Scientific Philosophy

How Storybranch Understands, Uses and Communicates Scientific Knowledge

Version 1.0 (Draft)

Evidence first. Communicate with integrity. Create with purpose. Continue learning.

Introduction

Science is one of humanity's most rigorous ways of investigating the natural world. Through systematic observation, measurement, experimentation, modelling, critical evaluation and revision, it has transformed our understanding of life, Earth and the universe.

At Storybranch, verified scientific knowledge is the evidentiary foundation for educational experiences, stories, illustrations, workshops, digital resources, research activities and collaborations. This does not mean that science provides absolute certainty. Scientific knowledge is reliable precisely because claims remain open to scrutiny and revision when methods improve or new evidence emerges (National Research Council, 2012; Lederman, 2007).

This commitment is inseparable from Storybranch's origin. The organization began with the belief that sustainable futures should be cultivated early. Children deserve access not only to scientific conclusions, but also to the habits of mind that help them ask questions, evaluate evidence and understand their place within living systems. These capacities remain relevant throughout life and across professional and organizational decision-making.

Storybranch's scientific philosophy therefore guides both what we communicate and how we communicate it. Every project begins with evidence. Only then do we ask how that evidence can become understandable, memorable and meaningful through creativity, storytelling and design.

In this document, science refers primarily to the natural sciences while recognising that environmental challenges also require contributions from engineering, the social sciences, education, psychology, economics and the humanities. Scientific questions may also intersect with Indigenous and local knowledge systems. These forms of knowledge should be approached respectfully and distinctly, with clarity about their origins, methods, authority and appropriate use.

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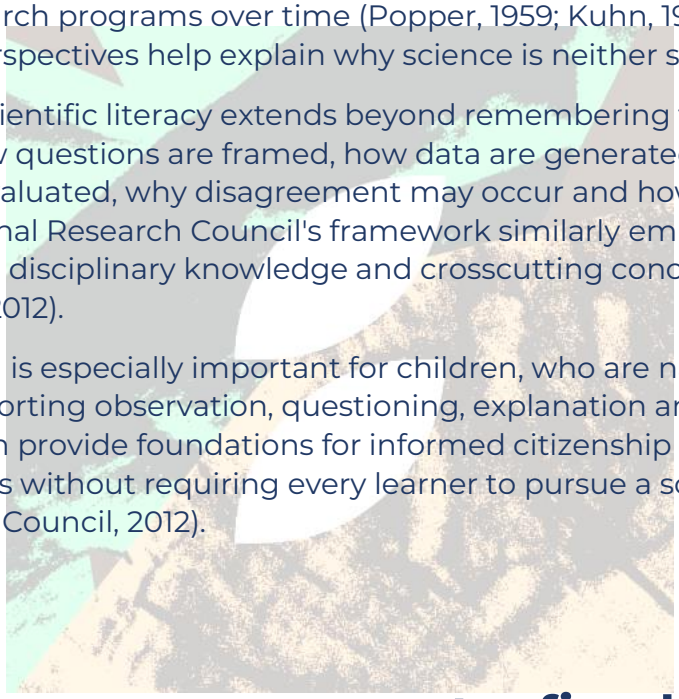
1. Why science matters

Scientific knowledge supports medicine, agriculture, conservation, engineering, public health and environmental policy. It enables claims to be tested against empirical evidence, methods to be scrutinized and conclusions to be revised through collective criticism.

Science is not infallible, and no single philosophical model fully describes how it progresses. Popper emphasized testability and openness to refutation; Kuhn drew attention to periods of conceptual change; and Lakatos described the development of competing research programs over time (Popper, 1959; Kuhn, 1962; Lakatos, 1978). Together, these perspectives help explain why science is neither static nor dogmatic.

For Storybranch, scientific literacy extends beyond remembering facts. It includes understanding how questions are framed, how data are generated, how explanations are evaluated, why disagreement may occur and how uncertainty is handled. The National Research Council's framework similarly emphasizes scientific practices alongside disciplinary knowledge and crosscutting concepts (National Research Council, 2012).

This understanding is especially important for children, who are naturally active investigators. Supporting observation, questioning, explanation and evidence evaluation early can provide foundations for informed citizenship and future professional choices without requiring every learner to pursue a scientific career (National Research Council, 2012).



