



Explanatory Metaphor

# Ecosystem

A metaphor for the integral role of informal learning experiences in STEM education



## The story you're telling:

Just as an ecosystem relies on all plants and animals within it, STEM learning relies on in-school and out-of-school playing their roles.



Strategically redirects thinking away from patterns such as:

- Cultural Differences
- Drive
- Learning Hierarchy
- Recharging Attention
- Zero-Sum Game



## Concepts and ideas included in this frame element:

- **Just as an ecosystem relies on all of the plants and animals within it, STEM learning relies on in-school and out-of-school playing their roles. Children’s STEM learning happens within a complex ecosystem of in-school and out-of-school experiences:** This metaphor defines formal and informal learning as distinctive but complementary, without placing them in competition.
- **Afterschool programs, science centers, museums, and zoos and aquariums are some of the elements of the STEM learning ecosystem:** To make the ecosystem analogy come alive, it’s important to explicitly offer concrete examples of informal learning settings. Our list isn’t sacred or exhaustive—feel free to choose others—but be sure to include several examples.
- **Every species in an ecosystem is essential—both the mix and the balance are necessary for the system to thrive. In the same way, learners need access to formal and informal opportunities to learn STEM:** By focusing on interdependence and balance, informal learning can be positioned as essential, not merely a “nice extra.”
- **Ecosystems operate according to natural rhythms; things work together. Our STEM learning ecosystem works best when in-school and out-of-school experiences are in sync, too:** Helps to make the case for coordination without suggesting that afterschool or free choice environments should be “just like school.”
- **When natural resources are missing or depleted from a local ecosystem, the negative effects are obvious. Right now, some communities don’t have thriving STEM learning ecosystems, and we can also see the effects:** Extending the spatial element of the analogy helps to make the case for equity in a productive way. It focuses attention on problems with resource distribution, rather than allowing people to assume that disparities are natural or a function of “cultural differences.”



## User Notes:

- Out-of-school learning is an essential part of the ecosystem of education for science, technology, engineering, and math—what is called “STEM.” Just as an ecosystem depends on all the plants and animals that make up the system playing their role, STEM education depends on in-school and out-of-school learning playing their roles and being connected. Out-of-school environments like afterschool clubs and summer camps are pollination points within the learning ecosystem—essential locations that children need to grow STEM knowledge and skills. Quality out-of-school STEM programs are part of a thriving learning ecosystem for all young people.