

# Introductory Session

## Introducing the REVEAL PD Program

### Introducing the REVEAL PD Program

---



Spend the introductory session (about one hour) discussing the following topics, taking time for thoughts and questions from the group at each section.

#### **Share why you chose this PD program for this group and your expectations for its impact.**

This helps everyone to be on the same page and to work toward a shared outcome. Emphasize that this program was developed through research with front-line museum facilitators and that these partnerships gave shape to the focus of the REVEAL project. Tell participants that they will be getting background information on REVEAL to review before the next session (Handout #1).

#### **If appropriate, discuss aspects of your institution's culture that are relevant to this professional development.**

- Who are the primary audiences for your exhibits? How do you think these visitors view your museum?
- Does your team have a shared understanding of what “good” facilitation looks like? If so, how would they describe it?
- How do facilitators conceptualize the goals of their interactions with visitors?
- How and when do facilitators currently have the opportunity to work together? How do they support each other's work?

#### **Identify the exhibits in your institution that you will practice with during the program.**

Either tell the group which exhibits you have chosen or enlist their aid in coming up with a few that have these characteristics in common with the REVEAL exhibits: open-ended, multiple potential outcomes, opportunities for exploring content at different levels, and accommodating to intergenerational visitor groups. Tell participants they will be reading about the REVEAL exhibits that will be featured in the videos before the next session (Handout #3).

## **Introduce the idea of using videos for professional development.**

It is unlikely that participants in your group have used unscripted videos of visitors and facilitators interacting as part of professional development before. Tell them that such videos are the backbone of this professional development program, and that there are some important techniques for watching the videos, which are outlined in Handout #2.

## **Set group norms for discussions during the modules.**

As with sharing your own goals for the program, establishing group norms helps to create a supportive, welcoming environment, particularly since some of the content and activities in these modules ask participants to share personal stories and views. Some possible group norms might include:

- Be respectful of other perspectives.
- Listen to understand.
- Recognize that everyone has something to learn.
- Acknowledge that everyone has expertise and personal strengths to offer.
- Speak from personal experiences.
- Take risks and ask questions.
- Honor confidentiality.

It is helpful to discuss these norms from the very beginning. Then, as needed during discussions, remind participants about them to maintain a respectful and productive environment.

## **Prepare for the first module.**

Make sure you have a plan for scheduling time for the first discussion module. As participants leave, distribute the four handouts to read before the next session:

- 1) Provoking Reflection: Program Intent and Objectives
- 2) Video Viewing Tips
- 3) REVEAL Exhibit Descriptions
- 4) Introducing Module 1: Understanding the Family Context

Museums, science centers, and other informal education institutions offer powerful engagement and learning experiences for children and adults of all ages. Staff facilitators, such as museum educators or docents, play an important role in these settings and can enhance and deepen visitors' interactions at exhibits and during programs. By effectively balancing the exploration of educational content with sensitivity for the needs and desires of the visitors, facilitators create personalized interactions with the potential to impact visitors long after the experience is over. Despite their important role, however, it's rare for staff to have the opportunity to watch other facilitators in action, learn about and practice new facilitation strategies, or discuss their practice with peers and colleagues. Even rarer are quality, sustained, research-based professional development resources to help these individuals reflect on their work and improve their practice.

Through the program, we hope participants will:

- 1) *Strengthen and deepen their awareness and understanding of the complex dynamics of family learning in museums and how these relate to the role of a museum facilitator;*
- 2) *Increase their skills in reflecting on their practice so as to become more effective facilitators and more insightful museum professionals; and*
- 3) *Expand their repertoire of strategies for facilitating exhibit-based family learning in museums in a way that honors and responds to the needs and goals of families.*

