National Aeronautics and Space Administration

SCIENCE ACTIVATION

Development Process for the NISE Network Space and Earth Informal STEM Education (SEISE) project

February 23, 2022

NISE
NATIONAL INFORMAL STEM EDUCATION NETWORK

Space and Earth Informal STEM Education Project

Toolkits

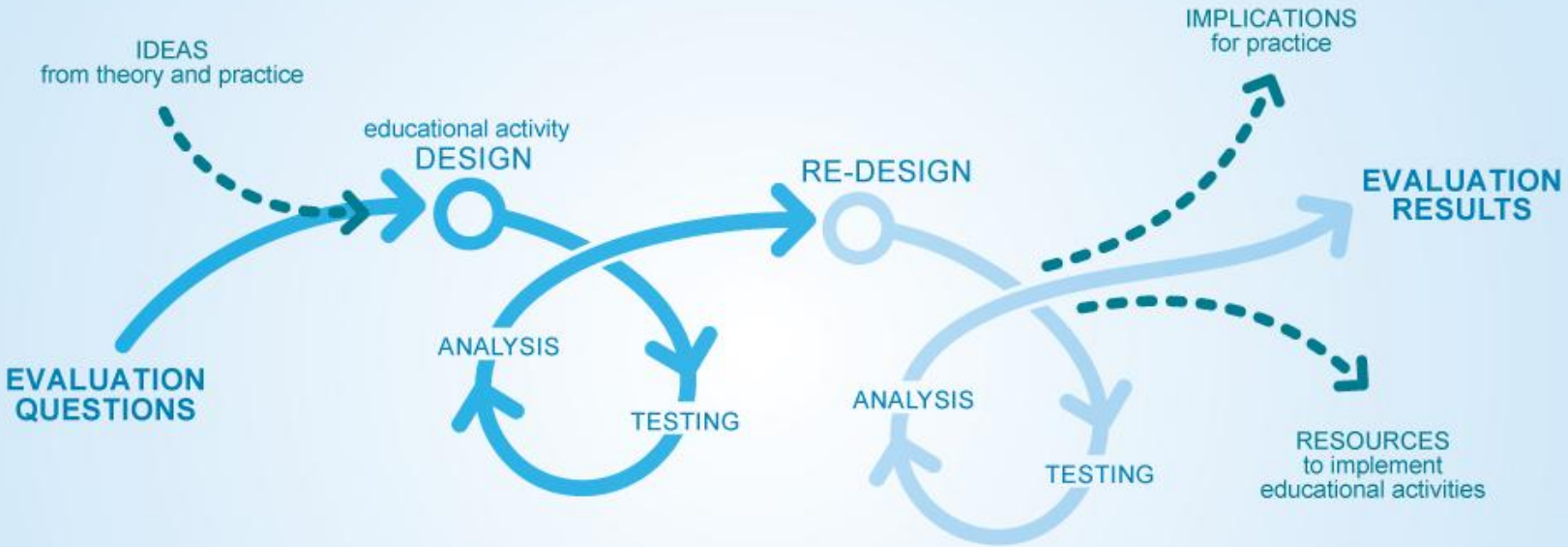
Explore Science: Earth & Space toolkits

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.

nisenet.org/impact/development-process

Scientist Review

Peer Review

Visitor Evaluation

Partner Feedback

Icons from: flaticon.com

Scientist Review

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 others' comments, in person or online, the review process is focused and productive

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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

Scientist Review

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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 Review

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

Peer Review

***Quick tip:** Develop methods to capture peer comments for later reference

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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

Peer Review

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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

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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

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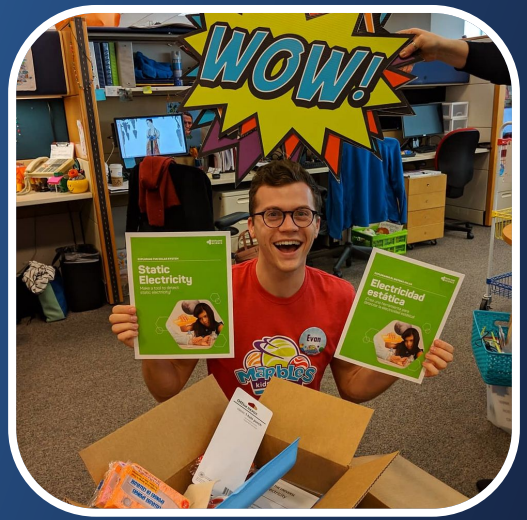
How does evaluation help?

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

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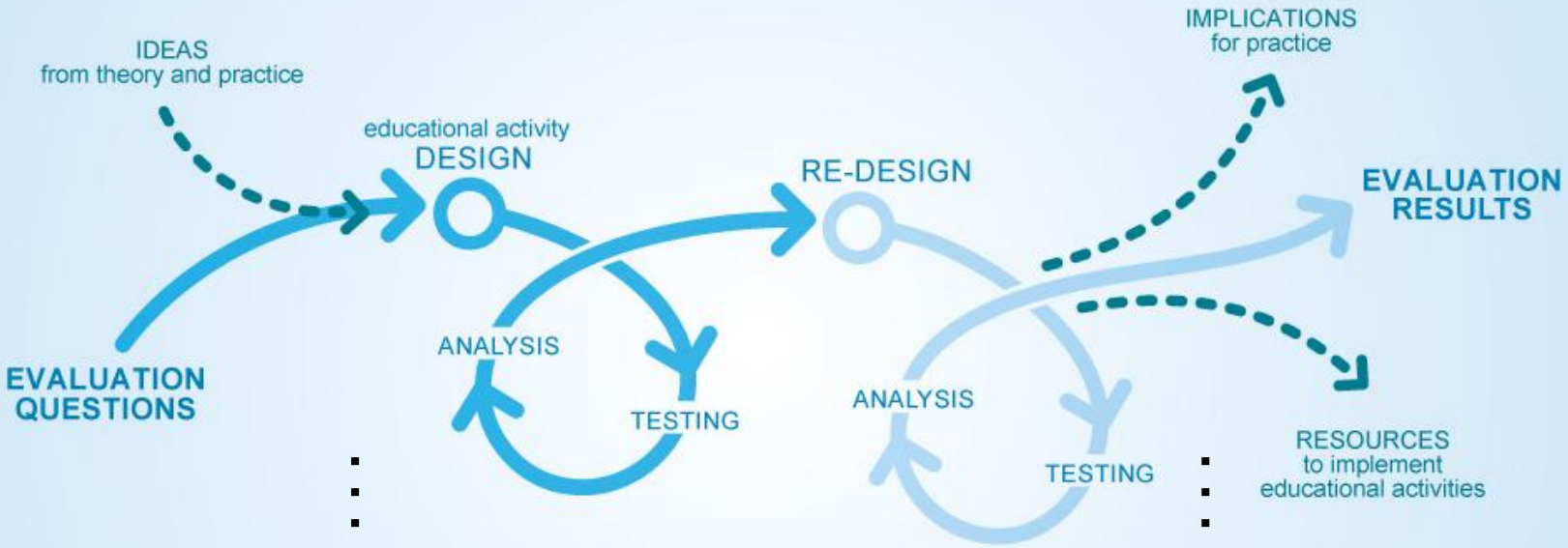
What do partners say?

*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



Input

- Scientist Review
- Peer Review

Interactive Design and Testing

- Peer Review
- Visitor Evaluation
- Scientist Review

Output

- Visitor Evaluation
- Partner Feedback

Thank You









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