



WONDERLAB LEARNING RESOURCES

A GUIDE FOR EDUCATORS

Photo: National Geographic Impact Story Lab

Guiding Question

How might we as educators guide learners “to slow down, observe, find the mystery of things that hide in plain sight and take the time to explore the wonder of our world” as they develop skills and attitudes of an Explorer, such as curiosity, empathy, empowerment, problem-solving and storytelling?

Introduction

The [WonderLab Learning Resources](#) is a collection of resources for educators to bring wonder back into their teaching, inspired by the work of [National Geographic Explorer Anand Varma](#). These resources were designed using two foundational frameworks: the Explorer Mindset Learning Framework and the Wonder Learning Strategies.

The resources allow educators to inspire their learners “to slow down, observe, find the mystery of things that hide in plain sight and take the time to explore the wonder of our world” as they develop skills and attitudes of a National Geographic Explorer. The collection consists of flexible, non-standard aligned short activities, learning tools, professional learning resources and videos.

This guide consists of the following sections:

- I. **Explorer Mindset and Explorer Mindset Learning Framework**
- II. **Wonder Learning Strategies Framework**
- III. **Scientific Practices to Inspire Wonder**
- IV. **Professional Learning Resources**
- V. **Activities**
- VI. **Learning Tools**
- VII. **“I Wonder” Educational Video Series**

**I. Explorer Mindset and Explorer Mindset Learning Framework**

The Explorer Mindset is a series of attributes, shared values and commitments that define what it means to be a National Geographic Explorer. Explorers embody the attitudes, skills and knowledge of what National Geographic recognizes as the Explorer Mindset:

- Curiosity
- Empathy
- Empowerment
- Communication
- Problem-solving
- Collaboration
- Geographic knowledge and practices
- Geographic perspectives.

These attributes are codified in the Explorer Mindset Learning Framework. To learn more about how the Explorer Mindset manifests in Explorers' work, check the videos and resources [on this page](#).

COMMUNICATE

Explorers are storytellers who communicate about their work through a variety of methods (scientific, academic, and narrative) and media. Explorers communicate to inspire others to protect and sustain the wonder of our world.

PROBLEM-SOLVE

Explorers seek solutions to problems to protect and sustain the wonder of our world. Explorers are capable decision-makers, able to identify alternatives and weigh trade-offs to make well-reasoned decisions based on factual knowledge. Explorers pursue bold ideas and persist in the face of challenges.

USE GEOGRAPHIC PERSPECTIVES

Explorers use geographic perspectives (including geological, ecological, historical, economical, political, cultural and spatial perspectives) at different scales (local, regional, and global) as they observe, analyze, visualize, and model spatial patterns, processes, and change over time of the human and natural systems.

APPLY GEOGRAPHIC PRACTICES

Explorers apply geographic practices such as mapping, inquiry, and citizen science to explore geographic questions, investigate, examine, assess problems. Explorers think critically as they create new insights and understanding.

COLLABORATE

Explorers engage with the communities in which they work. They create and foster a global community, supporting DEI across fields, countries, and cultures. They include diverse stakeholders, work productively and inclusively to achieve goals toward a sustainable future.

CURIOUS

Explorers are curious and engage with the world around them. Explorers observe, document, and ask questions about where things are and why they are there.

EMPATHETIC

Explorers care about other people, cultural resources, and the environment. They are respectful and committed to making the world a better place. They value and understand their own and others' points of view, acknowledging differences.

EMPOWERED

Explorers recognize their ability to protect people, cultural resources, and the environment. Explorers are leaders who utilize their knowledge, confidence, means, and ability to take action and make a difference.

ATTITUDES**SKILLS****KNOWLEDGE****SEEK INTERCONNECTIONS**

Explorers strive to recognize and understand the intricate and interconnected systems of the changing planet we live on. They examine how humans coexist and interact with the environment and the ways places and people impact each other.

LEARN ABOUT HUMAN AND NATURAL SYSTEMS

Explorers become informed as they study the physical properties of the planet, the human and natural systems spread across it, and the diverse creatures we share our world with.



II. Wonder Learning Strategies Framework

The Wonder Learning Strategies are very simple instructional strategies that educators can use to bring back awe and wonder into their instructional practice to increase learner engagement.

These strategies are:

- stimulating the imagination
- making space for learners to explore and experiment
- encouraging contemplation
- creating enriched learning environments
- defamiliarizing the familiar, and
- stimulating meaning making.

The professional learning resources, activities, learning tools and videos explore one or more of these strategies and provide guidance on how to incorporate them when educators are planning and designing instruction. These strategies can be easily used in different grade levels and/or national or local standards.