The video-based professional development program presented in this guide is intended to help fill this gap and provide a catalyst for staff facilitators in museums, science centers, and other informal learning environments to discuss, reflect on, and improve their educational practice with their colleagues. The program blossomed from the REVEAL project (see next page), a research study that concentrated on the work of facilitators interacting with families at interactive exhibits in a science center. While other PD projects have focused on more formal programs, such as stage demonstrations or classes for school groups, this professional development resource centers on informal, conversational interactions between staff and visitors—particularly staff facilitation of family learning at interactive exhibits. In addition to being a common way that staff members engage with visitors in these settings, we believe these types of interactions offer unique opportunities for educators to capitalize on the characteristics of informal learning and deepen and enrich visitor experiences while still allowing families to pursue their own goals and interests.

This professional development program builds on findings and lessons learned from REVEAL to help staff facilitators reflect on and improve their work with families. The program is not a how-to guide to family facilitation. Instead, the videos and professional development modules are designed to prompt discussion, reflection, and experimentation around critical facilitation issues that we identified during our research. Using videos of natural, unscripted interactions with REVEAL facilitators and families, participants can first and foremost develop their “noticing” skills—e.g., paying attention to how personal experiences and assumptions shape facilitation, observing families for clues about how to best respond to and support the group, and understanding how particular facilitation strategies work in different situations. Watching and discussing videotaped interactions, participants can then build on these noticing skills to practice and refine their facilitation strategies with families at their own institutions.

---

### The REVEAL Project

In 2013, the Oregon Museum of Science and Industry (OMSI) received funding from the National Science Foundation to support a three-year study, *Researching the Value of Educator Actions for Learning (REVEAL)*. The project was guided by the belief that front-line educators who engage with visitors—particularly families—at interactive exhibits in all types of informal learning institutions are a central and integral part of the visitor experience. The study was designed to contribute much-needed research to investigate the impact of staff facilitation on visitors and to identify effective staff facilitation strategies for supporting family engagement and learning in these settings.

REVEAL built on the *Design Zone* exhibition, which engaged visitors and families in exploring algebraic relationships and functions through hands-on music, engineering, and art exhibits (<http://www.oms.edu/exhibitions/designzone/>). Expanding on this prior work, REVEAL utilized a two-phase research design to study and measure the impact of staff facilitation on family learning at exhibits—specifically, three exhibits from *Design Zone*. The first phase was a qualitative, design-based research (DBR) study with two expert educators to collaboratively develop and refine effective staff facilitation strategies and to identify contextual factors, such as exhibit design or visitor characteristics, that influence the nature and outcomes of these interactions (Pattison et al., 2016).

