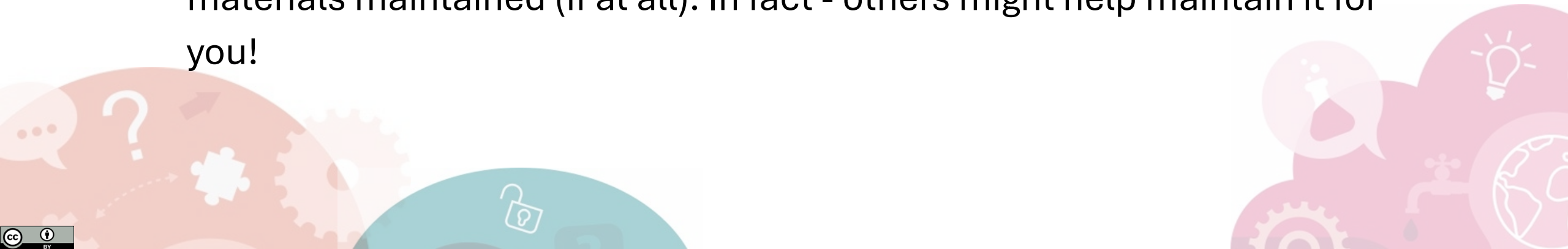
MISTAKES

SCOOPING

CREDIT

MAINTENANCE

- Sharing your work **doesn't mean you have to maintain it** for the rest of your life, or even at all.
- By **adding appropriate licensing, documentation, and contributing guidelines**, you can make it clear how long you plan to keep your materials maintained (if at all). In fact - others might help maintain it for you!





<https://openscience101.org>

Questions?