The strategies were identified, introduced and tested by researchers at the School of Education at the University of Amsterdam. For more information about this study consult: [Conijn, J., Rietdijk, W., Broekhof, E., Andre, L., & Schinkel, A. \(2022\). A theoretical framework and questionnaire for wonder-full education. Journal of Curriculum Studies, 54\(3\), 423-444.](#)



Adapted from: Conijn, J., Rietdijk, W., Broekhof, E., Andre, L., & Schinkel, A. (2021). A theoretical framework and questionnaire for wonder-full education. Journal of Curriculum Studies, 54(3), 423-444.



III. Scientific Practices to Inspire Wonder

When students are encouraged to actively engage in the process of science, it can foster critical thinking and problem-solving skills. By participating in practices like asking questions, developing models, and conducting investigations, students learn how science works in real-world contexts. The [eight scientific and engineering practices](#) work together to help students build a deeper understanding of scientific concepts through hands-on, inquiry-based learning that lead to authentic questions, inspiring them to wonder about the world they live in. The following resource will help learners develop their wondering questions related to each one of the practices as they engage in the process of science.

Scientific Practice	Examples of Related Wondering Questions
Asking Questions	<i>What do I notice? What happens when...? I wonder what would happen if...? What is one thing I can change?</i>
Analyzing and Interpreting Data	<i>What data should I collect? How should I look at the data? What data display makes sense for my results?</i>
Obtaining, Evaluating, and Communicating Information	<i>Who do I want to share my work with? How should I share it?</i>
Planning and Carrying Out Investigations	<i>What do we want to explore? How could we investigate? What materials do we need? What are we going to measure?</i>
Constructing Explanations	<i>What do I think is happening? Why do I think so based on evidence? What scientific reasoning supports this?</i>
Engaging in Argument from Evidence	
Developing and Using Models	<i>How can I represent what I think is going on?</i>
Mathematics and Computational Thinking	<i>How can math or computational thinking help me answer my questions?</i>

Adapted from: Science and Engineering Practices. <https://my.nsta.org/ngss/PracticesFull.aspx>



IV. Professional Learning Resources

Professional learning resources guide educators through a planning process to incorporate the Wonder Learning Strategies and the Explorer Mindset into their instructional practice before using the activities and tools with learners. **Educators determine when and how to incorporate the activities or learning tools into their lessons by aligning them to the standards they teach.**

The professional learning resources:

- Provide educators with the foundational knowledge and philosophy behind the design of the WonderLab Learning Resources and a methodology to plan, design and implement their own lessons.
- Should be reviewed before implementing any of the activities or using any of the learning tools from the WonderLab Learning Resources.
- Include videos in which Explorer Anand Varma exemplifies the attitudes, skills and knowledge that make up the Explorer Mindset. Varma also models how wonder and curiosity, empathy, problem solving and storytelling, as well as the wonder learning strategies, are key for research, exploration, storytelling and photography.



[How to Set Up a WonderLab: A Professional Learning Resource](#)

This resource introduces considerations for designing a WonderLab to inspire a sense of wonder and awe in science. It encourages deeper focus on slow observation to develop the attitudes, skills and knowledge that make up the Explorer Mindset using Wonder Learning Strategies such as: create an enriched environment and encourage contemplation.



[Explore and Experiment: A Professional Learning Resource](#)

This professional learning resource encourages you to embrace the power of exploring and experimenting within learning spaces to cultivate wonder and develop the attitudes, skills and knowledge that make up the Explorer Mindset. It introduces the Wonder Learning Strategy: Create an Enriched Environment and thus a space for wonder.



[Defamiliarizing the Familiar: A Professional Learning Resource](#)

This professional learning resource introduces the Wonder Learning Strategy: Defamiliarizing the Familiar to inspire wonder around familiar things. Learn how to observe familiar things in new ways by using tools to notice differently, making space to observe and allowing surprise to inspire questions.



[Stimulating the Imagination](#)

This professional learning resource introduces educators to the Wonder Learning Strategy: Stimulating the Imagination. This simple strategy helps educators inspire wonder and curiosity in their learners around phenomena they select and that is of interest to their learners.

Photos (top to bottom): Dustin Humes/Unsplash; Anand Varma; Freddie Whitman, National Geographic Impact Story Lab; David M. Barreda/National Geographic



V. Activities

Note that activities are not lesson plans. Instead, these are flexible, non-standards aligned, open ended activity ideas that can be adapted and modified as educators develop their own lesson plans. Can be used in formal and informal settings or as enrichment activities. The activities are discussed in the professional learning resources.



Seeing a Tree from Multiple Viewpoints

This is an activity to encourage learners to see and contemplate the role of a single tree from many different viewpoints. It helps learners develop empathy as they consider all the connections to a single tree, and how these different viewpoints influence what they notice.