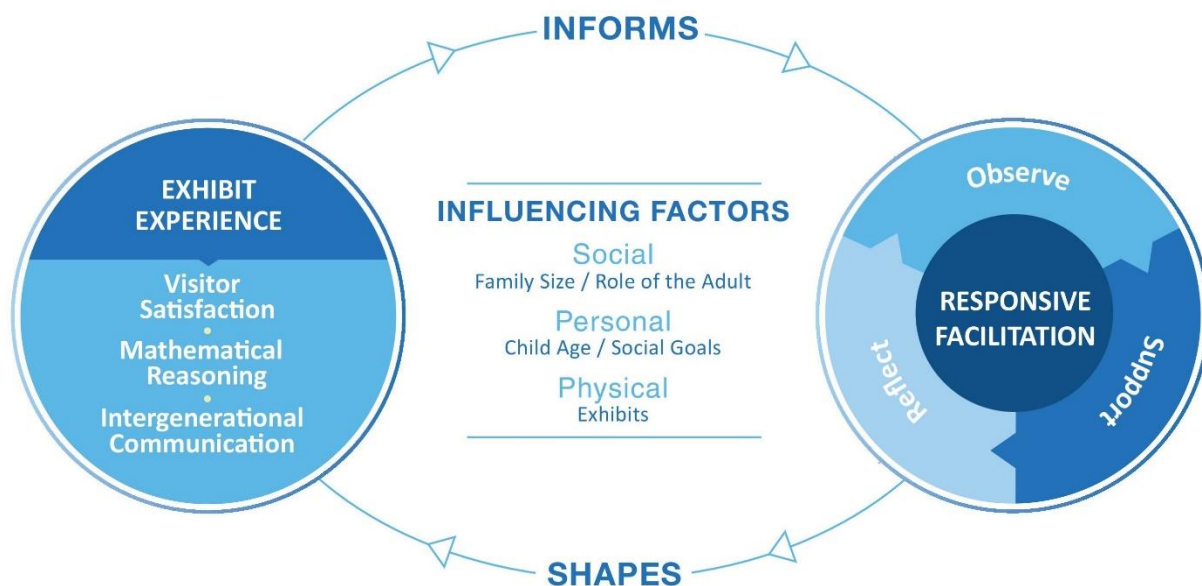
Using the model of facilitation developed through the DBR study, the team then trained four new educators on the REVEAL facilitation approach and conducted a quasi-experimental study with 263 visitor groups to compare the outcomes of family learning experiences at the *Design Zone* exhibits with and without the expert facilitation of the educators (Pattison et al., 2017). Family learning and engagement, including visitor satisfaction, level of intergenerational communication, awareness of the mathematics in the exhibit, and depth of mathematical reasoning, were measured through both video analysis and post-interaction visitor surveys. The results of these studies provided some of the first robust, empirical evidence that educators do indeed play an important role in supporting family learning at exhibits and served as the foundation for the ideas and strategies presented through this program.

To learn more about REVEAL and explore more project resources, visit the project website: <http://REVEAL.terc.edu>.

This program was particularly designed for staff facilitators at museums, science centers, and other informal learning institutions who engage with families and visitor groups through informal, conversational interactions. Throughout this guide, we use the term “facilitator” to refer to staff (paid and unpaid) who interact regularly with visitors in these settings. Although these staff go by many titles (e.g., educator, docent, explainer, instructor, volunteer, teacher, expert), they all share the common goal of facilitating learning for visitors and providing social, personalized experiences that go beyond what can be offered through a stand-alone exhibit or display. Although the REVEAL project focused on math-based exhibits and visitors in family groups, this professional development program emphasizes reflective practices and facilitation strategies that we believe apply to a wide range of content areas, visitor groups, and informal learning environments.

### The REVEAL Facilitation Approach

Throughout REVEAL, experienced museum educators were key members of the project team. Working together with researchers, they provided insight into the facilitation process and helped to shape data collection, analysis, and interpretation. From that collaboration, the team developed the REVEAL facilitation model, outlined in the diagram below.



The REVEAL facilitation model reflects the ways that we observed expert educators noticing aspects of a family’s interactions, responding to the unique needs and interests of each group, and supporting family engagement and learning. As shown in the diagram, the model identifies the team’s three interrelated visitor experience goals (visitor satisfaction, mathematical reasoning, intergenerational communication), outlines the cycle of responsive facilitation (observe, support, reflect) that educators used to support these goals, and highlights the physical, personal, and social factors that influenced the nature and outcomes of the interactions.

Educators used a variety of support strategies as part of the responsive facilitation cycle, including orienting visitors, providing challenges to guide and extend engagement, explaining key aspects of the mathematics, and showing appreciation for visitors' efforts and actions. More importantly, educators continuously worked to find a match between their educational goals and the needs and interests of families. For example, educators modified their facilitation strategies based on the extent to which each family oriented to the basic function and goals of the exhibit, found ways to deepen their own engagement, and discussed the mathematical relationships embedded in the activity. The educators also shifted their role and approach depending on the extent to which family members were already facilitating learning within the group and the degree to which both adults and children seemed comfortable exploring the exhibits together.

