Development Process for the NISE Network Space and Earth Informal STEM Education (SEISE) project
February 23, 2022
Space and Earth Informal STEM Education Project

Toolkits
Explore Science: Earth & Space toolkits

Exhibitions
Sun, Earth, Universe exhibitions

Professional Development
NISE Network educational materials are created through an iterative, collaborative process that involves scientists, informal education professionals, and targeted public audiences.
A process completely embedded in all our development.
Scientist Review Basics

- Involve subject matter experts (SMEs) early and often
- SMEs provide input at conceptual phases and review content at defined stages of development
- SMEs help identify ideas, concepts, and connections to the science and communicate excitement
Scientist Review

*Quick tip:* When SMEs can build on each other's comments, in person or online, the review process is focused and productive.

How are SMEs involved?

- Contributions to a learning framework guiding all development
- Suggestions for activities to adapt, assistance brainstorming concepts and assets to feature
- Scientific review of draft materials—especially images and multimedia selection—for accuracy
- Connections to NASA science for content and possible extensions
How are SMEs involved?

*Valuable suggestions for the science tools and testing substrates in Using Tools to Detect the Invisible

*Adding black drawing paper and wax pencils to better demonstrate the use of filters in Exploring the Universe: Filtered Light
Peer (Educator) Review Basics

- Many voices should provide input including staff who facilitate programming and exhibits
- Prototypes are the basis of peer review; don’t just review documentation, present prototypes virtual or live
- Develop processes to quickly capture and summarize feedback
- Ask peers outside of the development process to test prototypes
How does peer review work?

- Developers shepherd an activity or component through the entire process.
- Rough prototypes are demonstrated to the entire team for feedback organized by the learning framework—**not all prototypes survive review**.
- Comments, and formative evaluation results, are used to revise product and finalize a draft of all required guides.
- Materials are reviewed and tested by educators outside of the development process.

*Quick tip:* Develop methods to capture peer comments for later reference.
How does peer review work?

Some important topics covered during peer review:

- Safety and suggested risk mitigation
- Inclusive audiences design*
- Format, relevance, and appropriateness
- Ease of sharing, reproducibility & adaptation
- Universal design & accessibility
- Professional development facilitation & training

Full list: nisenet.org/development_process-more
Visitor Evaluation

How does evaluation help?

Formative evaluation

- Formative evaluation informs the development of products and helps with project decisions based on visitor experiences
- Evaluators are embedded in development teams and create instruments for visitor evaluation
- Evaluators produce reports for single products and also evaluate whole toolkits or exhibition prototypes
Visitor Evaluation

How does evaluation help?

Summative evaluation

- Final materials undergo summative evaluation to insure all project deliverables are accessible, engaging, and educationally effective
- For example, a diverse subset of partner museums across the country hosted evaluators for the summative evaluation of the Explore Science: Earth & Space toolkit and the *Sun, Earth, Universe* exhibition
- Summative evaluation allows stakeholders to understand the project’s reach and outcomes—connecting goals to the final set educational materials
Partner Feedback

NISE NETWORK

What do partners say?

- A subset of the hundreds of NISE Network partner museums were included in the peer review for toolkits and *Sun, Earth, Universe*
- Partners provide valuable feedback on their use of current products and suggestions for future resources
- Partner also share great examples of local customization—including stories that are inclusive and relevant to their audiences
Partner Feedback

What do partners say?

*We received incredible feedback from our long-time partners at Port Discovery Children's Museum in Baltimore on Design, Build, Test spacecraft components of the final *Sun, Earth, Universe* prototypes.

*Many partners reported high interest in the tactile books featuring solar eclipse and Mars content and commented they could use more in future toolkits.*