Making the Familiar Unfamiliar

We get used to seeing some things so often that we stop paying attention to them. Photography allows us to capture everyday moments that we can later examine in more detail through reframing the images, zooming in, or using different filters. This activity gets learners excited about noticing familiar things in new ways to reinspire awe and wonder.



Meaning-Making Through Slow Motion Video

Slow-motion video allows us to see things in the world that are almost invisible to us because they move too fast. This activity allows learners to discover how slow-motion video helps us to see beauty and make sense of science in the world in new ways.



Take a Wonder Walk

Explorers build knowledge by seeking and researching the connections between humans and their environment. This activity makes space for learners to explore the world around them by giving them time to walk, encouragement to talk, and inspiration to wonder.



An Artist's Notebook

An important skill of an Explorer is to document what they notice about the world so they can communicate this information to others. This activity encourages learners to represent their observations through their own drawings.

Photos (top to bottom): Pablo Alvarenga/National Geographic; Anand Varma; Anand Varma; Pablo Alvarenga/National Geographic; Madeleine Foote/National Geographic Okavango Wilderness Project



VI. Learning Tools

Flexible and adaptable graphic organizers that can be incorporated into lesson plans to spark curiosity and wonder, when introducing new topics or to spark learner engagement. The tools provide ideas of how to incorporate them into instruction. The learning tools are discussed in the professional learning resources.



What I See ... and What I Don't See

This is a general tool that invites learners to make their thinking visible by constructing a representation, or model, of a phenomenon. The pictures they draw and the explanations they include will make their prior knowledge explicit. When they revisit their models, learners can see how their thinking has changed.



How I Wonder ... Through Different Viewpoints

This tool encourages learners to slow down and see one thing using multiple points of view. They become aware of details that they might not have seen at first glance, pay attention to the object and the interactions between that object and its surroundings.



Defamiliarizing the Familiar: Which One is Unique

This tool encourages learners to contrast things that have some similarities and some differences. By drawing comparisons between four items, the goal is that learners will attend to details in new ways and justify how and why they see something different, or unique, in one of the familiar items.



Multimodal Storytelling

This tool encourages learners to share a story using different modes of communication. Engaging in multimodal storytelling can help Explorers (and/or learners) stimulate the imagination and be more expansive and creative in the ways they communicate their discoveries and work to different audiences.



I Wonder...Should We?...I Investigate

Explorers are curious and wonder about the world. They do not stop at their wonders. They allow their wonders to be shaped into questions that they want to investigate or questions that might not have a clear answer, but are worthy of exploring from multiple viewpoints. This tool helps learners extend their wonderings into complex decisions or investigations.

Photos (top to bottom): Anand Varma; Freddie Whitman/National Geographic Impact Story Lab; Anand Varma; Ian S. Foulk/National Geographic; Anand Varma



VII. "I Wonder" Educational Video Series

["I Wonder"](#) is an educational video series that follows Anand Varma, a National Geographic Explorer, photographer and founder of WonderLab, on his journey "to slow down, observe, find the mystery of things that hide in plain sight and take the time to explore the wonder of our world".



Create Space for Wonder (video)

Welcome to WonderLab, a space founded by National Geographic Photographer and Explorer Anand Varma, where young scientists, learners, and storytellers can collaborate while exploring their curiosity and embracing the wonder of the natural world. Anand introduces us to the concepts of wonder and curiosity when he receives his first batch of bobtail squid and flamboyant cuttlefish eggs for his latest photography project.



Explore and Experiment (video)

Anand races against the clock to create an aquarium in which the bobtail squid and flamboyant cuttlefish eggs can incubate, using everyday materials and tools. He also takes his first photos of the cephalopod embryos, and shows us that you don't need to do everything perfectly when starting a new project; what matters most is taking the time to explore and experiment to discover what works best.



Defamiliarize the Familiar (video)

Before diving into the actual photography aspect of his cuttlefish project, Anand and his team must first observe and document the cuttlefish's behavior. Using infrared technology and macro lenses, Anand takes a detailed look at the hunting and mating patterns of a creature that has become familiar to him in his lab. This process of defamiliarizing the familiar opens his eyes to just how complex and strange these animals are, and informs the story he will eventually tell.



Stimulate the Imagination (video)

Meet Jacob Saffarian (WonderLab assistant) and Gena Steffens (National Geographic Explorer), two talented photographers working on their own projects at the WonderLab under the mentorship of Explorer Anand Varma. Jacob experiments with new techniques to take a closer look at how life develops in a jumping spider egg. Gena uses science and technology to show plants in a whole new light. The resulting images stimulate the imaginations of the people who view them, as well as the photographers themselves.

Credits

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