This research-based facilitation model, and the key issues that emerged during its development, shaped the focus of the four main modules in this program:

- 1) **Understanding the Family Context:** How to notice clues about a family's social and educational goals, the roles individuals take on during the interaction, and the match (or mismatch) between educator goals and family interests
- 2) **Supporting Intergenerational Communication:** How to encourage visitors of different ages to work together during an interaction and how this can lead to richer family learning experiences at exhibits
- 3) **Encouraging Exploration and Inquiry:** How to support visitor-led exploration of exhibits that emphasizes inquiry and discovery rather than facts or right answers
- 4) **Negotiating Family and Facilitator Goals:** How to balance the educational goals of the facilitator with the needs and interests of the family in order to support a strong facilitator-family match

## Culturally responsive education

During our investigations of staff facilitation, we recognized that studying and supporting how people learn is not free of the influences of our personal identities and cultures as educators and researchers. Thus, the REVEAL study and the facilitation model described above were founded in culturally responsive and asset-based approaches to research and education (e.g., Allen et al., 2007; Brown & Crippen, 2017; Gutierrez & Rogoff, 2003; NRC, 2009a). Paying close attention to how facilitator expectations and assumptions about family learning in museums are shaped by individual cultural backgrounds and prior experiences is essential, we believe, to creating positive experiences for visitors. The better that we can respect and value differences in identity and culture, the better we can work across these differences, serve visitors, and ultimately become more culturally responsive facilitators.

Rather than dedicating a separate module to culturally responsive and respectful facilitation practices, these ideas and practices have been woven throughout the four modules. As you will see, the background readings, reflective questions, video examples, and suggested facilitation strategies presented through the guide continuously reinforce four major threads that were fundamental to the REVEAL facilitation approach:

- **Understanding and *empathizing with our visitors*** and working to appreciate their perspectives;
- **Treating others *as they want to be treated***, not just how we would want to be treated ourselves;
- ***Balancing the educational goals of facilitators with the needs and interests of visitors***; and
- **Engaging in ongoing *self-reflection* and learning.**

The facilitators who are featured in the videos for this professional development program participated in REVEAL training specifically designed to encourage culturally responsive facilitation and promote overall enjoyment and satisfaction for visitor groups. As you will see, the facilitated interactions are not always successful, either from the perspective of the educator or the visitors, and the facilitators never completely embody the four tenets described above. The process of becoming a more reflective facilitator doesn't guarantee perfection, but it is a journey that can lead to rich professional growth for staff and, ultimately, deep and satisfying visitor learning experiences.





Watching and discussing video of education and learning in action is challenging, even for those who have been doing it for years. Video offers a hyper-detailed record of behavior, talk, intonation, context, background, and more, and it can quickly become overwhelming to try to determine where to focus, which aspects are important, and what details might be relevant for discussions of education in museums. This is particularly true in the context of the REVEAL project, which focused on spontaneous, unstructured interactions between staff members and families at interactive exhibits, situated within the noisy, chaotic environment of the museum. Multiple visitor groups with many family members move in and out of the frame, talk over one another, and compete with the general hustle and bustle around them, while the facilitator does his or her best to navigate the space and support family learning. Sometimes the audio is clear, while at other times it's almost impossible to understand or distinguish what a visitor or facilitator is saying.

Watching and talking about videos of museum facilitators with colleagues adds an additional set of challenges. For many of us in museums, it can be difficult to talk about our job and discuss strategies for improvement. Like many classroom teachers, museum facilitators often work in isolation, with little opportunity to share ideas and strategies with their peers. Because of this, we often lack a common vocabulary for discussing our work, which makes it even more difficult to describe what we are seeing in the videos, connect it with our own practice, and explore ideas for new strategies and approaches.