2. Science as a process, not a fixed collection of facts

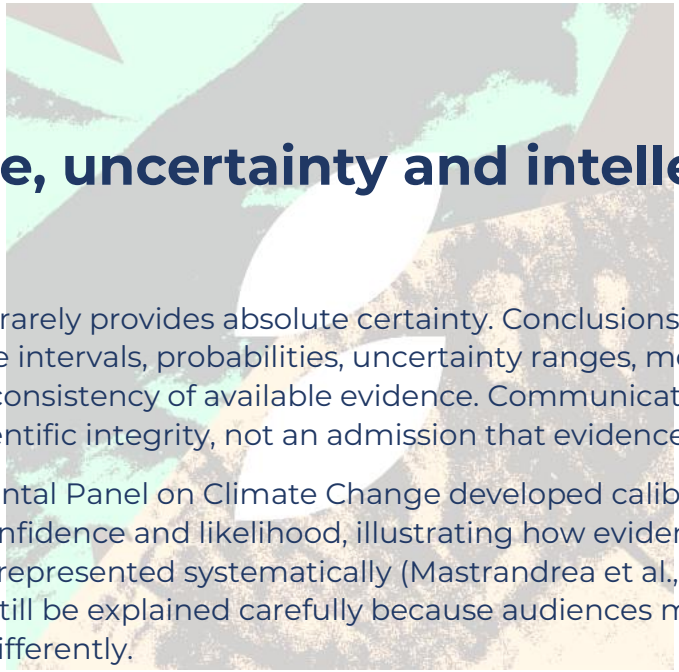
Scientific knowledge is both dependable and provisional. Its reliability comes from disciplined methods, transparent reasoning, critical review, replication where appropriate and willingness to revise conclusions.

Contemporary scholarship on the nature of science stresses that scientific knowledge is empirically based, theory-laden, socially embedded and open to change. Scientific literacy therefore requires familiarity with practices, evidence, uncertainty and the social processes through which knowledge is developed, rather than memorization alone (Lederman, 2007).

At Storybranch, we seek to communicate not only what is currently known, but also how that knowledge was produced. Where appropriate, we explain methods, sources, limitations, competing interpretations and the difference between an observation and an inference.

Scientific claims used by Storybranch should, wherever practicable, meet the following standards:

- claims are supported by relevant evidence and appropriately qualified;
- sources and methods are transparent enough to be examined;
- authoritative reviews and scientific consensus are preferred for established topics;
- primary research is consulted when specialized or emerging claims are presented;
- uncertainty, limitations and legitimate scientific disagreement are acknowledged;
- materials are reviewed and updated when evidence changes.



3. Evidence, uncertainty and intellectual honesty

Scientific evidence rarely provides absolute certainty. Conclusions may be expressed through confidence intervals, probabilities, uncertainty ranges, model assumptions or the weight and consistency of available evidence. Communicating these limits is a requirement of scientific integrity, not an admission that evidence has no value.

The Intergovernmental Panel on Climate Change developed calibrated language for communicating confidence and likelihood, illustrating how evidence and agreement can be represented systematically (Mastrandrea et al., 2010). Such frameworks must still be explained carefully because audiences may interpret verbal probability terms differently.

Storybranch distinguishes scientific uncertainty from unsupported doubt. The first reflects limits in data, models or current understanding. The second may arise when opinion, speculation or misinformation is presented as equivalent to evidence.

Transparent communication of uncertainty can support credibility when it is relevant, clearly explained and connected to the decision context (Fischhoff, 2013; National Academies of Sciences, Engineering, and Medicine, 2017). We therefore aim to communicate strong evidence with confidence and incomplete evidence with appropriate restraint.

Whenever relevant, Storybranch distinguishes among:

- observations and interpretations;
- correlation and causation;

- evidence and opinion;
- scientific consensus and emerging hypotheses;
- established knowledge and unresolved questions;
- the absence of evidence and evidence of absence.

4. Evidence and different knowledge systems

Scientific evidence is the basis for Storybranch's scientific claims. However, environmental understanding may also involve professional knowledge, lived experience and Indigenous and local knowledge systems developed through long relationships with particular places.

These knowledge systems should not be merged uncritically or ranked through simplistic comparisons. Each has distinct methods, contexts, authorities and limitations. Scientific validation may be appropriate for some empirical claims, but it should not be used to appropriate, decontextualize or erase the cultural and ethical dimensions of community-held knowledge.

Where Storybranch collaborates with Indigenous Peoples or local communities, participation should be voluntary, reciprocal and shaped by community priorities. Proper attribution, protection of sensitive knowledge, respect for intellectual and cultural rights and free, prior and informed consent are essential. Some knowledge should remain confidential or restricted, and community representatives must have a meaningful role in deciding how it is interpreted and communicated (UNESCO, 2015; UNESCO, n.d.).

Storybranch will therefore identify the origin of knowledge clearly, avoid presenting Indigenous or ancestral knowledge as decoration, and distinguish community knowledge from scientific findings unless a transparent and appropriate research process has examined the relationship between them.

5. Science communication: from evidence to understanding

Scientific knowledge contributes to society only when people can access, interpret and evaluate it. Science communication is therefore more than transferring

information from experts to passive audiences. It may involve explanation, dialogue, listening, public engagement and adaptation to different goals and contexts (National Academies of Sciences, Engineering, and Medicine, 2017).