Despite all of these challenges, we've seen time and time again that video of facilitator-visitor interactions is a powerful and exciting learning resource for museum educators. It takes practice and time, however, to become comfortable with watching video and reflecting on our own practice. With this in mind, we offer the following tips for using video as a professional learning resource, adapted with permission from the work of Susan Jo Russell and colleagues at TERC (Russell et al., 1999):

- 1) Use the optional warm-up activities highlighted in each module as a way to establish trust within your group** and set a positive and productive tone for video discussions. This can be critically important when a group of facilitators is just starting to work together in the context of professional learning and reflection.
- 2) Use the suggested discussion questions outlined in each module to help focus the video viewing** and clarify why you're watching the video clips. Otherwise, discussions can quickly go off track or become lost in the complexities of the interactions.

- 3) **As you watch, try to put yourself in the place of the facilitators and empathize with their challenges.** Remember that these videos captured *actual* facilitators at OMSI engaging in unscripted conversations with *actual* families who were not recruited prior to the videotaping. Each clip offers examples of facilitation strategies that might be worth emulating, and others that could be improved.
- 4) **When discussing the video, use specific examples from the interactions between the staff members and families.** Refer to particular actions or conversations whenever possible. This will keep the conversation firmly rooted in the video and help you and others avoid falling back on prior perceptions or assumptions about families and educators.
- 5) **Watching a video multiple times before and during the discussion** can be very helpful for understanding all the nuances and complexities of the interactions between staff and families. Even a short video includes a huge amount of information. Similarly, it's important to discuss videos immediately after watching them, rather than watching and then scheduling a separate meeting for reflections and discussions.
- 6) **Explore different strategies for ensuring that all group members have time to talk and share their thoughts during the discussions.** This is especially important when team members have different levels of comfort and experience with viewing video or reflecting on their practice. If needed to engage everyone, try sharing in pairs before beginning a full-group discussion.

The exhibits used in the videos for this program are from a touring exhibition called *Design Zone*, created by the Oregon Museum of Science and Industry. All of the activities in the exhibition explore algebraic relationships through creative design challenges related to art, music, and engineering. Unlike the algebra many of us learned in school, the mathematical content in these activities focuses on functional relationships among quantities—in other words, quantities that are linked so that a change in one produces a predictable change in the other. Each exhibit in *Design Zone* embodies one or more of these relationships, which visitors must discover, investigate, and use in order to complete the design challenges. Museum educators have an important role in *Design Zone*, and many of the exhibit activities include additional challenges or materials that educators can make accessible to extend and deepen visitor engagement.

For the REVEAL research project, three exhibits (Drawing in Motion, Balancing Art, and Designing for Speed) were used to collect data about interactions between facilitators and families. This professional development program includes videos filmed at two of the three: Balancing Art and Drawing in Motion. Below are descriptions of these two exhibits, as they appeared in the final touring exhibition. Because REVEAL used prototype versions of the activities, you may notice some differences between the exhibits as described below and as they appear on the videos.

For more information about *Design Zone*, visit the exhibition website:  
<http://www.oms.edu/exhibitions/designzone/>.

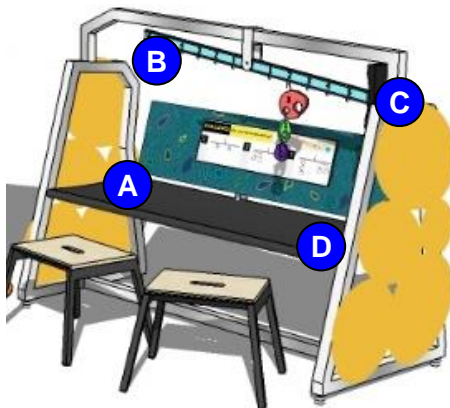
## Balancing Art

---

Visitors explore equality and the relationship between weight and distance from the balance point in a mobile.

### Description

Visitors construct a large mobile using whimsical colored shapes of different weights hung from different positions along a balance bar. To do this, visitors choose weighted pieces, labeled numerically according to their relative weight, from a bin and suspend them from numbered positions along a hanging rod. Positions on the rod are labeled according to their distance from the central point from which the rod is hung. Balance is indicated by the position of the tip of the rod along a scale; a central colored region indicates that the mobile is balanced. Pieces are weighted in relative units of 1, 2, 3, and 4 (i.e., 2 is twice as heavy as 1). Pieces of the same weight are all one color, but are several different shapes. Pieces can be suspended from other pieces, creating more complex mobiles. Visitors can build freely or work on posted challenges.



- A. Weight bin
- B. Balance bar
- C. Balance scale
- D. Facilitator prop storage

Additional facilitator props:

- Mystery weights (These are shaped like question marks and do not have their weight value labeled. The ordinary thickness piece is a 3, the “Swiss cheese” piece is a 2, and the hollow double thickness piece is a 3.)
- Dry erase board, markers, and eraser

### Mathematical Relationships:

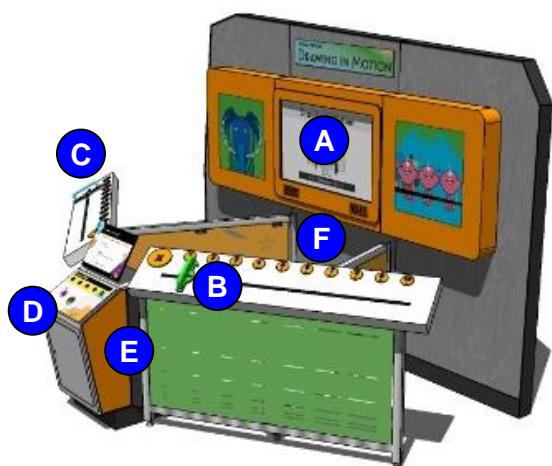
To balance, both sides of the bar have to have equal force on them. The force on each side depends on both how heavy the weights are and where they are hung: both weight and position matter. The overall force on each side is the sum of each weight multiplied by its distance from the central point from which the bar is hung (also called the fulcrum.)

## Drawing in Motion

Visitors use their own movement to explore the coordinate grid and how their combined motion can lead to lines with different shapes and slopes.

### Description

Two visitors work together to draw a picture on a gridded screen. One person moves a slider on a number line that represents the horizontal (X)-axis while another moves a slider on a number line representing the vertical (Y)-axis. The combined movements are translated into a real-time drawing on the coordinate grid, similar to an Etch a Sketch. Visitors use buttons to select from four programmed challenges in which they follow on-screen paths to connect a series of dots and create an image that then turns into a colorful animation. They can also create their own shapes in free-draw mode.



- A. Screen
- B. X-axis slider
- C. Y-axis slider
- D. Challenge buttons
- E. Facilitator controls
- F. Prop storage

Additional facilitator props:

- Laminated challenge cards, dry erase board, markers and eraser
- Facilitator controls (turn off screen timeout, deactivate challenge buttons)

### Mathematical Relationships

The position of the “pen” on the screen is a function of the position of both sliders. The X-axis slider determines the horizontal (left and right) position of the pen and the Y-axis slider determines the vertical (up and down) position of the pen. To draw a horizontal line, only the X-axis person has to move. To draw a vertical line, only the Y-axis person has to move.

To draw a diagonal line, both people have to move at the same time. The slope, or steepness, of a line is a function of the relationship between the speed of the X person and the speed of the Y person. If both move at the same speed, the line will have a slope of 1 or -1. If the Y person moves faster than the X person, the line will be steeper. If the X person moves faster, the line will be less steep. Creating a curved line, like a circle, is more complicated, as the relationship between the speed of the X person and the speed of the Y person has to change over time.