People encounter scientific information with prior knowledge, values, identities and experiences. Effective communication must therefore remain accurate while also considering relevance, trust, accessibility and opportunities for dialogue. Communication choices should be evaluated against their purpose rather than assumed to work equally for every audience (National Academies of Sciences, Engineering, and Medicine, 2017; Scheufele, 2014).

At Storybranch, storytelling, illustration, theatre, design and immersive technologies are communication tools, not alternatives to evidence. Their purpose is to reveal relationships, make invisible processes perceptible and create entry points into complex ideas without concealing uncertainty or distorting scientific meaning.

The objective is not to remove complexity until only a simple message remains. It is to structure complexity so that people can engage with it honestly and progressively.

6. From evidence to meaningful experience

People build understanding by connecting new information with prior knowledge, observation and experience. A scientifically accurate explanation may become more memorable when learners can investigate a phenomenon, view a microscopic structure, explore a model or discuss how evidence relates to their own surroundings.

This does not justify replacing evidence with emotion or entertainment. The scientific content must remain traceable to reliable sources, and creative interpretation must be clearly separated from factual claims.

Storybranch designs experiences for children and adults because environmental understanding develops across generations and contexts. A children's story, an augmented-reality activity, a professional workshop and a scientific illustration may use different forms, but all remain accountable to the same evidence.

Creativity serves science when it improves attention, comprehension, inquiry and memory. It fails that purpose when it exaggerates findings, implies false certainty or prioritizes emotional impact over accuracy.

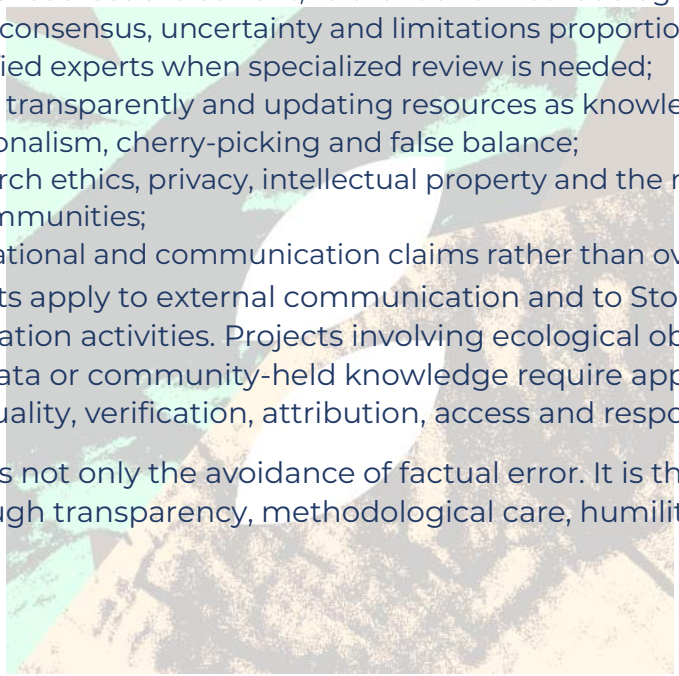
7. Scientific integrity in practice

Storybranch commits to:

- grounding factual content in peer-reviewed research, authoritative assessments and appropriate primary sources;
- using consistent in-text citations and maintaining complete reference lists for substantive documents;
- distinguishing clearly between evidence, interpretation, creative representation and opinion;
- checking whether sources are current, relevant and methodologically appropriate;
- communicating consensus, uncertainty and limitations proportionately;
- consulting qualified experts when specialized review is needed;
- correcting errors transparently and updating resources as knowledge develops;
- avoiding sensationalism, cherry-picking and false balance;
- respecting research ethics, privacy, intellectual property and the rights of participating communities;
- evaluating educational and communication claims rather than overstating impact.

These commitments apply to external communication and to Storybranch's own research and innovation activities. Projects involving ecological observations, citizen science, personal data or community-held knowledge require appropriate protocols for consent, data quality, verification, attribution, access and responsible use.

Scientific integrity is not only the avoidance of factual error. It is the practice of building trust through transparency, methodological care, humility and accountability.



8. Looking forward

Science will continue to change as new evidence, methods and questions emerge. Storybranch's responsibility is therefore not to defend fixed conclusions, but to remain faithful to the scientific process and revise its materials when warranted.

Our purpose is to make verified knowledge more accessible and meaningful without weakening its integrity. We begin early because children deserve the tools to understand evidence and living systems; we continue across adulthood and organizations because sustainable decisions are made throughout society.

Storybranch's commitment is simple: begin with evidence, communicate with integrity, create with purpose and continue learning.

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