Supporting family learning in museums begins by understanding the family context. Although facilitators may spend much of their time with school groups, families continue to be a central audience for informal learning institutions (Ellenbogen et al., 2007; Falk & Dierking, 2013; NRC, 2009b). Because this is such an important and unique group of visitors, the REVEAL project focused specifically on understanding how facilitators can support family learning at interactive exhibits. For this project, we adopted a broad definition of families, including any group of visitors that comes to the museum together and includes at least one adult 18 years of age or older and one child under the age of 18. This might include two biological parents and their son and daughter, a grandfather and grandmother with their grandchildren, a young adult with their younger siblings, a group of adult and child friends, or any number of other configurations. Most importantly, these groups have a shared history together and a learning dynamic that likely involves both children and adults.

Families are not only a large audience for museums, but they are also unique. And it is this uniqueness that creates special opportunities and challenges for facilitators supporting family learning. First and foremost, families almost always have a long history of learning together. Decades of research studies have documented the ways families learn and explore the world at home, at museums, during dinner conversations, outdoors, and across their lives (e.g., Callanan et al., 2012; Ellenbogen et al., 2007; NASEM, 2016). These studies have shown that families are highly effective at learning together and making meaning around different situations and topics, with adult family members often playing important roles in scaffolding and supporting learning (Fender & Crowley, 2007; Pattison & Dierking, 2013). In other words, in the context of family learning, both adults and children are already playing important facilitation roles, even without the presence of a professional educator. Learning is often an important goal of family experiences, but this goal is usually only one of many, including ensuring safety, supporting moral and cultural development, fostering enjoyment, and reinforcing family bonds (Falk, 2009; Falk & Dierking, 2013).

An important reminder when thinking about this audience is that the structure of families and expectations about how families behave and interact can vary greatly across cultures (NASEM, 2016; NRC, 2000; Pattison, 2014). All of us have had families in one way or another, and we often have strong expectations and implicit assumptions about how families should look and behave, especially in regards to adult family members and parenting. It's important to remember that there are many ways a family can learn together and many factors that can influence how a family behaves in a particular situation. Are the adults tired or distracted because of a family emergency? Has a family

spent three hours in the museum, with the children and adults running out of energy and patience? Does an adult see a particular exhibit as an opportunity to help their child with some aspect of development completely separate from the intended goals of the activity? In the REVEAL project, we tried to be sensitive to the unique needs and goals of families, honor the learning and facilitation that naturally occurs within these groups without the support of a trained educator, and remain aware of our own assumptions about family learning and how they might or might not match those of our visitors.

As facilitators, we can occasionally fall into the trap of looking for things that families are doing wrong or criticizing how family members are engaging in their groups. For example, you may have overheard a conversation among museum educators complaining about how parents are “always” on their cell phones. As noted above, however, research from many fields continues to show that families learn very effectively together and that adult family members often play important and successful roles as learning facilitators. In fact, because of the long history families have learning together, they almost always know more about each other than a facilitator does and can be better equipped to tailor museum experiences to individual interests and connect the experiences to prior knowledge or future learning opportunities (e.g., Pattison & Dierking, 2013). In the REVEAL project, we adopted an asset-based perspective on family learning (e.g., Garibay et al., 2015; Gutiérrez & Calabrese Barton, 2015; Gutierrez & Rogoff, 2003), focusing not on what we thought families were doing “wrong” at exhibits but instead identifying the strengths of family learning and finding strategies that facilitators could use to support and deepen the learning that was already happening. In some cases, this required a recognition that families were fine on their own, or that the best role for the educator was to step back and provide occasional hints or additional challenges as needed.

Think about these questions in preparation for discussing them in small groups when you meet to participate in Module 1.

- 1) What expectations do you have about the ways families should interact with exhibits at your institution? How do you respond when they don't quite meet these expectations?
- 2) Do you find your expectations about a family can fluctuate based on certain characteristics (gender, race, age, group composition, language use)? In what ways?
- 3) How do you think your assumptions or expectations about a family might affect your interactions with them?
- 4) In what ways do you gather information about what a family needs or wants out of a particular interaction? What clues do you look for to gauge family mood, goals for the visit, or relationships among individuals?